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CONTENTS.

PAGE
Editorial Comment:
A Warning to Pilots ... 1
Smuggling by Aeroplane ... 2
The Hendon Aerodrome and its Work ... 2
Men of Moment in the World of Flight: Pierre Chanteloup ... 3
A Warning to Pilots. By Harris Booth ... 4
Paris Aero Salon ... 6
Royal Aero Club. Official Notices ... 10
Eddies. By "Will o' the Wisp" ... 11
From the British Flying Grounds ... 13
Christmas Flying at Hendon ... 15
Armchair Reflections. By The Dreamer ... 17
Aeroplane Types. Wright Model E ... 18
Aero Engines. By Granville E. Bradshaw ... 19
British Notes of the Week ... 21
Foreign Aviation News ... 22
Models. Edited by V. E. Johnson, M.A. ... 23
Model Club Diary and Reports ... 25

EDITORIAL COMMENT.

"A Warning to Pilots." Elsewhere in this issue, Mr. Harris Booth calls attention to what is apparently a defect in the pitot tube type of air speed indicator which is used on aircraft to determine the speed of the machine relative to the air through which it is moving, and he attributes the difference of opinion that exists at the present time as to the utility of an air speed indicator, as a safeguard against such accidents as may ultimately be caused through a pilot stalling his machine, to the incorrect reading given by the instrument.

For the benefit of our readers who may not be conversant with the construction of the pitot tube type of indicator, it may be observed that it consists of a U tube partly filled with a suitable liquid, one limb of which is in communication with a small orifice facing the air stream, and the other limb with an orifice at right-angles to the direction of the flow of air. In still air, the level of liquid is the same in both limbs, since the atmospheric pressure acts upon each column; but in moving air, while the latter is unaffected by the velocity of the air passing by the orifice, the former is subjected to the pressure caused by the air impinging upon the mouth of the orifice. Thus, the difference in the level of liquid in the two limbs of the U tube is due to the forward velocity of the machine relative to the air; and from the fundamental formula for the flow of air, the head of liquid is proportional to the square of the velocity.

There cannot be the slightest doubt concerning the accuracy of the instrument for measuring the speed of the air or of other fluids moving with uniform velocity, and it has been employed for this purpose in experimental and practical work all over the world; and provided that the plane containing the U tube is set at right-angles to the direction of motion and the apparatus is not subjected to a vertical acceleration—either positive or negative—it may be relied upon to give correct readings, even in gusty winds. But, if the forward velocity is accelerated or retarded from any cause, and the plane containing the U tube is in the direction of motion, the small quantity of liquid in the horizontal portion of the U tube will tend to lag behind, or be urged forward, by the accelerating force, thus destroying the accuracy of the instrument. Similar remarks apply should the indicator receive a vertical acceleration, but as Mr. Booth discusses this in his article, it is unnecessary to enter upon the matter in this column.

It may be pointed out that the question of lag, due to the viscosity of the liquid employed in the instrument or to other causes, cannot enter into the matter; as apart from the fact that the vibration to which it is subject would overcome any such tendency, the magnitude of the alteration in the height of the column of liquid accompanying changes in velocity at ordinary flying speeds, is altogether too great compared with any lag that there may be. Thus, if the instrument is so graduated that a column of 8 inches represents a speed of 100 miles per hour, at 50 miles per hour the difference in the height of liquid in the two limbs would be 2 inches and at 60 miles per hour it would be 2·88 inches.

The arguments adduced by Mr. Booth in support of his contentions appear to leave little room for doubt as to the accuracy of his conclusions, which may be equally well applied to any form of indicator that is gravity controlled. In view, therefore, of the supreme importance of knowing the actual speed of the machine relative to the air, under many flying conditions, owing to the fatal consequences that may ensue should reliance be placed upon an

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instrument that is defective in this respect, we shall be glad to receive the opinions or the experiences of aviators and others on this matter.

◆ ◆ ◆

Smuggling by Aeroplane. According to the *Evening Standard*, a Bill is to be introduced into Parliament during the coming session to deal comprehensively with the questions of smuggling by aeroplane, and of free aerial navigation in these islands.

There are many reflections that may be inspired by this announcement, assuming it to have a solid basis of fact for its foundation. First and foremost, it brings home very forcibly to the mind the enormous progress in flight that is implied by such action by a responsible government. When we remember that it is only about five years ago since the first flights were made by man, and that now the science has made such strides as to have made the Governments of the world anxious about their customs frontiers, it seems almost too much to be believed by men in their sober senses. And yet the evidences are all there in the shape of cross-country flights of many hundreds of miles, flights that have brought home to every intelligent observer the conviction that frontiers have ceased to exist, except as merely geographical expressions.

Next there comes the impression that, as we have so often observed in these columns, flight has become so absolutely a commonplace that no one dreams of even attempting to controvert any proposition, however wild it might have appeared a year or two ago. It is simply accepted just as the record of a train journey would be. Let us quote from the *Evening Standard's* article. It says :

> "It is no secret that the Excise authorities have been perturbed for months past over the impossibility under existing conditions of framing any Customs regulations which would effectually control the movements of aircraft. Officially Great Britain is surrounded with a non-existent fence open to aircraft through certain small and equally non-existent gates on difficult portions of the coast. Practically there is nothing whatever to prevent any aviator from crossing the Channel and bringing back a quantity of dutiable material, which he could drop, if necessary, by means of a parachute or without it, in some prearranged spot."

There is a simple statement of the facts, without any argument for or against the proposition that it is possible to conduct a smuggling service by way of the air—simply an acceptance of the fact and nothing more. To us it seems all very wonderful and very eloquent of the progress that has been made in the past four years. If the suggestion goes any further, we may express the hope that any legislative action that may be taken will stop short of anything that may be calculated to retard the proper development of the movement. It is absolutely essential that development should be as free as possible, and that it should not be hampered by unduly repressive legislation, although it is quite conceivable that it may be deemed necessary presently for something of the sort to limit the enterprise of those who may be tempted to enter upon illegal enterprises. As to how this is to be done is another matter. The *Evening Standard* suggests that it may be possible to establish a service of aerial police. That, we think, is going rather beyond the possibilities of the present, whatever may be the case in the future. In this connection we are content to leave things to the authorities themselves, always with the proviso that nothing be done to hamper the proper development of flight as a science.

◆ ◆ ◆

The Hendon Aerodrome and its Work. At the beginning of another year we feel we should be doing something rather less than justice to the Hendon Aerodrome did we not make some reference to the work it has done in the cause of advancement during 1913. Its meetings have become one of the most popular spectacles in London, and therein it has been enabled to accomplish much good work for the movement at large. As we have so often pointed out in these columns, it depends altogether on the man in the street whether or not the authorities rise to the needs of the situation in so far as concerns our position in matters affecting aerial defence. Without some such institution as the Hendon Aerodrome, it would be impossible to bring home to that individual exactly what the potentialities of flight are and are likely to be. Through its medium many hundreds of thousands of the populace have been given, during the year, an excellent opportunity of seeing at first hand to what perfection the science of dynamic flight has attained, and, collaterally, what a tremendous bearing it must have on the defence problems of the future. Its educative value, therefore, has been enormous—so great, in fact, that we may justifiably apply the term of a truly national institution to it. To our way of thinking, it is only a pity that there are not many more such enterprises in full work in other parts of the country. If there were, we feel assured that we should not have to regard the future with the misgiving which all thoughtful people must feel when they contrast our own present position in the air with that of our possible rivals. In saying this we do not wish for a moment to belittle the splendid work that has been done by both Services. But much as they have accomplished during the year, there still remains much to be done, in which institutions like Hendon can bear a great part. It is only to be hoped that the Government will properly back up the efforts which are being put forward by those who have taken up the great cause of aviation.

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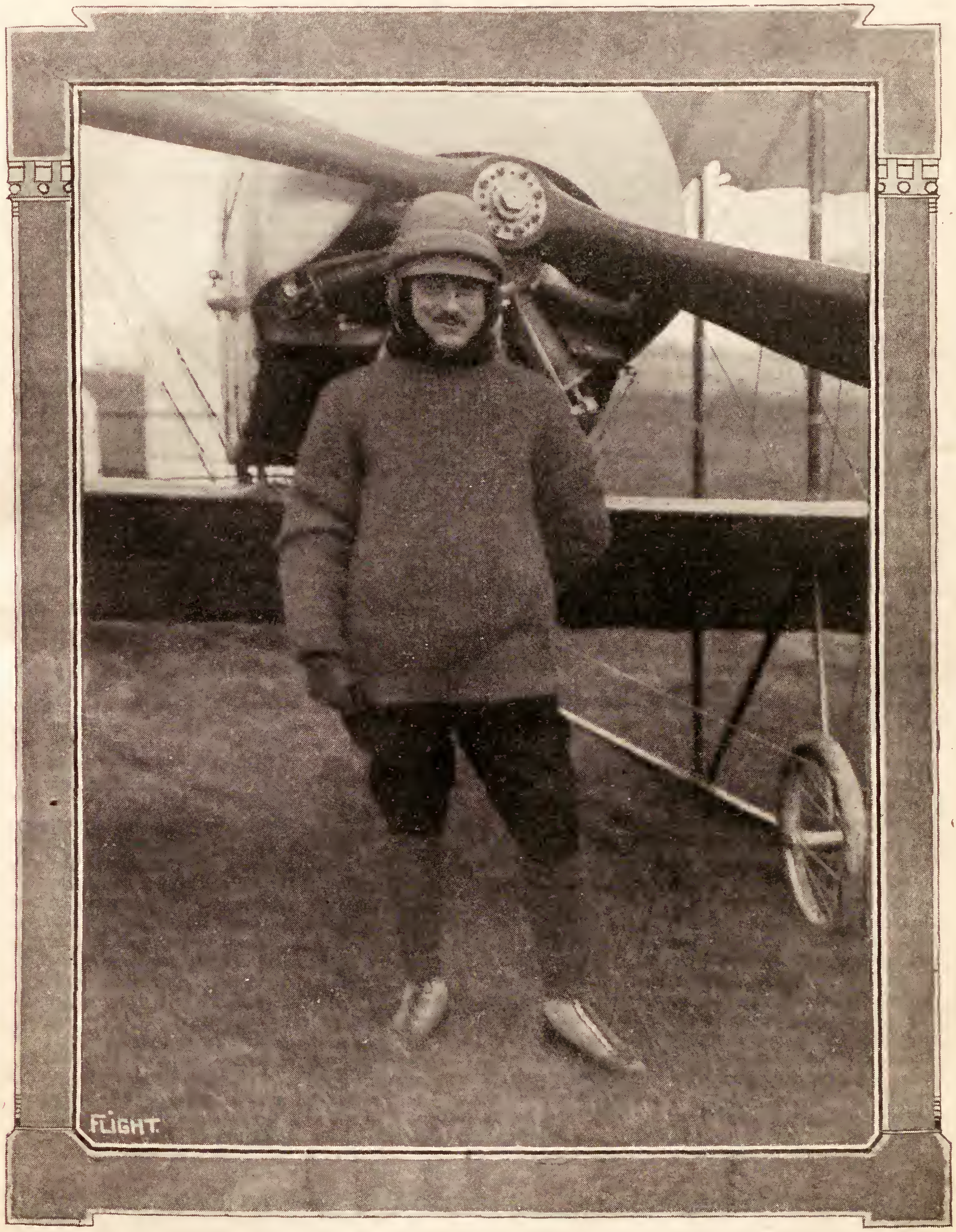
PIERRE CHANTELOUP.

There is no lack of romance connected with the career of Chanteloup, the young French pilot, who has become famous on account of his marvellous exploits on the Caudron biplane—looping the loop, tail diving, &c. He was born at Beaune twenty-four years ago, and his first occupation was that of farm labourer, but his bent was towards mechanics, and in 1909 he passed his tests for driving a taxicab, at which occupation he remained for two years at Nantes. He then, having saved up the necessary tuition fees, underwent a course at the Caudron School, at Crotoy, and obtained his ticket in July, 1911. Later in the same year he commenced his military service as sapper-aviator. On September 6th last he purposely looped the loop, or flew upside-down on a Caudron biplane, and for his pains received 15 days' imprisonment, by order of the military authorities, for dangerous flying. As soon as his period of military service had expired, he returned to the Caudron firm, and since then he has been giving his daring demonstrations under their auspices in various countries. Personally, he is the most unassuming and genial pilot one could wish to meet. He enters his machine smiling, he is smiling when he leaves it, and I firmly believe he is still smiling when he is flying upside-down. The Hawk.

MEN OF MOMENT IN THE WORLD OF FLIGHT.



M. CHANTELOUP.

A WARNING TO PILOTS.

By HARRIS BOOTH, A.M.Inst.C.E. A.F.Ae.S.

Though it is now pretty generally admitted that the use of a speed indicator is a good safeguard—almost an absolute safeguard—against accidents due to stalling a machine, it is curiously noticeable that those pilots whose experience has been limited to the pitot tube type are of the reverse opinion.

Until quite recently I, rather foolishly, supposed that this was mainly due to prejudice on the part of pilots trained in the old school to rely on the feel of the machine, though I thought it might be partly due to the fact that this type usually depends on a liquid gauge, which is obviously rather liable to get out of order.

The other day, however, I discovered the true reason for the discredit from which this type suffers: it is that the liquid gauge part of the apparatus is *gravity controlled;* that is to say, the liquid column is urged up by the pitot pressure and held back by its weight, so that it moves just so much as to keep the balance between these two opposing forces. This arrangement seems, at first sight, to be so simple that it cannot very well go wrong, but, as a matter of fact, it can and does go wrong, and that just when it is most needed.

As I have said, in this kind of instrument everything depends on two things, namely, the action of the pitot tube and the weight of the liquid. Now, as a matter of fact, the pitot tube is infallible: it sends a pressure down the pipe which is proportional to the square of the relative speed under all possible conditions in actual flying practice, but the *weight* of the liquid in the gauge-glass actually *varies* whenever the machine meets with any conditions that cause it to rise or fall.

The reason for this is that if, for instance, the machine meets a head gust, the relative velocity of the air being temporarily increased, the machine has too much lift on it, and therefore rises with a slight acceleration. The effect of this on the pilot is well known; it forces him harder into his seat, *i.e.*, his weight is, practically speaking, increased for the time being. What applies to the pilot, applies equally to the liquid in the gauge; its weight is increased, and it is thus prevented from moving to the position which properly corresponds to the higher velocity, and, indeed, the liquid actually stays still in the glass, as will be evident from a numerical case.

First of all, suppose as an extreme case (though one not likely to occur in practice) that the machine meets a head gust of its own velocity; this doubles the relative wind speed, so that the lift is four times the normal. This, of course, causes the machine to move upwards with an acceleration equal to three times the acceleration of gravity, all bodies in the machine consequently appearing to be four times as heavy as usual (as we learn from elementary dynamics), so that the liquid in the gauge-glass, in particular, has its weight[*] temporarily increased to four times the normal. Turning now to the pitot tube, as the relative wind speed is doubled, the pitot pressure is multiplied by four. Thus both the forces on the liquid are multiplied by four; the liquid is, therefore, still in balance and does not have to move in the glass to get a new position of equilibrium.

That is to say, a head gust of velocity equal to the machine's normal flying speed has *no effect* on an instrument of this type.

We will take one more case, and this time one which commonly occurs in flying. Suppose that the machine is struck by a following gust of 10 per cent. of the normal flying speed. The relative speed is reduced by 10 per cent., the lift is reduced by 20 per cent., the weight of the liquid is reduced by 20 per cent., and the pressure in the pitot tube is likewise reduced by 20 per cent. Result, again *no movement* of the gauge at all.

Other cases can be easily worked out in a similar way, and it will always be found that although the instrument gives the real speed when flying steadily, *as soon as anything happens*, the instrument gives *quite the wrong reading*.

The above does not pretend to be a full scientific exposition of the cause of failure of these instruments, and indeed the full proof is rather cumbersome, and would probably only carry conviction to the minority. I, therefore, give a couple of easy (and safe) practical tests by which any pilot who has the gravity type of instrument on his machine can satisfy himself of its uselessness, and I strongly recommend all pilots who have these speed-indicators to make these trials, since an ounce of test is worth a pound of theoretical argument.

First Test.—Take the machine up on a fairly calm day, and then move the elevator control backwards and forwards (say, once in a second or two). You will then notice that the speed-indicator moves considerably when this is done. But if you have a speed-indicator worked by springs or their equivalent, you will see that it does not budge for such rapid control movements.

Now ask yourself whether your machine really changed its velocity on the instant with the movement of the control (as the gravity instrument asks you to believe), or whether it had not time to get going at a new speed before the reversal of the control checked it again (as the spring instrument says).

Second Test.—Take the machine out in as gusty a wind as you care to fly in, and take notice of the readings of the gravity indicator at rest, while running on the ground, and when aloft. You will see that the gusts are registered all right while the machine is resting on the ground or running supported by the ground, but once it is air-borne, the gust readings cease and, in fact, the gauge remains at rest excepting when it is disturbed by your elevator movements. Now, if you have a spring-controlled type of instrument, you will see that it gives you the gusts in the air just as much as on the ground.

These tests should convince you that there is something wrong with the gravity-controlled type, and that you ought not to rely on this kind of instrument.

In conclusion, I have only to express my willingness to explain as far as I am able any doubtful points which may crop up on this subject.

---

[*] Its *mass*, however, is, of course, still the same.

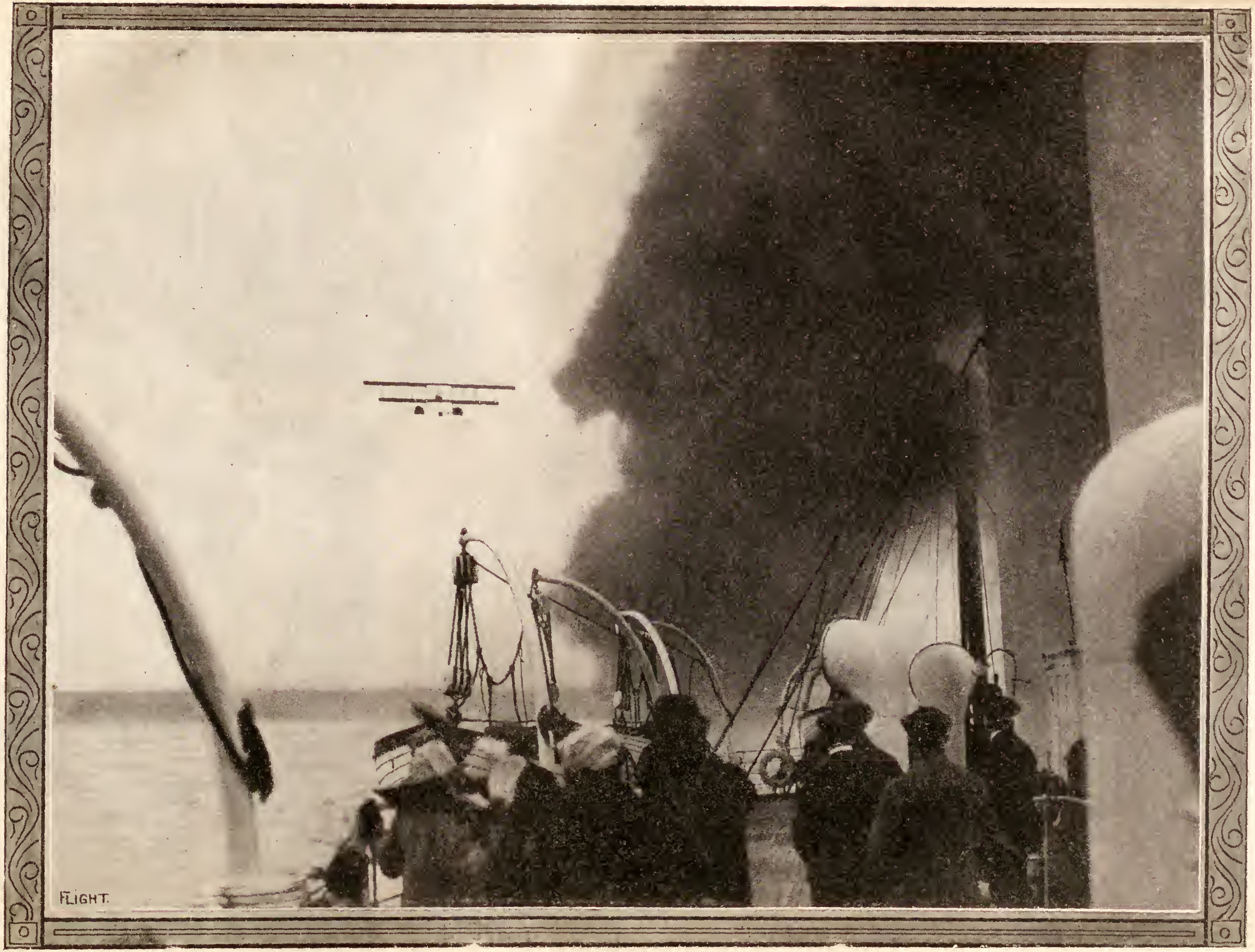
* * *

Lord Kitchener Tries an Aeroplane.

On the 29th ult., Lord Kitchener enjoyed a flight with Olivier on an 80 h.p. Farman biplane, and on his return to *terra firma* said he thought it was "a splendid game." During a 15-minute trip, starting from the Heliopolis flying ground, the machine was piloted over the outskirts of Cairo.

Olivier Flies Round the Pyramids.

Some time ago the Boghos Nubar prize of £400 was offered for the first aviator who should fly from Heliopolis round the Ghizeh and Zakkareh Pyramids and back to Heliopolis. This flight was carried out by Olivier on his Farman biplane the other day, and it is announced that he has been awarded the prize.



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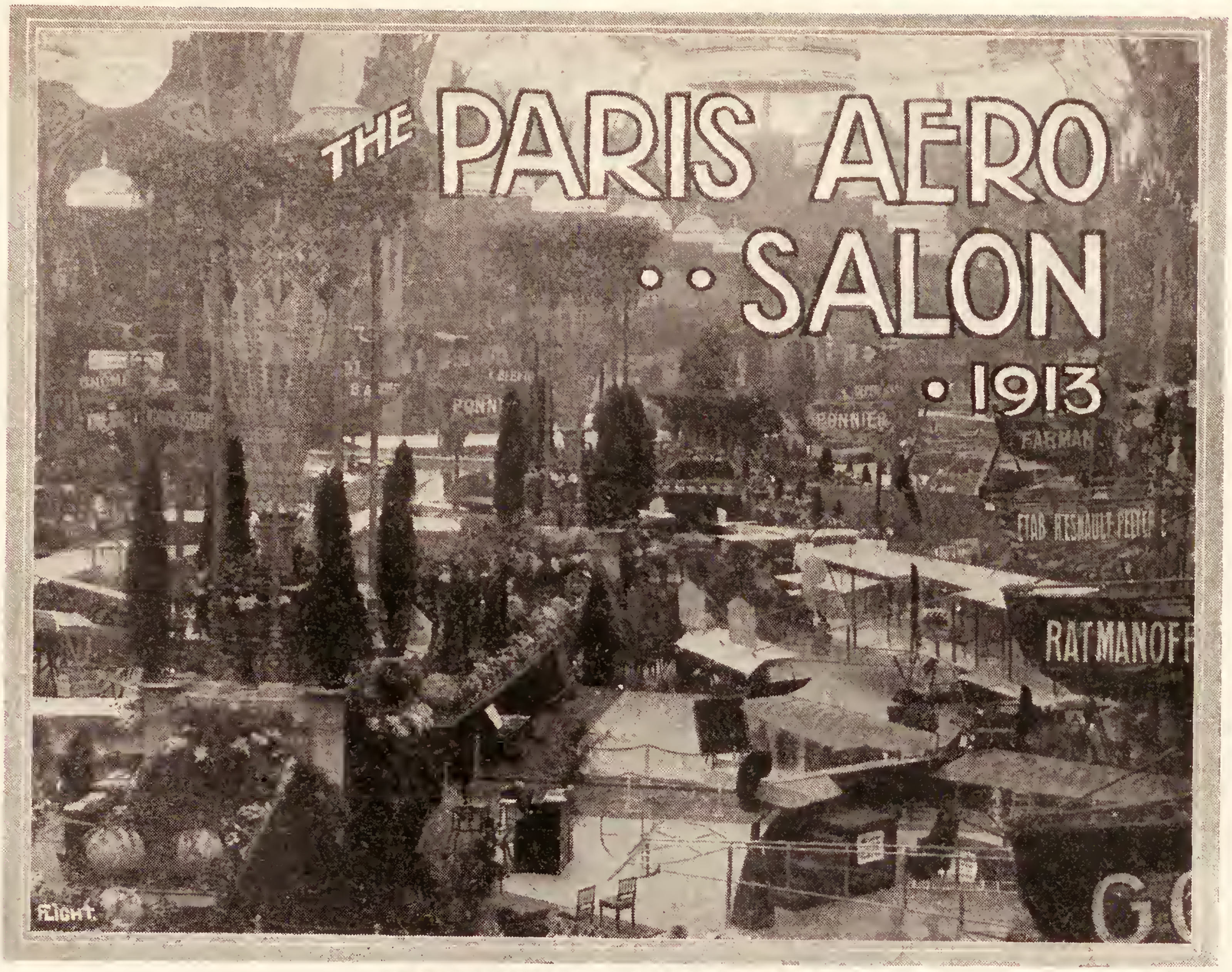
A Maurice Farman hydro-biplane piloted by Mr. Maurice Farman personally, making "rings" round the Boulogne–Folkestone boat, off the French coast.

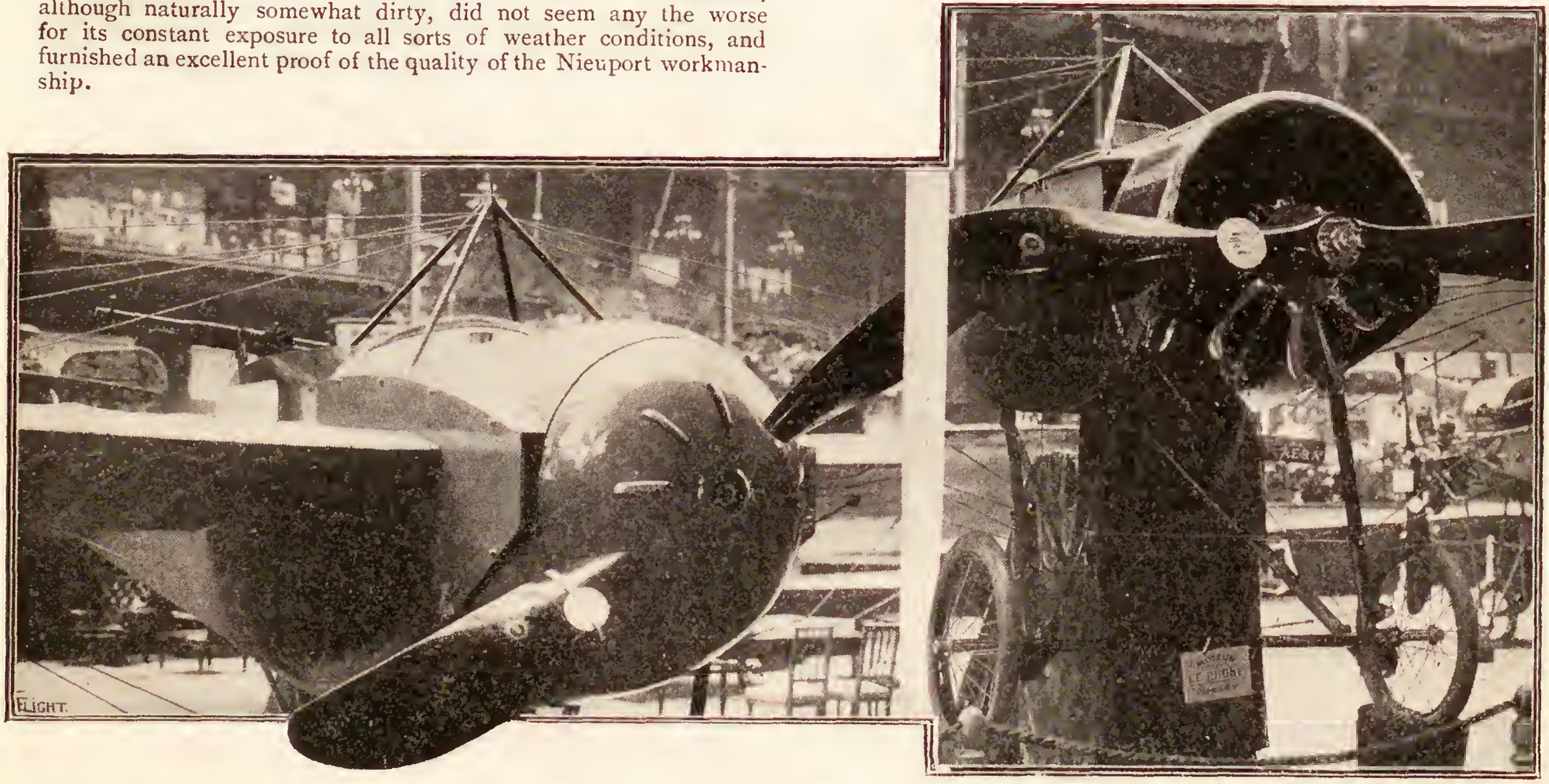


FOURTH ARTICLE.

NIEUPORT.

THE Nieuport firm made an impressive show with four monoplanes and a Nieuport-built Dunne biplane. One of the machines, and not the least interesting, was the one on which Helen recently covered a distance of some 20,000 kilometres. The machine, although naturally somewhat dirty, did not seem any the worse for its constant exposure to all sorts of weather conditions, and furnished an excellent proof of the quality of the Nieuport workmanship.

Of the other machines shown, one was an armoured monoplane of the Military type, and fitted with a Hotchkiss machine gun.



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THE NOSE OF THE ARMOURED NIEUPORT MONOPLANE.—On the right the Nieuport single-seater.

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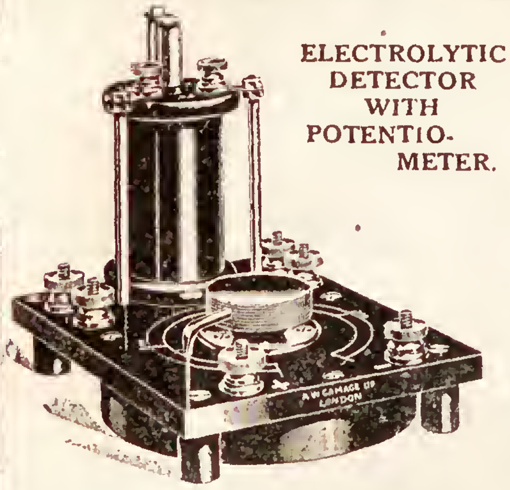

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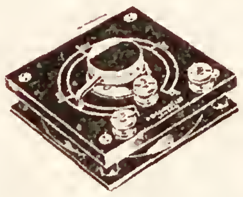

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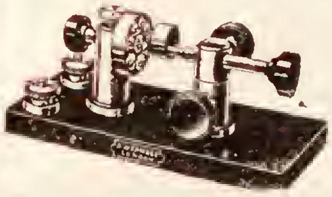

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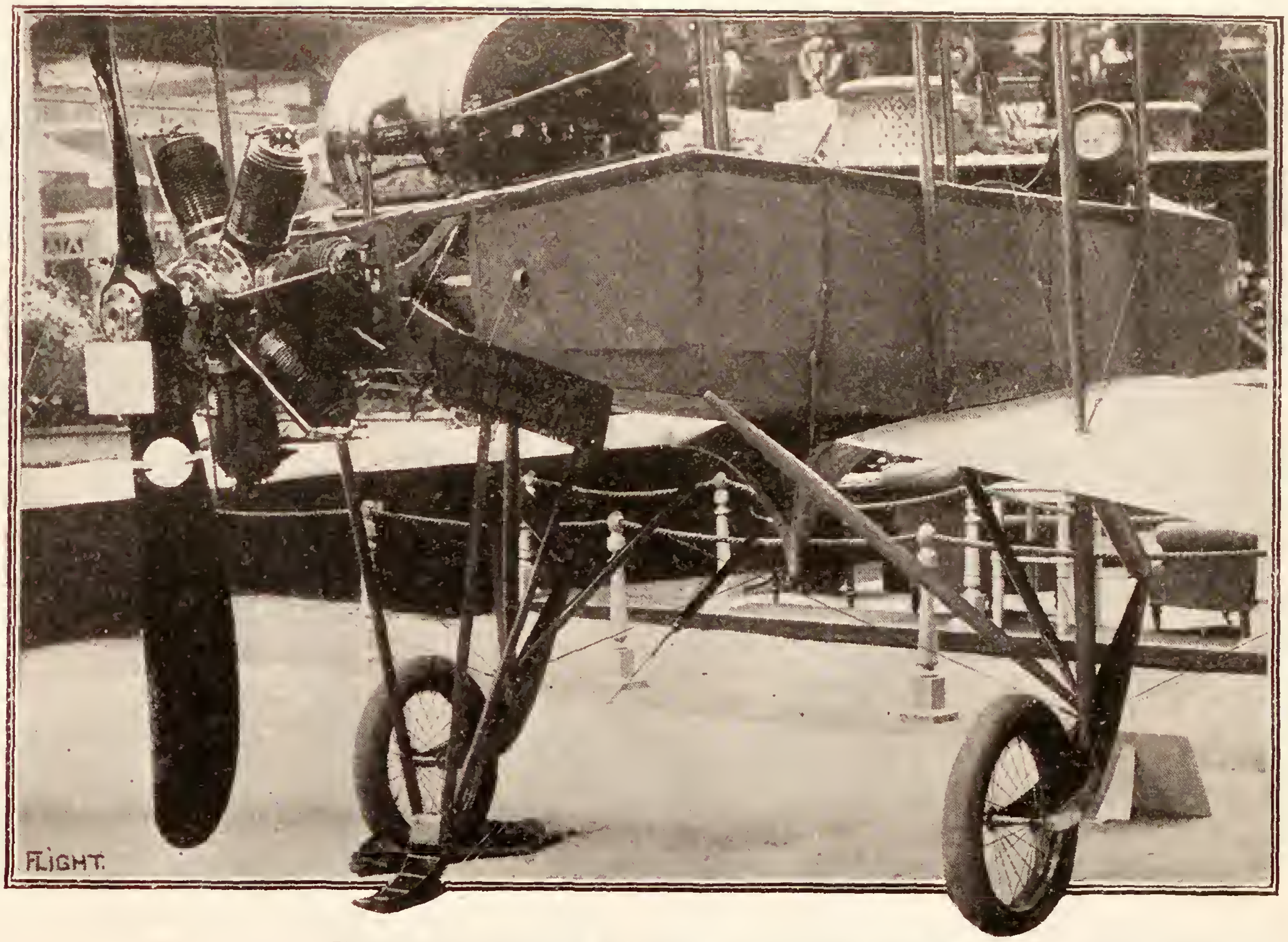
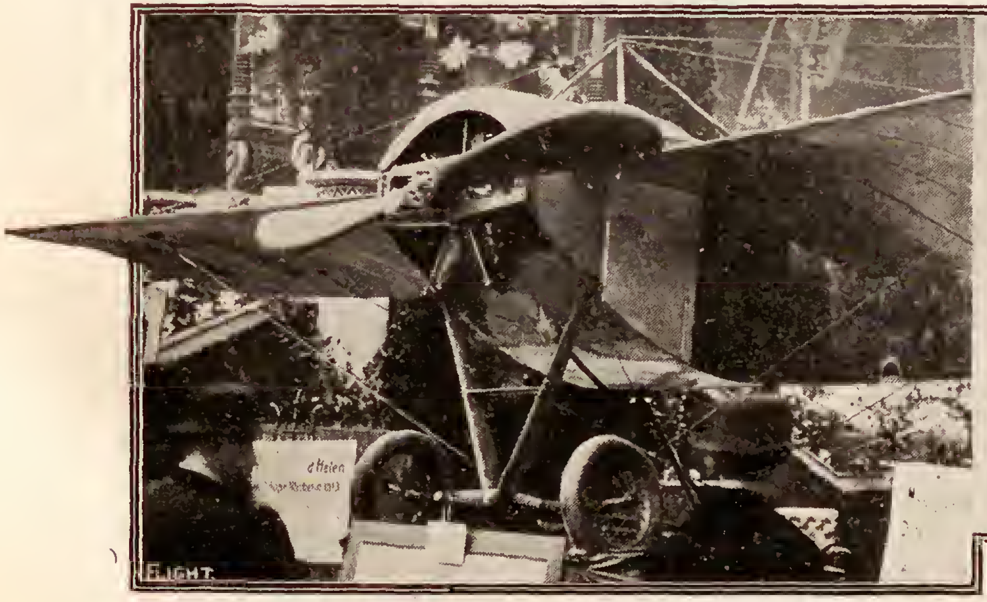


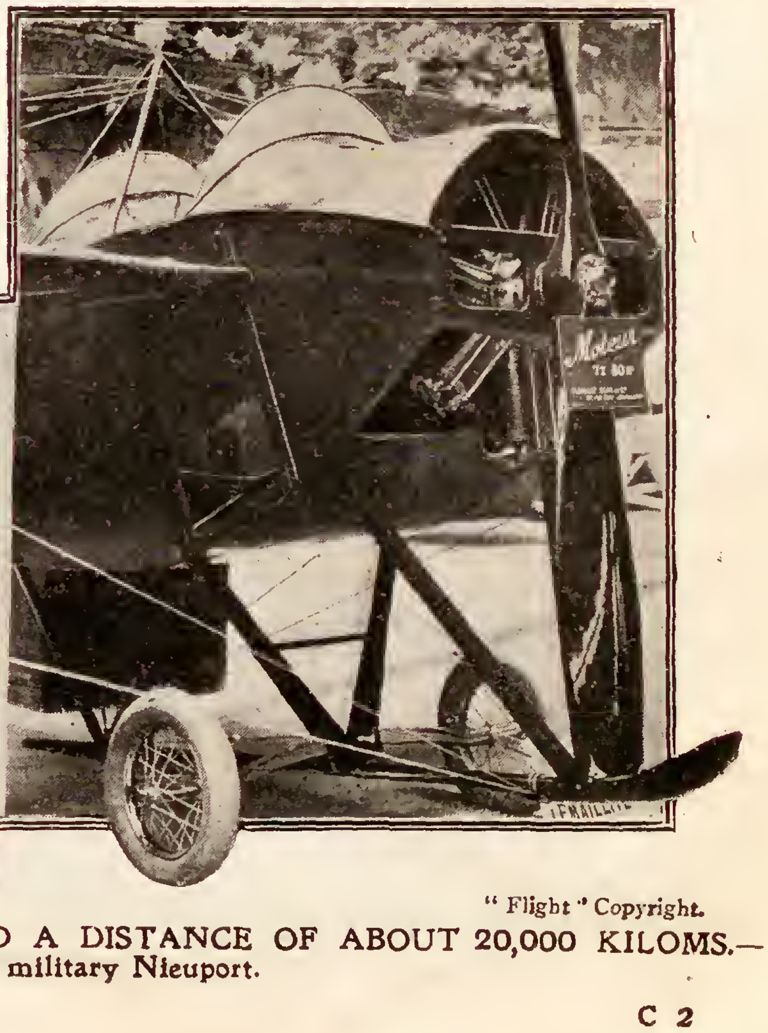
Chassis and *nacelle* of the Nieuport-built Dunne biplane. "Flight" Copyright.

The front portion of the *fuselage*, up to just behind the seats, is covered with sheet steel, and a cowl of the same material is fitted on the propeller boss with which it revolves, so that there is very little chance of a bullet hitting any part of the engine, and thereby putting the machine out of action.

It is driven by a 14-cyl. 160 h.p. Gnome engine, mounted on double bearings. The *fuselage*, which is of the usual deep Nieuport section, is built up of four *longerons* of ash, connected by struts and cross-members of spruce.

Inside this roomy *fuselage* are arranged the seats for the pilot and two passengers, the pilot's seat resting on a large petrol tank in front and the passengers' seats arranged side by side behind him. The set of instruments fitted is one of the most complete seen on any of the machines at the Show. The chassis is of the usual Nieuport type, consisting of three pairs of V-struts of streamline steel tubes, which carry on their lower extremities a tubular skid, whilst springing is effected by means of a leaf spring-axle carrying the two wheels. A rocking shaft sloping down from the *fuselage* to a bearing behind the rear pair of chassis struts carries a crank-lever, to which are attached the warping cables. On the upper end of this rocking shaft is mounted a transverse foot-bar, by means of which the wings are warped. A single tubular lever is used for operating rudder and elevator. The main planes are of the usual





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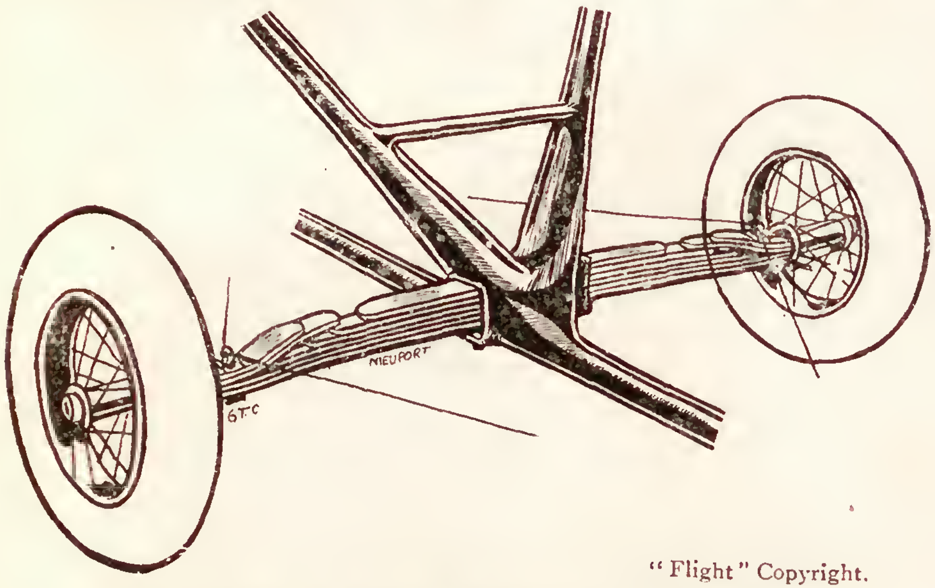
HELEN'S NIEUPORT MONOPLANE WHICH HAS COVERED A DISTANCE OF ABOUT 20,000 KILOMS.—
On the right the tandem-seater military Nieuport.

Nieuport section, and taper considerably towards the tip. The fixed tail plane, which is of semi-circular shape, is mounted on top of the *fuselage* and to its trailing edge are hinged the two elevator flaps. The rudder, which projects some distance above the tail plane, is pivoted to a steel tube forming the stern post of the *fuselage*.

Of the other machines shown, one is a tandem two-seater Military monoplane, which is driven by an 80 h.p. 7-cyl. Clerget engine, mounted on double bearings in the front portion of the *fuselage*. This machine follows in every respect the usual Nieuport practice. The seats for the pilot and passenger are arranged tandem fashion, the passenger's seat in front being mounted on one side of the *fuselage*, so that he is facing towards the right-hand wing. The object of this arrangement is not quite clear, but the idea is presumably to give the pilot a more unobstructed view straight ahead. The two seats are arranged, each in its own cockpit, each occupant being protected by a wind-screen of large dimensions.



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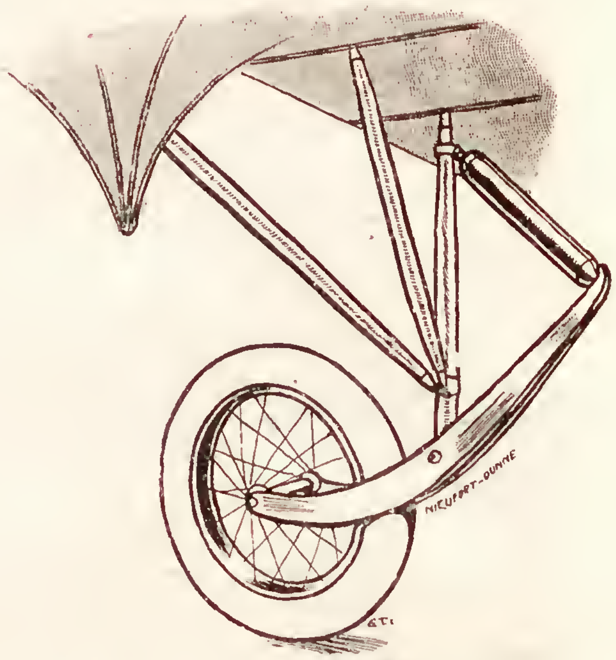
The leaf spring of the Nieuport tandem two-seater.



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Sketch illustrating the method of springing employed on the Nieuport-built Dunne biplane.

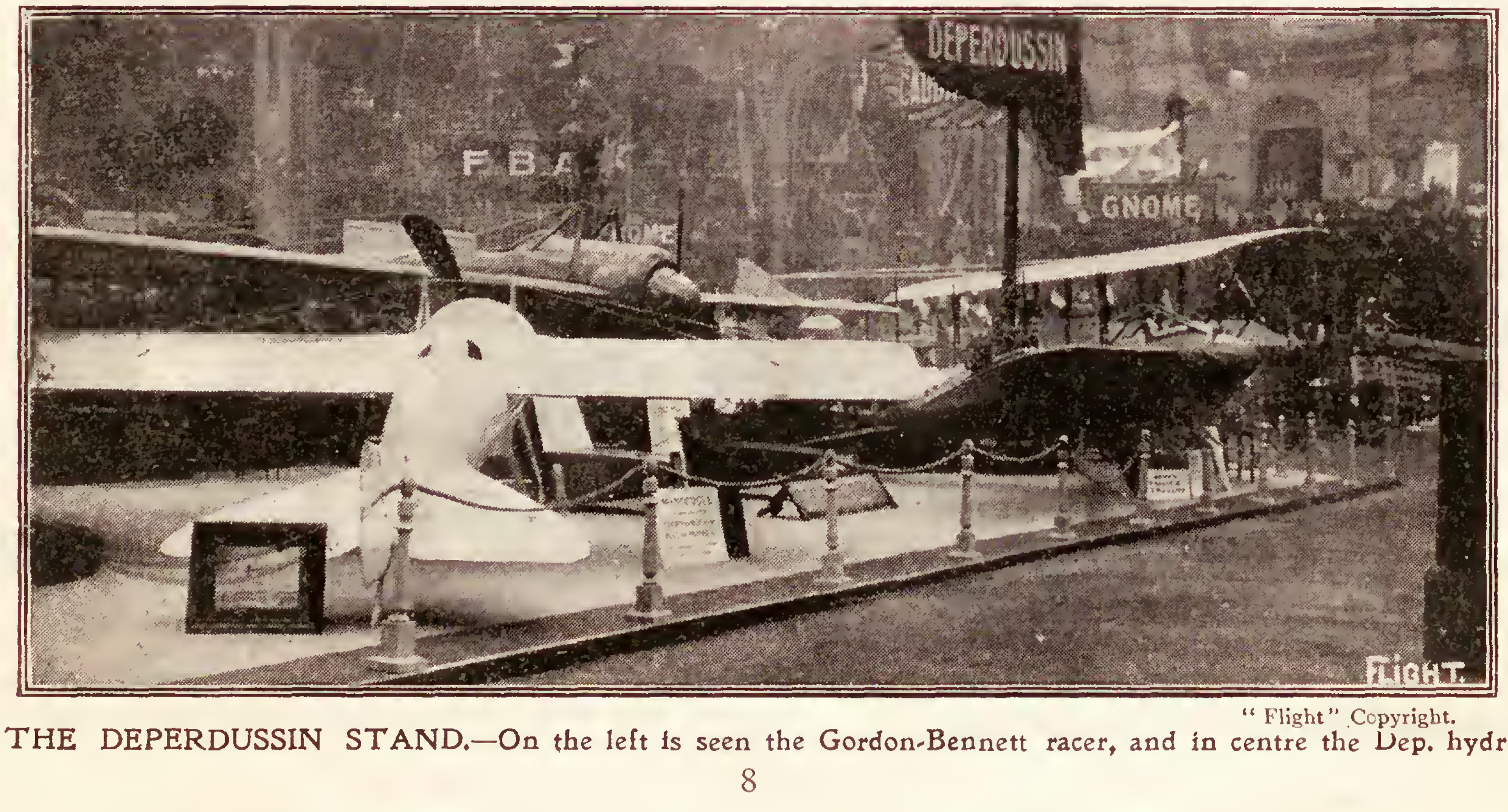
The remaining monoplane is slightly different from the usual Nieuport machines, and is somewhat reminiscent of the Morane-Saulnier monoplane, this resemblance more especially applying to the chassis and engine housing. It is fitted with a 7-cyl. 60 h.p. Le Rhone engine, mounted on overhung bearings.

The cockpit in which is situated the pilot's seat seems very comfortable, and similarly to the other Nieuport machines, no trouble or expense seems to have been spared in order to make the instrument board as complete as possible. The controls in this machine differ from the usual Nieuport practice in that the hand-lever is used for warping and a foot-bar for operating the rudder.

The Nieuport-built Dunne biplane completes this exhibit, but as the Dunne machine has been fully described quite recently in the columns of FLIGHT, there is no need to describe it here in detail. Several minor alterations have been made in the construction; for instance, the *nacelle* is built up of steel tubes, and is of a slightly different form from that of the British-built machine. Also the chassis has been altered, and is in this machine surprisingly like the chassis fitted on the Blériot biplane. Another alteration is that all the inter-plane struts are made of streamlined steel tubes, whereas in the British machine, it will be remembered, they were made of spruce. The workmanship of this machine, as well as that of all the monoplanes, is of very high quality, as one might expect from a firm of Nieuport's standing.

DEPERDUSSIN.

All three of the machines exhibited on the Dep. stand had *fuselages* of the *monocoque* type, so that apparently this construction has been found satisfactory, and it certainly offers several advantages. In the first place a much better streamline may be obtained by this construction, as there are no sharp corners to cause edge disturbances. Secondly, for military purposes it would seem that this construction is less liable to get seriously damaged by bullets piercing it than would a *fuselage* of the ordinary girder type, for is is quite conceivable that a *monocoque fuselage* might be penetrated by a lot of bullets without its strength being very greatly affected, whereas a bullet hitting one of the *longerons* of a girder type *fuselage* would weaken that structure tremendously.



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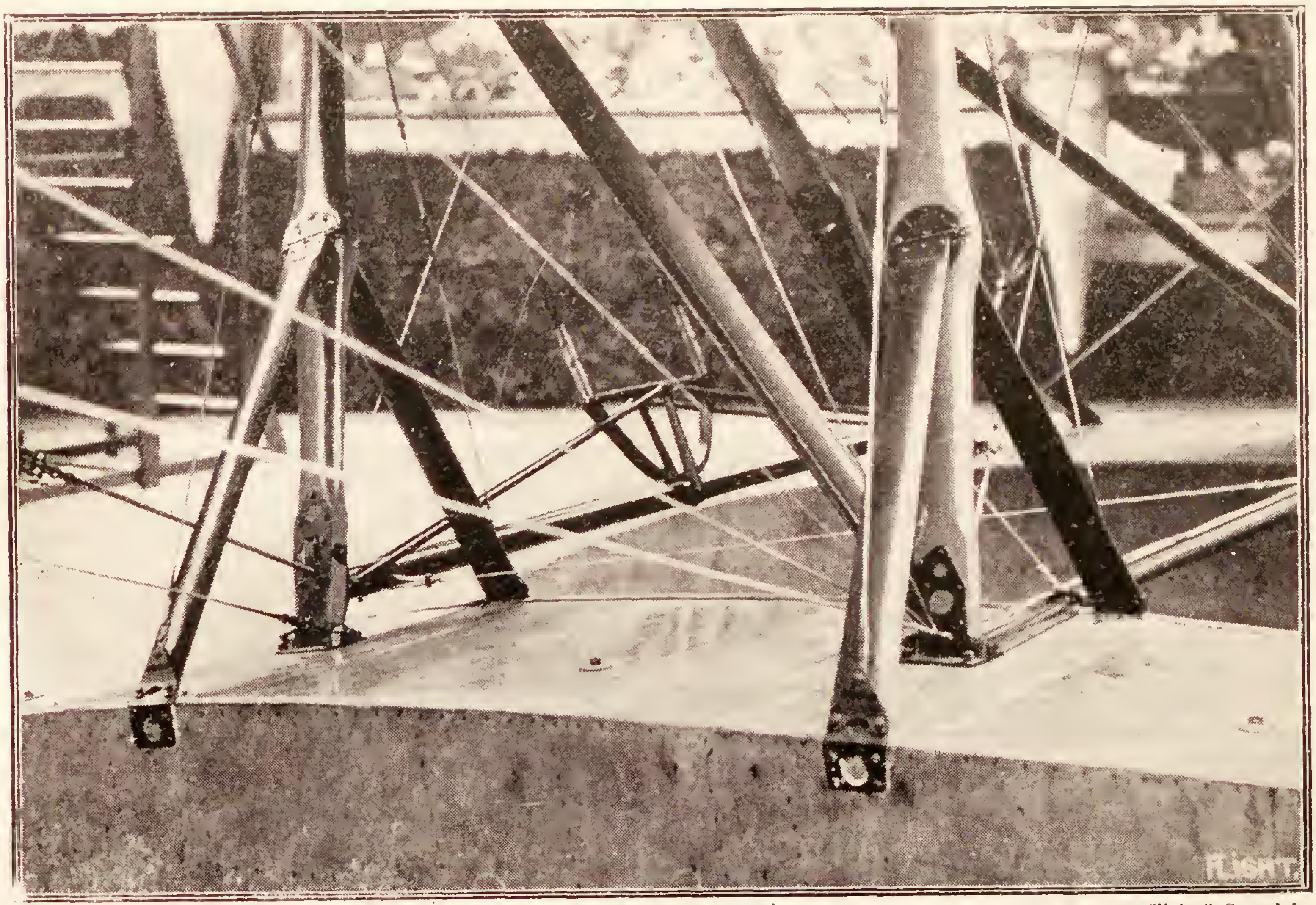
THE DEPERDUSSIN STAND.—On the left is seen the Gordon-Bennett racer, and in centre the Dep. hydro.



Details of the Dep. float attachment.

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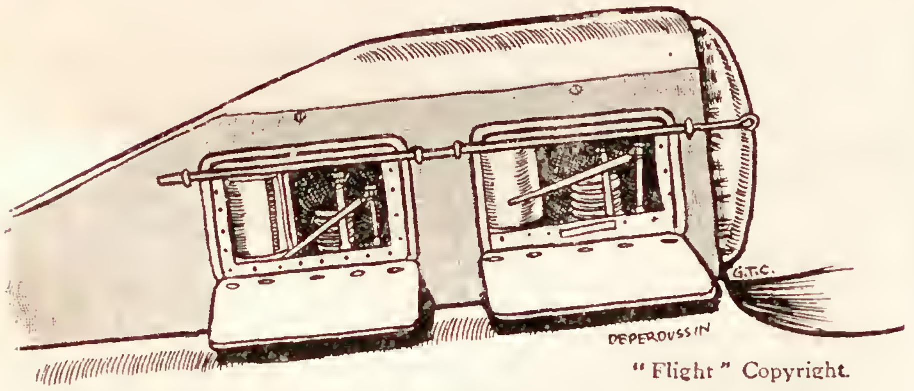

"Flight" Copyright.

A neat way of mounting the instruments on the Deperdussin monoplane.

One of the machines shown was the actual monoplane on which Prevost won the Gordon-Bennett Race, and which was described fully in FLIGHT only a short time ago. The other land machine is the one flown by Gilbert in his famous flight from Paris to Putnitz on the Baltic Sea, a distance of 1,050 kiloms., which he covered in 5 hrs. 11 mins., or at an average speed of over 200 kiloms. an hour. The tanks necessitated by so long a flight were mounted on the outside of the *fuselage* in such a manner that they did not disturb the symmetry of the machine, but on the contrary were utilised to form the excellent streamline. Except for the fact that this machine has more serviceable wings braced in a more secure manner, it was practically the same as the Gordon-Bennett racer.

The third machine shown was a hydro-monoplane which does not seem to differ materially from previous Dep. hydros. It was a two-seater monoplane, with the pilot's and passenger's seats arranged tandem fashion.

(*To be continued.*)

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Legagneux Beats the Height Record.

AFTER making an unsuccessful attempt to improve on the world's height record at Villacoublay, on the 19th ult., when he only got up to 5,700 metres, Legagneux had his Nieuport monoplane despatched to St. Raphael in the Riviera. There his efforts were rewarded, and on Saturday, during a flight which lasted 1 hr. 49 mins. the barograph showed that he attained an altitude of 6,150 metres (20,200 ft.). The old record was 5,880 metres (19,600 ft.), made by the late E. Perreyon on a Blériot, at Buc, on March 11th, 1913. Legagneux started from the Frejus aerodrome. To assist his breathing he inhaled oxygen when ascending above 4,000 ft., and when he landed his barograph was covered with ice. The machine was a light Nieuport, fitted with an 80 h.p. Rhone motor and Chauvière propeller, and the planes were doped with Novavia. It is interesting to recall the progress of the height record. At the end of 1908 it stood to the credit of Wilbur Wright, with 100 metres; in 1909 to Latham, 453 metres; in 1910 to Legagneux, with 3,100 metres; in 1911 to Garros, with 3,950 metres, and in 1912 also to Garros, with 5,601 metres.

Other Aspirants for Height Honours.

THREE other pilots besides Legagneux are also in the South of France with the object of attacking the height record, Garros and Gilbert being at Frejus with Morane monoplanes, while Bielovucic is at Nice with a Ponnier.

Through American Eyes.

THE looping-the-loop feats of Lincoln Beachey on a 90-100 h.p. Curtiss machine has roused the vivid imagination of one American reporter. He says: "There is as much difference between the loop-the-loop flying of Beachey and that of the Frenchman, Pegoud, as between the trans-Atlantic performance of one Cristoforo Colombo and that of a modern liner. To give Pegoud his due—*he* did it first. But he flew upside down and looped-the-loop with passenger-carrying wings of large surface and an engine of small power. His machine probably carried not more than 3½ lbs. to the square foot, and flew at a speed of less than 45 miles an hour. Beachey, on the other hand, is looping the loop in a small surfaced speed machine. It is carrying about 6 lbs. to the sq. ft. of lifting surface, has one of the 90-100 h.p. Curtiss motors, and flies at approximately 75 miles an hour. One machine flutters over like a dead leaf turning in still air; the other shrieks in an aerial circle like a crazy sky-rocket."

A Record Balloon Trip.

ON Saturday, December 13th, the German balloon "Duisburg" ascended from Bitterfeld with three passengers, Von Kaulen, Schmitz and Krest. After being in the air for 87 hours, it landed at Perm, in East Russia, close to the Ural Mountains, so that a distance of 2,800 kilometres (about 1,740 miles) had been covered, thus beating the world's record of 2,400 kiloms. of M. Bienaime.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Aviators' Certificates.

NEW REGULATIONS.

SPECIAL attention is drawn to the new regulations for Aviators' Certificates which came into force on January 1st, 1914. In the altitude flight a maximum reading aneroid must be carried on the aeroplane.

The revised rules are as follows :—

AVIATORS' CERTIFICATES.

(*Fédération Aéronautique Internationale.*)

The Sporting Authority governing aviation in each country represented on the F.A I. can alone grant Aviators' Certificates to all candidates, of at least 18 years of age, and coming under its jurisdiction.

1. To candidates of the same nationality as the Club.

2. To foreigners belonging to a country not represented on the F.A.I.

3. To foreigners of a country represented on the F.A.I. ; but in this case the certificate can only be delivered with the authorisation of the Sporting Authority of the candidate's country.

The Royal Aero Club of the United Kingdom will grant certificates in accordance with the regulations of the Fédération Aéronautique Internationale to candidates who have complied with the following rules :—

RULES.

1. Candidates must accomplish the three following tests, each being a separate flight :—

A and B. Two distance flights, consisting of at least 5 kilometres (3 miles 185 yards) each in a closed circuit, without touching the ground or water ; the distance to be measured as described below.

C. One altitude flight, during which a height of at least 100 metres (328 feet) above the point of departure must be attained ; the descent to be made from that height with the motor cut off. The landing must be made in view of the observers, without restarting the motor.

2. The candidate must be alone in the aircraft during the three tests.

3. Starting from and alighting on the water is only permitted in one of the tests A and B.

4. The course on which the aviator accomplishes tests A and B must be marked out by two posts or buoys situated not more than 500 metres (547 yards) apart.

5. The turns round the posts or buoys must be made alternately to the right and to the left so that the flight will consist of an uninterrupted series of figures of 8.

6. The distance flown shall be reckoned as if in a straight line between the two posts or buoys.

7. The alighting after the two distance flights in tests A and B shall be made : -

(*a*) By stopping the motor at or before the moment of touching the ground or water ;

(*b*) By bringing the aircraft to rest not more than 50 metres (164 feet) from a point indicated previously by the candidate.

8. All alightings must be made in a normal manner, and the observers must report any irregularities.

9. Each of the flights must be vouched for in writing by observers appointed by the Royal Aero Club. All tests must be under the control of, and in places agreed to by, the Royal Aero Club.

10. The Royal Aero Club declines all responsibility for any accidents, or any damage that may occur to the aviators, their aircraft, or to any third parties during or in connection with the qualifying tests of the candidate.

11. Candidates must make application on a form provided for that purpose, and this form must be sent to the Royal Aero Club prior to the tests being made. Any expenses incurred must be borne by the candidates.

12. Foreigners belonging to a country represented on the Fédération Aéronautique Internationale can only receive a certificate from the Royal Aero Club with the consent of their national Sporting Authority. A certificate may be granted to a foreigner whose country is not represented on the Fédération Aéronautique Internationale.

13. The Committee of the Royal Aero Club will decide if the candidate has qualified for a certificate, but reserves the right to refuse the same or withdraw the same at any time without giving reasons.

14. The decision of the Committee of the Royal Aero Club in all matters connected with the tests is final and without appeal.

The Jacques Schneider Maritime Aviation Cup and Prize, 25,000 frs.

Mr. Jacques Schneider has given a trophy of the value of 25,000 francs and a cash prize of 25,000 francs for three years for international maritime aviation competition.

The Aero-Club de France, having won the prize last year, has organisation of the race for 1914. The Prize will be competed for over a distance of 150 nautical miles. The Contest will take place exclusively at sea, outside any port, and over a course of not less than 5 nautical miles. Further details will be announced later.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Gordon-Bennett Aviation Cup.

RULES FOR 1914.

The Race for the Gordon-Bennett Aviation Cup will take place in France this year.

The Race will be over a distance of 200 kilometres on a course having a minimum distance of 5 kilometres.

Competing aircraft, before taking part in the Race, will have to pass the following preliminary test : —

A flight in a straight line out and back of about 2 kilometres, without touching the ground, at a constant height of not more than 30 metres. The speed of the test shall be the mean of the speeds of the flights out and back, which must not exceed 70 kilometres per hour. In this test the aircraft must carry sufficient petrol and oil to cover the whole course of 200 kilometres. Three attempts will be allowed to each competitor.

After the qualifying tests have been passed, no modifications may be made to the aircraft. Repairs will only be allowed with the permission and under the control of the Officials.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Gordon-Bennett Balloon Race.

The cup having been won by a representative of the Aero Club of America, the race for 1914 will take place in America. The exact time and place will be announced later.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero Club of America, and such challenge must be sent in before February 1st, 1914.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, January 13th, 1914, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

A Voyage in Space.

EACH year round about Christmas time the theatre at the Royal Institution is invaded by crowds of children, and then the grave seriousness which usually dominates its atmosphere is crowded out. For this year's Christmas lectures, the Savilian Professor of Astronomy at Oxford, Dr. H. H. Turner, chose as his subject, " A Voyage Through Space." The first lecture on Saturday was mainly devoted to astronomy, &c., but in the second, on Tuesday last, Dr. Turner led his audience by very simple ways to understand something of how and why an aeroplane flies, and the use of balloons, kites, &c.

EDDIES.

I HAD a letter from Harry Busteed recently, enclosed with the photograph of himself which figured in our "Man of Moment" series, which perhaps puts the case for the inclusion of this page in FLIGHT in a nut-shell. He has been away for some time down at Pembroke Dock testing hydro-aeroplanes, and complains that because he is far away, everybody seems to have forgotten him. That's just the rub! If pilots go away and won't write to us to let us know what is happening in their part of the world, how on earth are we to know? I, like most people, derive great pleasure in receiving letters, and I should like all to write to me and let me have all the news, and I promise to write back, and so we may in the new year keep in touch with one another to our mutual pleasure and, I hope, benefit. By the way, I see that he has just been gazetted a Sub-Lieutenant in the reserve of the "King's Navee," so the Government have added another good pilot to their list.

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Except to his personal friends, it is perhaps not generally known that Mr. B. C. Hucks is a past-master in the art of repartee. To be a silent witness to a battle of wits between him and another is indeed a treat. Perhaps a couple of instances will not be amiss here.

Some little time ago when flying at Birmingham, where, on alighting, the people flocked round the machine and could not be kept back, he was much pestered by one of the "nutty" type, who had evidently read it all up and wanted to air his knowledge before his lady companion, when the following took place:—

"Ah! This is a Blériot, is it not?"

"Yes; this is a Blériot."

"Ah! It's a Gnome engine, is it not?"

"Yes; it's a Gnome engine."

"Ah! The whole thing revolves, does it not?"

"Well, not exactly. In this case it's only the engine."

"Oh!—er—yes, of course, I meant that. The petrol is led into the engine by a hollow tube, is it not?"

"Yes, in this case it is; but some use a solid one, I believe!"

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At the same meeting Mr. Hucks remarked to some friends that it was very windy, and that he had got rather badly bumped once or twice.

He was overheard by a little man who stood about four feet nothing in his shoes.

"Wind? I thought aviators flew in any wind now; why, there's no wind to-day!"

Hucks, who is fairly tall, looked down at his little heckler, with a world of pity in his eyes.

"Well, there might not be any wind down where you are, sonny, but there is up here!"

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The recent action brought by the Pashley Brothers, to recover damages arising from a collision of aeroplanes, was memorable, not only because it was the first case of the kind brought in the High Courts in England, but also because, strange to say, both the plaintiff and the defendant limped into court with crutches and sticks, though through no effects of the accident. One had been injured by a motor cycle and the other received his hurt at football. It is notorious that all airmen consider themselves much more safe in the air than when following sport of any kind on the ground. Mr. Grahame-White once remarked that he never felt safe in a taxi, and much preferred to be aloft; and I was once at Brooklands during the progress of a motor cycle race, when Gordon Bell, who was once a motor cycle racer, was asked how he would like to go back to it again: "Not me," he said, "it's too dangerous."

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Once again is the danger arising from the fascination of speed brought home to us by the sad death of poor Bobbie Slack. There is very little room to doubt that men accustomed to flying get saturated with the lust for speed, and hardly realise they are indulging in it when on the road. I have ridden with several airmen in their cars, and one and all have driven much too fast for safety on the public roads. I am not at all afraid of speed in its proper place, and have ridden round the track at Brooklands quite as fast as is necessary to cure a sluggish liver, but on the road, one is safe only till something happens. A friend of mine has recently been doing a good deal of motoring in a very hilly district as a passenger in a car driven at speed. On the last day the back axle broke just as they got home. Had it broken half-an-hour previously when they were descending almost a precipice, a most serious accident could not have been avoided.

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It is a pity that such a splendid aerodrome as that at Shoreham should have so little attraction for the people of Brighton. Brighton is a most peculiar place, and its people look down on Shoreham and Portslade as poor relations, and will have none of them. I certainly thought that such an event as the looping the loop by Mr. B. C. Hucks would have drawn a big crowd, but the result could not have been very encouraging, and no doubt it will be some time before they see Hucks there again. Yet when Salmet had to make a descent at Ripton Farm, off the Maidstone road, on his flight to France with the Hon. Mrs. Assheton Harboard as a passenger, a crowd of over a thousand people were quickly on the spot. Yes, Brighton, indeed, is a funny place, and no commercial traveller will go there if he can possibly avoid it. It is one of the jokes of the trade to send a new man to Brighton on his first trip; if that doesn't break his heart, he will turn out a good man.

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The difficulty of landing the fast little Morane-Saulnier monoplane has been seen at Hendon recently, where three of them have turned turtle after a good landing and when almost at the finish of their run. It seems rather a pity that this machine is not fitted with some sort of small front skid, not with any idea of saving the machine in a rough landing, but simply to offer some resistance to its standing on its nose just at the end of the run, and so save a few broken propellers. It seems to take very little to turn this machine off its course on the ground, especially as the speed decreases, and the rudder has little or no effect. The machine slews round and heels over till one wing-tip touches the ground, generally without damage, so far, but instantly the machine cart-wheels and gently stands on her nose, and a front skid or skids would, I think, save the situation.

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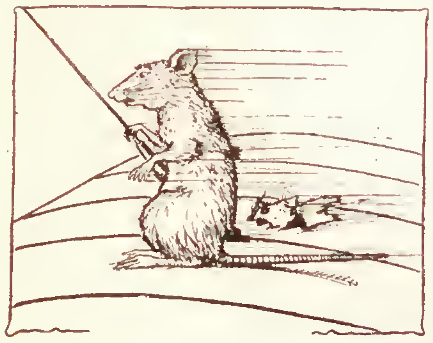

I really cannot quite believe that story about the mice in the aeroplane, even though it comes from the *Daily Mail.* You know it, of course? An Army biplane, after being flown from Aldershot to Montrose, was being overhauled when a nest of mice, including Mrs. Mouse, was found in a corner of one of the wings. I believe, even in our small way, it costs quite a lot of money to provide for the overhauling and upkeep of the few machines we possess, and surely if a mouse not only made a hole in the fabric of a wing, but also set up a nest there, it would have been seen—we are not really so bad as all that! Anyway, what a good job it was that Mrs. Mouse was at home when the journey started, because it was only through her being seen that the nest was found, and the young mice might have eaten up the whole machine, and even swallowed the story.

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Visiting Hendon on Saturday with the object of watching Chanteloup perform his aerial evolutions, I was delighted to run across Sidney Pickles, looking remarkably well considering what he has gone through. Unfortunately the plaster splint cannot be removed from his leg just yet, so he still has to content himself with watching the flying instead of taking an active part, but his interest in the art he has chosen to take up is as keen as ever, and he had travelled up from Brighton to see one of his favourite machines put through her paces.

I found him very cheery and brisk, and in the course of a long chat, he told me that he thought it a mistake for pilots to fly any machine that happens along, and that they should stick to one, or at most two, and that he would never have had his accident on the Champel had he known just a little more about it. Machines, he says, apparently seem exactly alike to control, till the moment when you expect a quick or a slow response and then comes the slight difference factor that upsets all calculations. His return to Brighton should help materially towards his complete recovery, and I hope soon to see him back with us in his old rôle.

"WILL O' THE WISP."

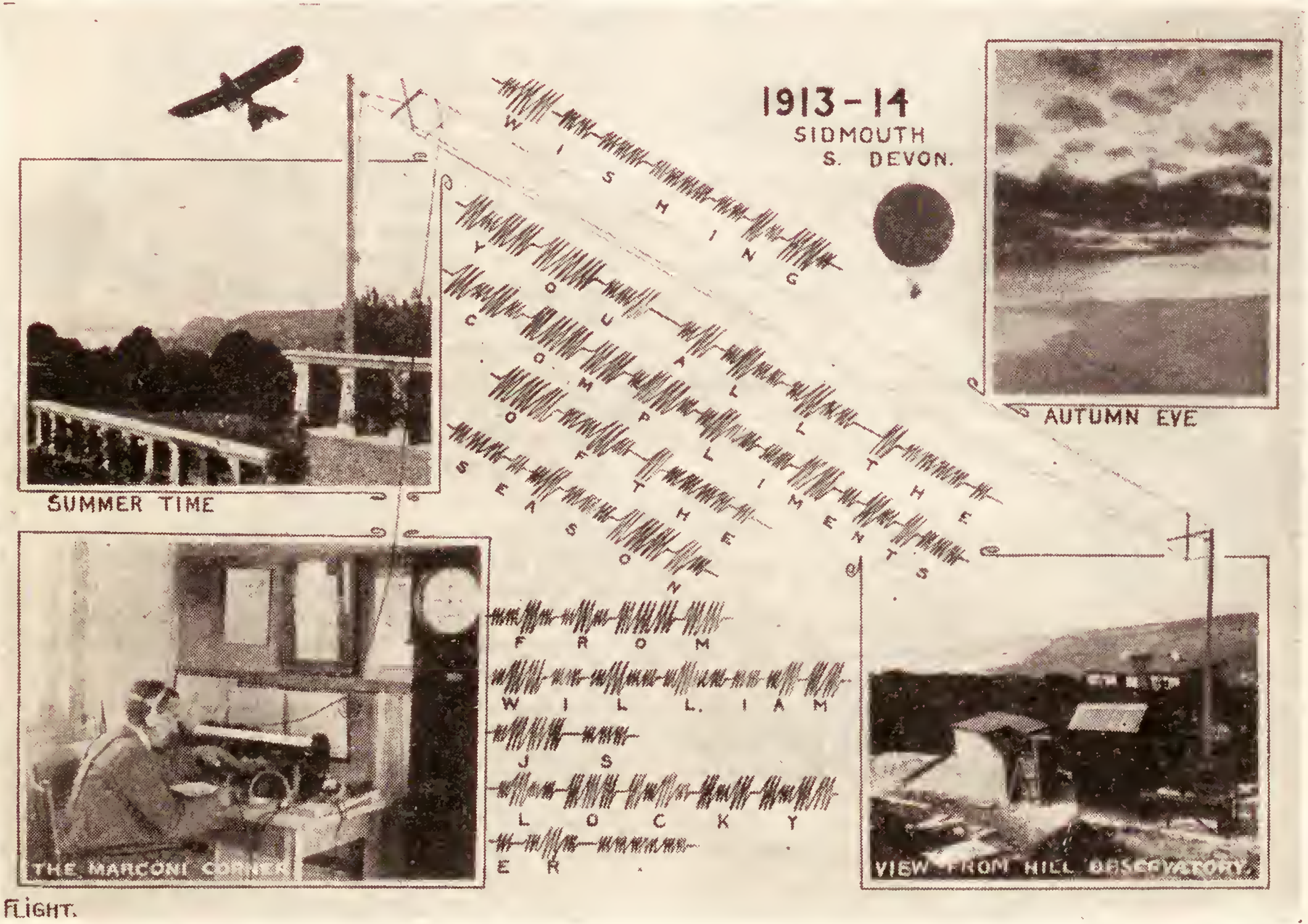
* * * *

The "Hansa" to be Overhauled.

AFTER being in use for over seventeen months the Zeppelin liner "Hansa" has taken up her winter quarters at Potsdam, where she is to be given a thorough overhaul. The airship station at Potsdam has been closed to the public for the winter months.

A Zeppelin Museum.

THE municipal authorities of Friedrichshafen have proposed to start a Zeppelin museum on the occasion of the 75th birthday of Count Zeppelin, and Count Zeppelin has promised to do what he can to assist them in getting together an interesting collection.



As usual, Dr. Wm. J. S. Lockyer sends us an unique reminder of the season, this time his greetings taking the above interesting form of a Marconigram. Dr. Lockyer has considerately translated, for the uninitiated, the hieroglyphic message.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Only one flight was made last week, Sub-Lieut. Rainey taking up the Bristol tractor, with 80 h.p. Gnome, in a very high wind on Tuesday. Further flying was stopped by the rain.

Brooklands Aerodrome.

For the week preceding Christmas, at the Bristol School four pupils—Mr. Finney, Lieut. Bridson, Mr. Macdonnell and Mr. Don, R.N., passed their *brevet* tests in good style. With the new year, one of Mr. Merriam's most promising pupils, who took his ticket in brilliant style, Mr. F. B. Halford, will act as instructor under Mr. Merriam.

Lieut. McDonald, who took his *brevet* excellently at the Bristol School, Brooklands.

On the Friday Mr. Gordon Bell left Eastchurch for Brooklands on a 50 h.p. Short biplane, but ran into a fog after Sutton, and it took him half an hour to get thence to Epsom, the fog being so thick that he came down near the Grand Stand and stayed for a couple of hours. For an hour and a half he tried to find Brooklands where the noise of his engine was plainly heard, but in the end he stopped at Epsom for the night. In his endeavours to locate the aerodrome, Mr. Gordon Bell varied his altitude from a height of 4,000 ft. to one of 40 ft., and the absence of a compass from his machine did not improve matters.

Mr. Gordon Bell flew in from Epsom, and left his machine at Brooklands. Mr. Barnwell was flying well on the new Vickers gun-carrying machine, as were Mr. Merriam on the Bristol biplane, Mr. Dukinfield Jones and several other pilots on the Flanders biplane, Mr. Pixton on the Sopwith biplane, and Mr. Raynham on the 80 h.p. Avro biplane.

On Sunday, the 21st December, the weather conditions were perfect for flying, and eight different machines made a number of interesting flights. Mr. Barnwell was early astir on the Vickers gun-carrying biplane. Mr. J. Alcock was flying extremely well on the Maurice Farman biplane fitted with the new 100 h.p. Sunbeam engine, and also took up the winner of the free passenger flight ballot—Dr. Violet Turner, of the Royal Free Hospital, Gray's Inn Road, London. Mr. Raynham gave some pretty exhibition flights on the Avro biplane. Mr. Dukinfield Jones made a number of flights on the Flanders biplane, as did Mr. Pixton on the Sopwith biplane. Herr Roempler was up a number of times on the D.F.W. biplane, with and without passengers. Mr. Merriam gave some fine exhibition flights on the Bristol biplane, and the Martinsyde monoplane was flying even better than ever.

With the principal schools shut for the Christmas week there has naturally been comparatively little flying done, but Herr Roempler was out several times on the D.F.W. biplane, Mr. Raynham on the Avro biplane, Mr. Dukinfield Jones on the Flanders biplane, and Mr. Alcock on the Maurice Farman biplane, the latter machine flying extremely well and steadily with its 100 h.p. Sunbeam engine in a 33 miles per hour wind, and reaching under favourable conditions a speed of about 90 miles an hour. Mr. Raynham took the 80 h.p. Avro biplane over to Farnborough where it was officially timed to accomplish the excellent speed of 80·9 miles an hour when carrying passenger and fuel, with a slow speed of 39 miles an hour.

On Sunday only three machines were flying, the Sopwith biplane (Mr. Pixton), the Flanders biplane (Mr. Dukinfield Jones), and the Maurice Farman biplane, with its 100 h.p. Sunbeam engine (Mr. Alcock), on which the winner of the ballot for the free passenger flight, Miss de Carteret, of 33, Birkenhead Avenue, Kingston-on-Thames, had an enjoyable trip in the clear and frosty atmosphere.

Bristol School.—Dec. 15th, 7.45 a.m., Merriam testing, taking Lieut. Bridson as passenger, and found very bumpy.

Dec. 16th, too windy all day for flying. On Dec. 17th, the Wednesday preceding Xmas week, blowing hard all morning. Afternoon, about 4 p.m., became calm. Merriam then for test, afterwards Mr. Macdonell then took certificate in a most skilful way. Merriam afterwards gave a trip to Lieut. Watkins (new pupil).

Next day, at 8 a.m., Merriam testing, taking Lieut. Watkins as passenger. Afterwards up behind Mr. Don on straights and circuits. Mr. Racine Jacques making circuits and half right-hand turns.

Merriam up early testing, afterwards up giving tuition to Lieuts. Watkins and Sanders on straights and circuits, also up behind Mr. Don on figures of eight, &c. (twice). Lieut. Robertson doing fine figures of eight, and v.p. landings, and also Mr. Finney.

After breakfast, Merriam testing, Lieut. Sanders being passenger. Mr. Finney then took his R.Ae.C. certificate very steadily, and making perfect landings to observers.

Lieut. Robertson flying high and figures of eight. Merriam took this pupil up to show him how to make a spiral descent. Afterwards instructor up behind Lieuts. Watkins (2) and Sanders (2), Mr. Don (2), giving all these pupils very long turns. Afternoon too windy.

On the Saturday, Merriam, at 7.45 a.m., testing, with Lieut. Watkins as passenger, afterwards behind this pupil on straights and circuits, later behind Lieut. Bromet (from Salisbury School) on figures of 8 and landings, also behind Lieut. Sanders on straights. Lieut. Bridson then away for his ticket, taking half in fine style. After breakfast Merriam first out, afterwards behind Lieut. Bromet on figures of 8. Lieut. Bridson then finished his other half of ticket very well indeed, making perfect landing. Merriam afterwards up behind Mr. Don on figures of 8, this pupil having control throughout, including landings. Mr. Don then went for his *brevet*, taking same in first-class style. Merriam afterwards up behind Lieut. Robertson on figures of 8 and landing a *vol plané*. Too windy afterwards for school work.

Mr. H. R. Johnson, who has just passed his *brevet* tests in excellent style at the W. H. Ewen School, Hendon, on a 35 h.p. Caudron biplane.

Afternoon, Merriam testing, taking Col. Driscoll as passenger for a short trip, and found too bumpy for school work, later tried the air again but found still bad.

Merriam testing on Monday morning last week, afterwards up behind Lieuts. Sanders, Watkins, and Bromet, giving them long turns. In the afternoon Merriam giving an exhibition flight, later up with Lieuts. Sanders and Bromet, and Lieut. Halford a solo. Lieut. Robertson doing a fine solo and landing near a mark. Merriam finished with a solo to sheds.

Merriam up first on Tuesday, afterwards up behind Lieuts. Bromet and Sanders on figures of eight, and giving them plenty of landing practice.

After breakfast Merriam behind Lieut. Sanders on figures of eight, and afterwards making several landings. Lieut. Bromet then took his other half of ticket very well indeed. Merriam afterwards up again behind Lieut. Sanders on figures of eight and landings, this pupil having control throughout. Lieut. Robertson up three times on figures of eight.

Merriam up again behind Lieut. Sanders on figures of eight, pupil having full control, and is quite ready to take his *brevet* whenever he wishes.

In the afternoon, Merriam testing first, afterwards Lieut. Robertson practising landings near a mark. Afterwards he took his *brevet* in a most excellent style, landing each test right on the mark from 450 ft. with engine absolutely cut off. Merriam finished up by taking Lieut. Sanders for a high flight.

Ducrocq School.—Tuesday, last week, Jack Alcock passenger carrying for one hour on the Maurice Farman, fitted with 100 h.p. Sunbeam engine.

Wednesday, again passenger carrying in gusty wind, and on Sunday, besides passenger carrying, giving exhibition flying during afternoon.

Eastbourne Aerodrome.

ON Saturday, December 20th, school work commenced early in the morning, Gassler starting out at 8 a.m. for a test flight on the Bristol. Mr. Thornely followed on the E.A.C. 'bus, and did a cross-country stunt; returning, he took up a mechanic, and flew for ten minutes with him. Mr. Hunt then did three circuits, solo, followed by Fowler, with Mrs. Salmon in the pilot's seat. Mr. Thornely was away again shortly afterwards across country. Later in the morning Fowler flew the Bristol to Pevensey, Mr. Thornely motoring there. They changed over there, and Mr. Thornely flew back, whilst Mr. Fowler returned by car.

Monday morning Gassler was out first on the E.A.C. 'bus. He then took up Mr. Gwynne behind again, with Mrs. Salmon in the pilot's seat, and lastly with Mr. Gwynne at the control. Mr. Hunt then did a solo, making several figures of 8 steadily and well. Fowler went up with Mrs. Salmon in the pilot's seat, and Mr. Thornely took a stunt across the marshes on the Bristol. Mr. Hunt then flew the necessary tests for his *brevet*, which he accomplished in good style and time. In the afternoon Gassler had Mr. Gwynne up in front for several circuits. Mr. Gwynne will now soon be in the solo stage. Mr. Hunt went out again on the Bristol, flying well. Mr. Thornely took the 80 h.p. H. Farman out and made two very good flights at about 1,000 ft.

Tuesday, Gassler started with the E.A.C. machine, followed by Mr. Thornely on the 80 h.p. Farman. Mr. Hunt then went up on the Bristol, and again Mr. Thornely followed on the Henry Farman: rapidly overhauling Mr. Hunt on the school 'bus and climbing to 2,000 ft. in a very short time, he then made an almost perpendicular dive, and flattening out with good judgment, brought the machine up close to the sheds. Wednesday morning, Mr. Thornely out on the 80 h.p. Farman in a strong wind, handling the machine well. In the afternoon, Mr. Thornely again on the H. Farman, and Mr. Hunt on the Bristol, doing some fine banking. Fowler then went out on the Bristol and Gassler had a stunt on the E.A.C. 'bus.

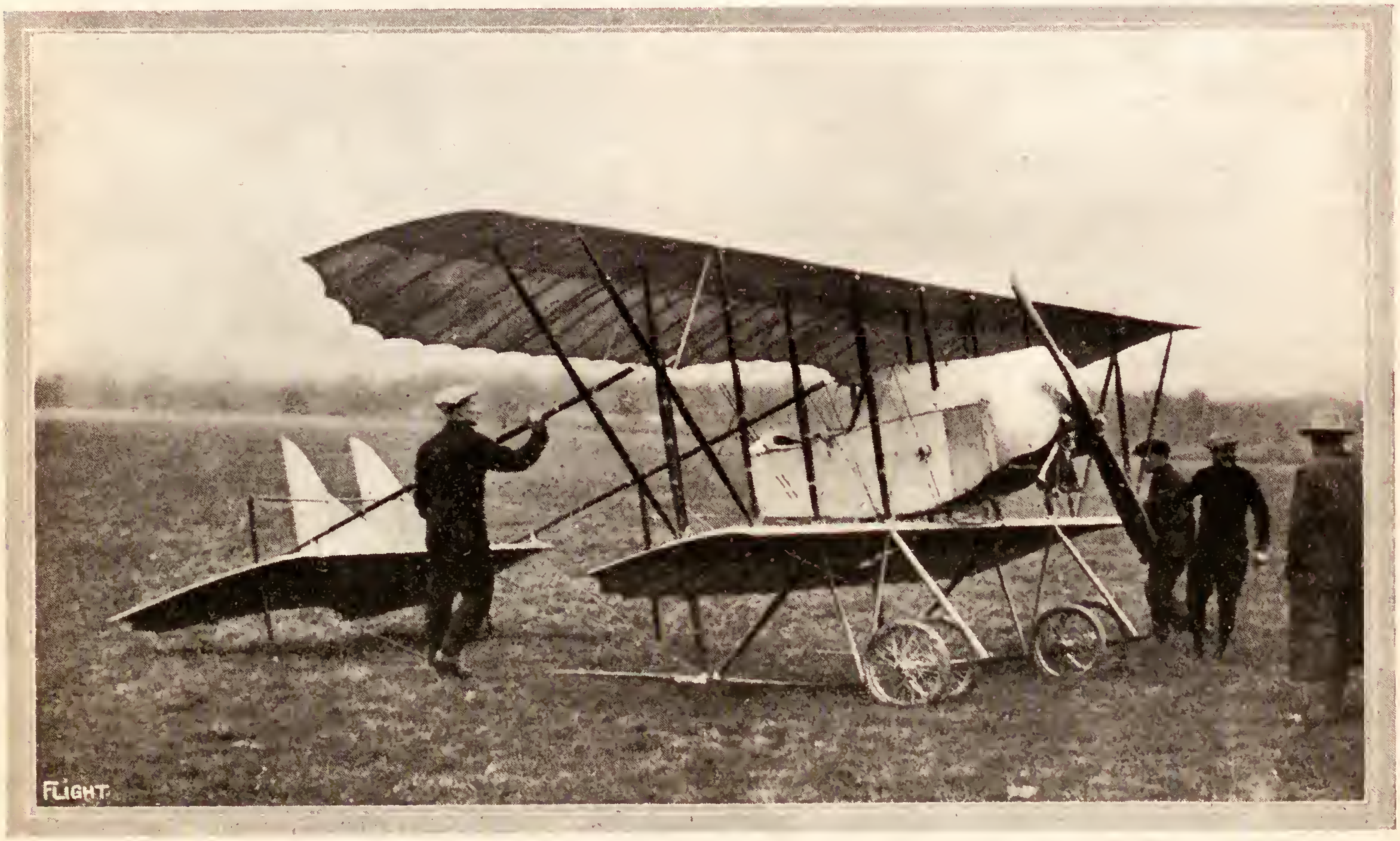
The school was closed from Wednesday evening until Monday morning for the Christmas holidays.

On Monday morning Gassler was first away on the E.A.C., followed by Mr. Thornely on the 80 Farman. Mr. Hunt then got away on the Bristol, but owing to the wind increasing to a gale no more school work was done.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday last week, Messrs. Fenwick, Cowley, Clarke, Bjorkland, Norris, straights with Instructor Strange, afterwards Messrs. Norris and Clarke solo straights. Messrs. Cripps and Webb solo circuits and figures of 8.

W. H. Ewen School.—On Monday, last week, school was out at 7.40 a.m. under the instruction of M. Baumann and Mr. F. W. Goodden. After test flight by M. Baumann on *brevet* machine, Mr. Badgery did circuits, right-hand turns, and landing practice, Mr. MacGregor half circuits, and Mr. Murray straight flights. Mr.



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Chanteloup, the first aviator to loop the loop on a biplane in England, just about to mount his Caudron machine at Hendon on Friday last week.

F. W. Goodden made a test flight on the 35 h.p. Caudron No. 1, after which Mr. Cooper did half-circuits, Mr. Bankes-Price straights, and Messrs. Freshney and Busk were rolling.

During the afternoon Mr. Badgery was out on *brevet* machine, doing figures of eight. He then went through his *brevet* tests in excellent style, making neat figures of eight, landing well, and rising to 300 ft.

Shoreham Aerodrome.

Wind prevailed during greater part of last week, but on Sunday and Monday the weather showed slight improvement, and all pupils came out under the instruction of Mr. Elliott. Lieut. Lucas flies exceptionally well. On Sunday he had one of the Avros up and gave an excellent performance. Purnell and Thompson have been doing good straights, and Cannon can now handle a 'bus in a good wind.

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CHRISTMAS FLYING AT HENDON.

REFERRING back to our report of the Christmas flying at Hendon a year ago (1912), we commented on the fact that in spite of a 40 m.p.h. wind, two aviators, Marcel Desoutter and Louis Noel made wonderful flights. They were wonderful flights *then*, but such is the progress of aviation now, that although during the Christmas holidays just passed the weather conditions were somewhat worse than on the previous Christmas, looping the loop and marvellous trick flying was the order of the day. B. C. Hucks induced us to look upon looping the loop and upside-down flying as quite commonplace, but the demonstrations given on Christmas Day, Boxing Day, and Saturday last by M. Chanteloup on his 60 h.p. Caudron biplane, make folk wonder what is to come next. Apparently it is all one to M. Chanteloup which way his machine flies out of the ordinary—upside-down, upwards, downwards, sideways, or tail first, in fact he seems to be able to tumble about anyhow, and to do just what he likes with it. There are three outstanding features about his demonstrations, viz., his machine is an absolutely standard Caudron biplane, a military single-seater with a 60 h.p. Rhone engine; he does not wear any straps other than an ordinary safety belt, and he makes a backward loop without any preliminary dive.

On Christmas Day, early in the afternoon, he gave his first demonstration under by no means favourable conditions, for not only was the wind blowing at between 30 and 40 m.p.h., but his engine was not running satisfactorily. He ascended to a height of 1,500 ft., at which height he made his first loop, and then proceeded to make a second, but as he was climbing, the engine stopped. The machine remained in this position, nose upwards, for an appreciable time and then dived, tail first, some three or four hundred feet. He came out of this terrible position by means of a cart-wheel turn and glided safely to the aerodrome. The necessary adjustments having been made to the engine, Chanteloup ascended for the second time and

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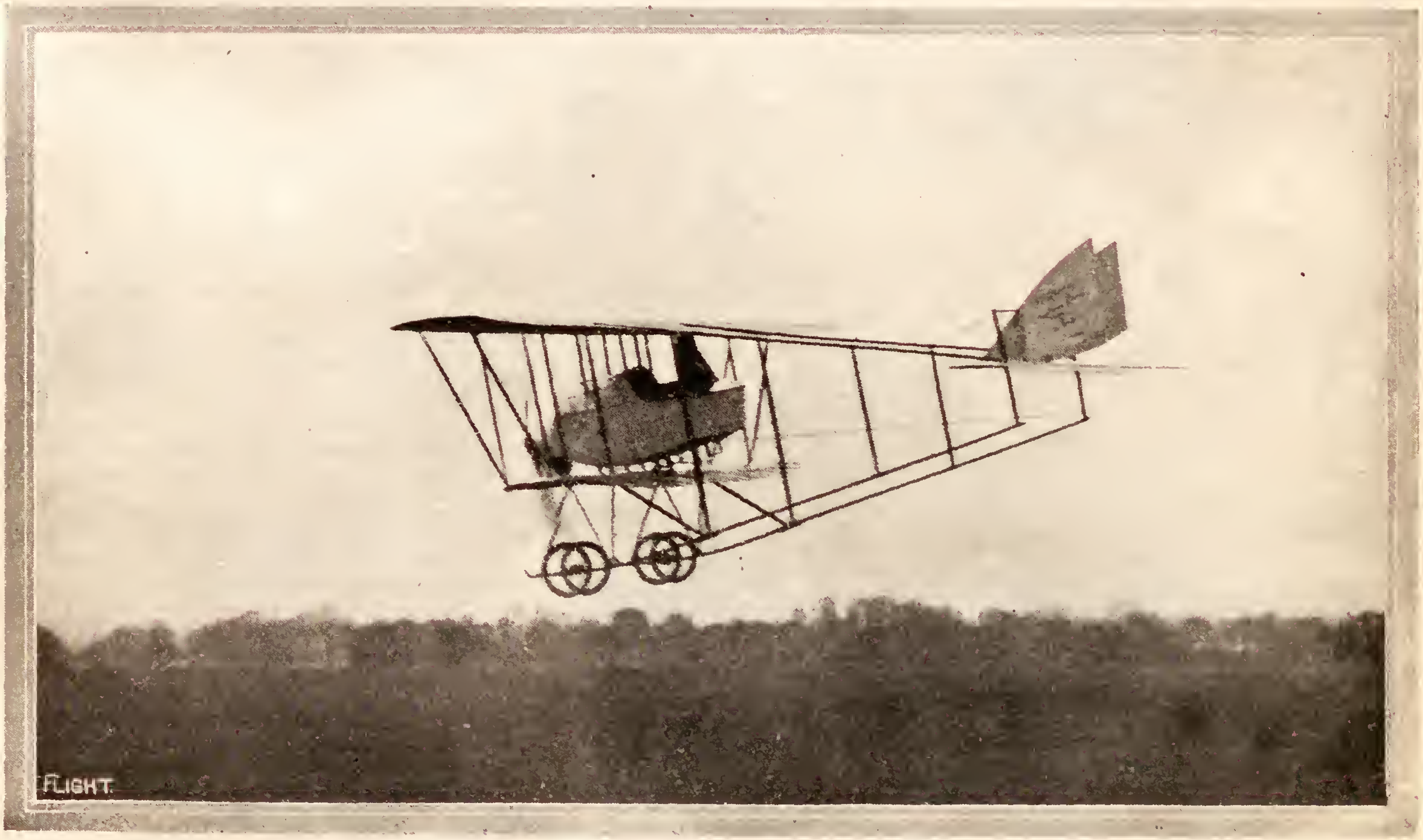
A plan view, from beneath, of the Handley Page biplane with the tail planes removed.



"Flight" Copyright.

Chanteloup descending on his Caudron biplane after carrying out his extraordinary loopings at Hendon on Friday.

put up some astonishing evolutions consisting of perfectly formed loops and side dives. This latter is a kind of *chute de côté*, in which the machine falls some considerable distance sideways before nose-diving.

On Boxing Day the wind increased in violence, but some splendid flying was put up nevertheless, and Chanteloup gave further demonstrations. At noon Philippe Marty ascended on the Morane-Saulnier monoplane, and a little later Louis Noel came out on the 70 h.p. Maurice Farman. Noel was literally lifted off the ground and was blown about in a remarkable manner; on one occasion the machine was forced down fully 200 ft. At 12 30 p.m. Chanteloup ascended on his little Caudron; he also was lifted off the ground as soon as the machine was released. He climbed to about 1,000 ft., and then executed a corkscrew dive to some few hundred feet from the ground. After this he ascended again to about 1,500 ft., and then made two backward loops without any preliminary dive. These loops are very similar to a performing dog turning a somersault. His next evolution consisted of a vertical dive from about 2,000 ft., and this was followed by a *chute de côté*, which terminated his demonstration. Most of the spectators then retired for lunch, but those who remained "on the premises" were treated to another demonstration by Gustav Hamel on his 80 h.p. Gnome-Morane-Saulnier. Shortly after 1 o'clock Hamel ascended to about 2,000 ft. and then executed three semi-loops, that is, he dives, brings the nose sharply up turning the machine over on its back and then falls out of the loop sideways. After these semi-loops he made a complete loop and finished up with a nose dive. On landing a gust caught the tail of the machine and turned it over on its nose. It remained in this position swaying in the wind with Hamel, held in by his shoulder straps, hanging upside down. It was not very long before many willing hands helped him out of his awkward, but by now, customary inverted position. On righting the machine it was found that the propeller and engine-plate were smashed, but otherwise little damage was done and Hamel was unhurt, but angry.

In the afternoon Noel and Marty again went up on the Maurice Farman and Morane-Saulnier respectively, Marty rising above the clouds, and being lost to view for some time. In the meanwhile the wind had increased to about 60 m.p.h. up aloft, evidence of which was forthcoming when Chanteloup ascended for the second time, the machine, which has a speed of 60 m.p.h. itself, at times remaining quite stationary, and even drifting backwards. On reaching a height of about 1,500 ft., Chanteloup made a nose dive to 600 ft. or thereabouts from the ground, and rising again he executed a number of banks and semi-loops, dropping the meanwhile to 500 ft. He then ascended once more to over 1,000 ft., where he made a "cart-wheel," which he followed up with a backward loop, and then descended to earth with a steep spiral dive. He was accorded a splendid ovation on landing, after which the proceedings were brought to a close.

Saturday was again very windy, but still fine, and a large number of visitors turned up at the aerodrome. Just before noon, G. L. Temple left for Uxbridge on his 50 h.p. Blériot. When within four or five miles of his destination he was forced to land and in doing so he was blown between two trees, where the machine was firmly wedged and but slightly damaged. At noon, Philippe Marty ascended with a passenger on the 80 h.p. Morane-Saulnier, and after making an excellent flight in the wind met with an exactly similar mishap to that which befel Hamel the day before. In this case the monoplane had come practically to a standstill, but a strong gust struck it, and the wheels catching in a rut, the machine turned completely over on its back emptying the pilot and passenger out on to the ground without serious injury. The machine itself only suffered a slightly cracked propeller and a bent tail. At 12.30, Chanteloup came out and quickly rose to 2,500 ft., from which height he made an inverted dive to about 1,000 ft., and then rising again he made a perfect backward loop, following this up with another loop, in which he turned over sideways when at the top of the loop. After this he made three cartwheels and then descended, having been aloft nearly 15 mins. In the afternoon the wind dropped somewhat, and a number of exhibition and passenger flights were made prior to Chanteloup's last demonstration. The first out was Claude Grahame-White, who made a 20-minute flight on the Maurice Farman. He was followed by R. H. Carr on the 50 h.p. G.-W. 'bus, Louis Noel on the Maurice Farman, and Marty on the 50 h.p. Morane-Saulnier. Next came some passenger flights by Carr and Noel, and a splendid display by Gustav Hamel on the 50 h.p. Morane-Saulnier. Hamel executed some wonderful banks, one time making a sharp spiral turn, rising steeply at the same time. Chanteloup then ascended slowly, his engine running somewhat poorly. When about 500 ft. up he made a steep *chute de côté*, and then descended to see to his engine.

After a few minutes he was up again, and climbing to 500 ft. he executed another *chute de côté*, followed by a right- and left-hand spiral side dive. He then climbed to about 1,000 ft., and made one of his back somersaults, after which he climbed to a height of from 3,000 to 4,000 ft., when he made an S dive to 2,000 ft., and then made another loop, finishing up with an amazing vertical corkscrew dive of 1,000 ft. On landing he was taken round the enclosures on the aerodrome car, and received an enthusiastic reception. After this the proceedings were brought to a close with a few exhibition and passenger flights.

Asked to give his impressions of his visit to England, M. Chanteloup said he was more than pleased with the reception accorded him, especially from those at the aerodrome. As to the latter itself, he thought it was an excellent ground, and the air conditions round about very good.

On the Sunday following, the weather was bright and frosty, and there was a good attendance of visitors. Gustav Hamel put up some of his old-fashioned stunt flying on the 80 h.p. Blériot with Miss Trehawke Davies as passenger. E. Baumann made a 6,000 ft. flight on the 60 h.p. Caudron, and Claude Grahame-White was busy taking up passengers on the Maurice Farman. Other pilots and machines up were Louis Noel on the Maurice Farman, R. H. Carr on the 50 h.p. G.-W. 'bus, and Philippe Marty on the Morane-Saulnier.

"Flight" Copyright.

Mr. Whitehouse flying the Handley Page biplane, with the tail planes removed, at Hendon.

ARMCHAIR REFLECTIONS.

By THE DREAMER.

Resolutions.

This is the 29th day of December. I know that because I have seen it printed on my morning paper. It also tells me that it is Monday, otherwise I should not know but that it might be any other day, last week having been made up principally of Sundays, with a balance of days that might have been anything. The fact is I have been lost. It has been Christmas. I spent the whole of the early part of last week telling people what I wished them, and the whole of the early portion of to-day has been taken up in enquiries as to whether my wishes had been fulfilled; but my morning paper reminds me that this is all behind me now, and that this is Monday, December 29th, and a solid working day, the first instalment of six solid working days in this week, and I have promised myself not to say Christmas any more, and not to think of holidays till Easter. Of course there is New Year's Day and Eve to come, but I am not sure what or when they are. Hogmanay is nothing of mine, and I don't care a brass farthing who will be the first to enter my simple abode on the morning of the first, or whether he carries a bottle or not.

The maiden I first see on New Year's morning is not at all likely to become my bride before the year is out, in spite of all theory to the contrary. I am strengthened in this refutation from a knowledge of the fact that she is "going out" with the baker's man. I shall not stand shivering in St. Paul's Churchyard waiting for the clock to strike twelve before I can take a "nip." My "fut" is on my native heath all the time; and, anyway, I don't come from that country where the men come from whom I vowed long ago never to call by name again—in short, I am a cockney, and New Year's Eve or Day is but one of 365.

The first of January will come for me, I know, because it is the day on which the income tax becomes due, and I have faith in the assessors that they will see to it that it shall arrive on time, even if they have to invent a new schedule.

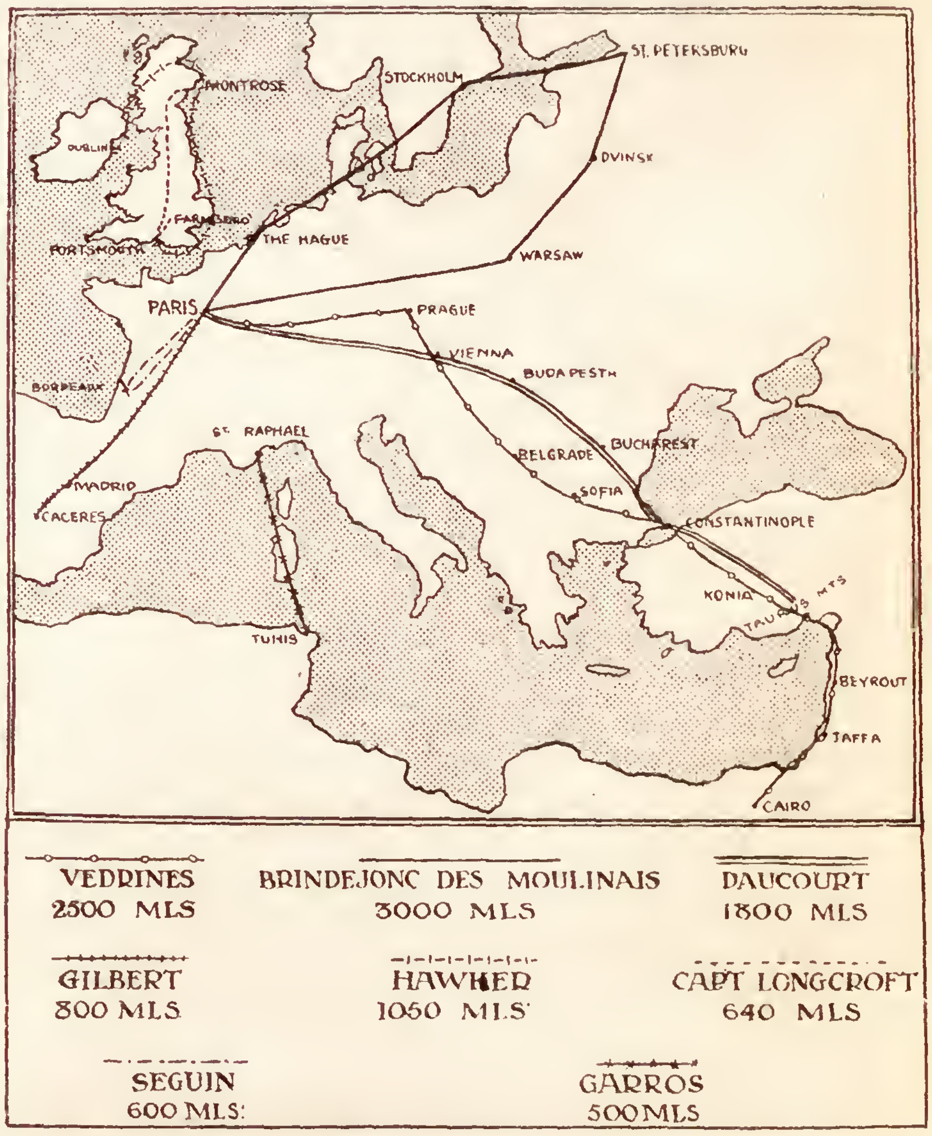
Yet, being but one of 365, it is nevertheless a day of great importance to me; it is the day on which I make all those resolutions with regard to the giving up of all that is worth living for, that has kept me in the same groove for—well, no matter how many years. If I had all the pipes I have given away when I gave up smoking I should be saved a deal of expense now in buying new ones; and I always have more cigarettes on January 1st than on any other day in the year. There is the box I left at home in the morning when I gave up the vile habit, and the box I bought on the way to the station when I side slipped again. After all, the making of resolutions must have a strengthening effect on the character, even if they are immediately broken; there is something in recognising one's shortcomings.

Long-distance Aeroplaning.

It seems but yesterday that the brothers Wright made history by keeping a machine in the air for 59 seconds. Things have progressed considerably since then; but I think the long-distance flights put up by pilots in this and other countries during 1913 outstrip anything in the way of progress in previous years, even taking into account improvements in machines themselves. It would be invidious to single out any particular flight, they have all been so magnificent, but a list of some that stand out pre-eminent, and deserve to be placed on record *en bloc*, may not be amiss.

The recent flight of Vedrines from Nancy, on the Franco-German frontier, to Cairo, some 3,500 miles, is in itself sufficient recompense for all the trouble and care that has been bestowed on the improvement of both pilot and machine. In addition we have Brindejonc des Moulinais, who, on June 10th, flew from Paris to Warsaw in one day, and thence continuing, till July 2nd, to St. Petersburg, Stockholm, The Hague, and back to Paris, covering in all 3,000 miles; M. Garros, on September 23rd, flew 500 miles across the Mediterranean, from St. Raphael on the Riviera to Bizerta, near Tunis, in Africa; M. Gilbert, on August 3rd, flew 870 miles with only one stop, the journey being from Paris to Caceres in Spain. Again, there is the fine flight of Helen on a Nieuport monoplane, who covered 13,060 miles in thirty-nine consecutive days, and the flight of Seguin from Paris to Bordeaux and back, non-stop, when he was in the air for thirteen hours. In England, Capt. C. A. H. Longcroft, on November 22nd, made a non-stop flight with a passenger from Montrose to Portsmouth, and back to Farnborough, a distance of 635 miles, at a speed of 90 miles an hour, and Hawker, in his attempt to win the *Daily Mail* prize of £5,000 for the circuit of Britain, flew from Southampton to Dublin *via* Ramsgate, Yarmouth, Scarborough, Cromarty, Oban and the Irish Channel, covering in all a distance of 1,000 miles.

These are but a few of the more prominent flights accomplished this year, but they show the enormous strides that aviation has made. It is beyond any man to say what will happen during 1914. In all probability next year will see two more expeditions to the South Polar regions, that of Sir Ernest Shackleton and Dr. Mawson.



Some long distance flights of the year.

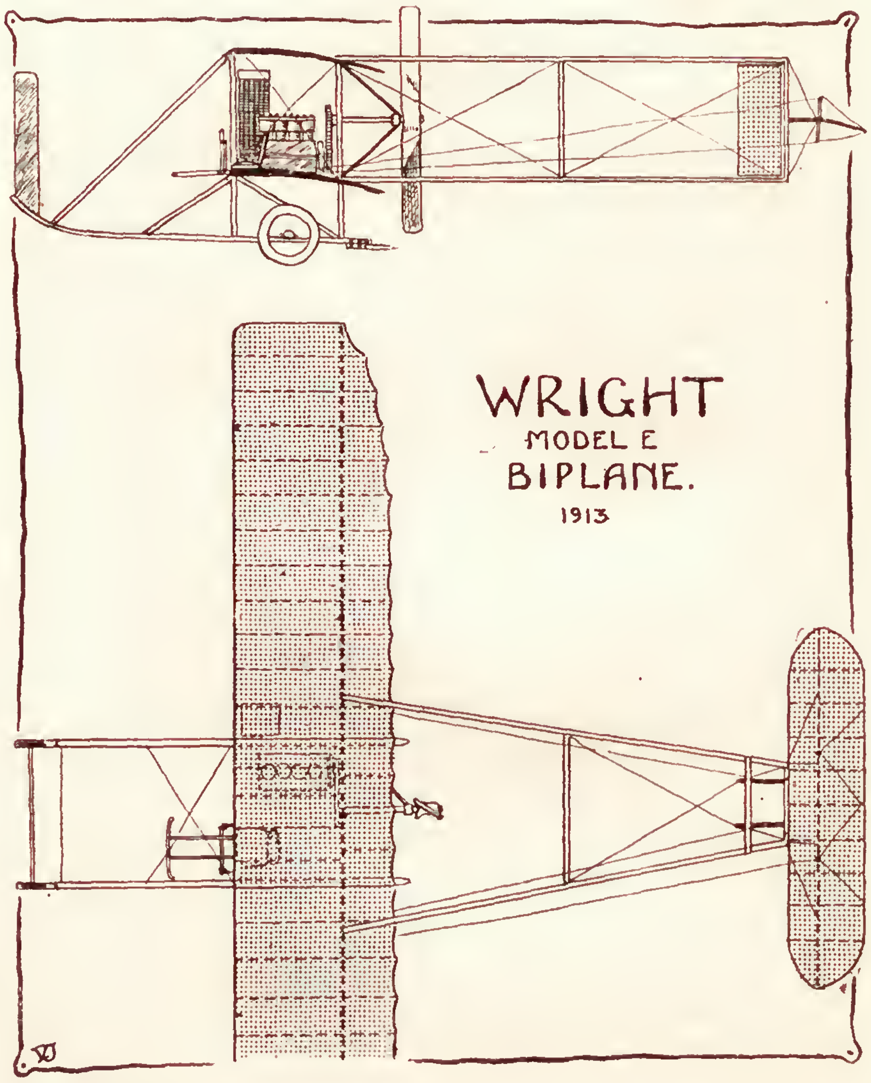
In both of these, aeroplanes, and sledges with aerial propeller drive, will be used, which will be a severe test for this form of locomotion under most trying circumstances. To leave one's companions and fly away into the unknown on an aeroplane must require nerves of steel. It is such a fast method of covering distance that no doubt much of the previously impossible will be accomplished. It would, for instance, quickly solve the question as to what was on the other side of huge fields of ice mountains, and for that purpose should prove invaluable; but it must be remembered that there is great danger in flying over these regions where, no doubt, landing-places are few and far between, and a man might easily fly into a fog or a storm and have to come down, and even supposing that he finds somewhere to land, a slight mishap might place him in extreme danger of not being able to get back. A man who leaves his base and flies off into the Polar Circle, to a very great extent take his life in his hands; but there is never much difficulty in finding men ready to do this, and I have no doubt trouble will not be experienced in that direction; one can only hope that every reasonable care will be taken, and that the airman, or airmen, will receive all they deserve from a not, as a rule, over-generous nation.

AEROPLANE TYPES.

THE MODEL E WRIGHT BIPLANE.

SOME little time ago the Wright Factory at Dayton turned out a new type of biplane specially designed for exhibition work, which has given very satisfactory results in the air. It more or less follows the usual Wright practice, the only way in which it differ, being that a single propeller is employed instead of the two that have previously characterised these pioneer machines. There are, of course, several differences in constructional details necessitated by the new method of propulsion. One important feature consists of the rapidity with which it can be dismantled and *vice versâ*. The planes are built up in three sections or panels, the centre one of which is carried on the chassis and bears the pilot and power plant. The latter consists of a water-cooled 30 h.p. 4-cylinder Wright motor, which is mounted on the lower plane alongside the pilot, on his right, and driving a seven-foot propeller by means of a single chain and a short length of shaft. The propeller is centrally situated at the rear of, and midway between the top and bottom planes, and its shaft is supported by a strut and three steel tie rods. The tail is carried by two pairs of V outriggers connected to the rear spar so that they are clear of the propeller. The tail is of the orthodox Wright pattern, consisting of a single elevator plane with a flexing trailing edge and a pair of directional rudders. Right in front of the machine are two "blinkers," which differ from those on other Wright models in that they are constructed of wood and are rigidly fastened at the bottom to the extremities of the skids. They are connected at the top by a thin tie rod, and the only other bracing required is a pair of diagonal wires from one to the other. The two outer cellules or panels are very easily detached from the centre one, the time taken to dismantle the machine for transport being well under fifteen minutes. The principal dimensions of this machine are:—Span, 32 ft.; overall length, 28 ft.; chord, 5 ft. 1 in.; supporting area, 316 sq. ft.; weight ready for the air, 730 lbs.

"VEE JAY."



Nieuport Aeroplanes in Great Britain.

A FURTHER addition to the list of British companies handling the best type of foreign designed machines in this country is an accomplished fact. Messrs. Nieuport (England), Ltd., has been established under very sound auspices, the members of the Board being Sir Inigo Thomas, G.C.B., formerly Permanent Secretary at the Admiralty; Col. C. V. Hume, M.V.O., D.S.O., late of the R.F.A., formerly Military Attaché at H M. Embassy, Tokio; Henri Kapferer, C.E., Knight of the Legion of Honour, the famous pilot, and Director of the Astra Airship Co., which has recently delivered to England the "Astra Torres," the aircraft holding the world's record for speed; Léon Bazaine, Director of the Nieuport Works at Issy-les-Moulineaux; and Albert Picard, Knight of the Legion of Honour, who will fulfil the duties of Managing Director.

It is intended eventually to build the machines in this country, and in the meantime Nieuport monoplanes will be demonstrated at Hendon, and the Nieuport waterplanes at Southampton, some of the best known Nieuport pilots coming over to pilot the machines. It is unnecessary to recapitulate here the fine work done on machines of this type, but mention must be made of the winning of the International Michelin Cup by Helen, the new height record by Legagneux, the flight from Paris to Asia Minor of Bonnier and it may be added that Dr. Espanet will shortly attempt to beat the speed records on a specially-built 200 h.p. monoplane. We understand that several new machines are now being built in the finely equipped factory and some of them will be seen on the Nieuport stand at Olympia. In this connection it will be remembered that the Nieuport have a licence for constructing the Dunne biplane. Apart from Great Britain, other Governments which have purchased Nieuport monoplanes, are the Italian, Russian, Spanish, Roumanian, Bulgarian, Grecian, Japanese, Siamese, Swedish, Argentine, &c., &c. Temporarily the offices of the firm are at 28, Milk Street, E.C.

An Italian Stability Machine.

FROM Turin comes a statement that Dr. Robiola has invented an automatically stable aeroplane, which is shortly to be tried at the Mirafiori Aerodrome. It is said to weigh very nearly a ton, and, fitted with two 80 h.p. Gnome engines, to have a speed of over 120 miles an hour.

AERO ENGINES.*

By GRANVILLE E. BRADSHAW.

THERE is probably no form of prime mover in existence that is more highly stressed, or that has a more strenuous life, than the Aero engine, and there is undoubtedly no engine that has greater claims on reliability.

These facts at once suggest that the aero engine requires greater accuracy of design, wider knowledge of the properties of the materials available for the construction of such engines, and the highest possible workmanship that can be obtained.

It has been said that the modern aeroplane, although not by any means perfect, has already reached a stage of efficiency such that extreme lightness of the power plant is no longer necessary to the evolution of the successful flying machine.

This has appeared in engineering periodicals on several occasions, and it is interesting to note that this form of argument invariably comes from those who have had little, if any, practical experience in aeroplane design, construction, or piloting.

The aeroplane manufacturer's cry for the extremely light engine is probably greater to-day than it has ever been in the history of aviation. The demands of the authorities who purchase aeroplanes are such that probably so much as 90 per cent. of the factors which determine the most successful machine, are governed directly or indirectly by the weight efficiency and fuel efficiency of the engine; by the former is meant, of course, the number of pounds of weight for every horse-power developed. (That the engine shall be extremely reliable is of course taken for granted.)

Amongst the essential features of all successful aeroplanes are the following:—

1st. That it shall climb very quickly.

2nd. That it shall have a good gliding angle.

3rd. That it shall have a combination of fast and slow flying speeds.

4th. That it shall be a machine safe to handle in all winds, both with and without the engine in operation.

5th. That it shall be able to remain in the air for long periods.

Investigating these in the order just cited, we find that the first essential feature, *i.e.*, "that it shall climb quickly," depends almost entirely on the weight efficiency of the engine. For our purpose, and because the design of the aeroplane does not enter into our subject, I propose to assume the aeroplanes themselves to be of equal efficiency in flight, and working on this assumption it is readily seen that the rate of climb varies directly as the power developed, and indirectly as weight to be lifted. That the aeroplane shall be very efficient in this particular can easily be understood when one remembers that its capabilities of evading destruction from projectiles depend to a great extent on how quickly it can get out of range of such projectiles. It must also be efficient in climbing in order to successfully rise from a small field surrounded by tall trees, which may be necessitated by a forced landing during a cross-country flight over a populous district.

The second essential, *i.e.*, "that it shall have a good gliding angle," or in other words, that from any given height it shall be able to glide for a great distance, is also governed indirectly by the weight of the machine, and consequently by the weight of the power plant, because a machine with a heavy power plant must be designed with a larger lifting surface, and must be stronger in proportion.

With the same lifting surface and head resistance, the angle of descent of the heavy engined machine will be steeper than that of the light machine, as higher speed is necessary in order to support the increased weight.

The third essential feature, *i.e.*, "that it shall have a combination of fast and slow flying speeds," is one of paramount importance, and one that aeroplane constructors are paying probably the greatest amount of attention to.

Just as the fast battleship is infinitely superior to the slow one, so will the fast aeroplane in time of war be able to frustrate and limit the usefulness of the slow machine. To have a machine that will only fly at a high rate of speed, however, is almost useless, and at the same time extremely dangerous.

For purposes of alighting in bad weather on rough and unknown ground, a machine that will not fly at a lower speed than about 70 miles per hour is anything but desirable, such a machine being of course much more liable to be broken up when alighting. The capabilities of a machine to fly slowly as well as fast, depend almost entirely on the adoption of an extremely light and powerful engine. If the machine is designed for very high speed, slow speed is only possible by the machine, and consequently the power plant, being very light. One cannot wonder therefore at the aeroplane constructor crying for a light engine.

The fourth essential, *i.e.*, "that it shall be a machine safe to handle in all winds both with and without the engine in operation," depends again to a great extent on the weight of the power plant. Aeroplanes have been built that will carry as much as from 15 to 20 lbs. per sq. ft of supporting surface, but constructors nowadays are agreed that the lightly loaded machine is the safer to handle, and the average loading on the planes is to-day generally in the neighbourhood of 4 or 5 lbs. per sq. ft.

A heavily loaded machine depends to a great extent on high speed of flight in order to maintain it in the air. Should the speed fall (unconsciously to the pilot) through loss of engine power, or from any other cause, the control becomes sluggish, and will not answer quickly, the aeroplane, unless the nose is put down very quickly to increase the speed, flounders about like a log in the sea, and generally ends in a sideslip and one of those terrible nose dives that have deprived us of so many of our best pilots.

The life of the pilot of the heavily loaded machine is more dependent upon the good behaviour of the engine than is the life of the pilot of the lightly loaded machine, and the latter could probably go on flying in search of a good alighting ground with two or three of the cylinders not firing at all.

The fifth and last essential, *i.e.*, "that it shall be able to remain in the air for long periods," depends chiefly upon the oil and petrol consumption of the engine, and without efficiency in this respect the extremely light power plant is practically useless, as flights of only a few minutes' duration are not likely to be of much use in serious warfare.

All the essentials just enumerated, and particularly the last, depend, of course, on the engine being absolutely free from any breakdown, which point has not been dealt with, as it is not a debatable one. We are all without doubt of one mind on this matter.

The foregone, to the writer's mind, proves that the light engine is not only desirable but essential. Competition demands it, the man who has to fly the machine demands it, and the nation demands it. There can be no doubt that the nation will be foremost in aviation which can produce the lightest, the most economical, and the most reliable aero engine.

We occasionally read in periodicals devoted entirely to automobilism, that if some of our car engine designers, who are so successful on the track and on the road, were to turn their attention to aero engines for a little time, and slightly modify the designs of their most successful racing engines, we should immediately have the perfect aero engine, and the aeroplane constructor's quest would be at an end.

Indeed, there seems to be an impression in automobile circles that the aero engine designer is a freak inventor with most weird and unmechanical ideas of making the cylinders run round the crankshaft, or of building engines of peculiar shapes, more with the idea of giving vent to their ingenuity than with a determination to evolve a successful engine.

As a matter of fact there is hardly a successful aero engine designer in existence who has not tried at some time or other the adoption of car practice to aeronautical purposes, and found in a remarkably short space of time that in designing aero engines he must first dismiss from his mind all thought of automobile practice. And really, when one comes to look at it in the light of the five essential features of a successful aeroplane, already dealt with, the aero engine must be built on lines almost directly opposite to those of the present-day high-speed car engine.

Just at the moment there appear to be three schools of thought in aero engine design.

The first builds an engine of very large capacity, and arranges induction and carburation so that little brake horse power is developed for the cylinder size. By this means it is found that the weight can be cut down to a greater extent than the horse-power, but at the same time bearing surfaces are as large as if the engine were double the power, and consequently the life of the engine is very great. This type of engine must always be the most reliable, as it is like any other engine running on two-thirds throttle, and is at the same time easily kept cool. It is generally in the form of a rotary cylinder, or radial stationary cylindered engine, with air-cooling, but it has its disadvantages.

In the first place it uses as much oil as an engine developing the full power of the cylinder capacity, and if it is a rotary cylindered engine it often uses more. Secondly, it is like an engine running on about two-thirds throttle, and the petrol consumption is consequently high per brake horse-power developed. It is also difficult to see just at the present how such engines will work in when high powers are required, such as say 300 to 400 horse-power. The size in this case will be considerable, and may lead to difficulties in fitting.

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* Paper read before the Scottish Aeronautical Society, on Wednesday, December 10th 1913, at the Engineers and Shipbuilders Institute, Glasgow.

This form of engine is ideal for short flights up to say one or two hours; it is also particularly suitable for trick flying and exhibition work.

The second school builds an engine with a particular view to all-round efficiency, especially with regard to petrol and oil economy, and an absence of the need for a specially trained mechanic in constant attention. It is generally of the vertical or "V"-type, with parts as light as is consistent with reliability, and it generally develops about 80 per cent. of the maximum power obtainable from an engine of its size. It is not so light as the first type of engine mentioned, but the whole outfit is lighter when both are carrying enough oil and petrol for a flight of four hours or more. It is sometimes air-cooled, and sometimes water-cooled, and runs at 1,300 or 1,700 revolutions per minute; in the latter case gearing is interposed between the engine and propeller.

The third school, which is not very much in evidence, builds an engine of more or less automobile practice, with heavy cast-iron cylinders and solid parts throughout. The weight efficiency of the engine is obtained by running the engine at a high speed, by large and quick lifting valves, by high compression, and by perfect tune. It runs at about 2,400 r.p.m. or possibly more, is water-cooled, and is more or less an orthodox car engine, lightened in external fittings. Its chief disadvantages are that in getting the last 10 per cent. of power it is probably stressed 25 per cent. more.

Experience has shown many times that an engine will run up to a certain horse-power regularly and reliably, whilst an attempt to get the last ounce of power often ends in the engine breaking up altogether.

The greatest disadvantage of this type of engine, however, is probably its propensity for getting out of tune. Such an engine seems to think nothing of dropping 100 revolutions from one day to the next with no apparent reason, and this probably the worst danger to flying. The pilot possibly knows it, but risks it occasionally, but such risks ought not to be offered to him.

Occasionally racing cars do 12 hours all out on Brooklands track, and this is claimed as an exceptional performance, which of course it is, and which few manufacturers succeed in doing at the first attempt, even if they succeed at all.

On the other hand, any and every aero engineman, any and every day, has to be capable of doing this if called upon, and whilst the car engine in its 12-hour run is allowed several short rests by being throttled down every two or three hours to fill up and change tyres, and has the best experts from its factory looking after it, the aero engine, on the other hand, has to do the 12 hours or more in the hands of inferior mechanics and without a moment's rest of any sort, With all this, the aero engine must be some 40 or more per cent. lighter than the car engine.

Racing cars nowadays invariably run in classes, and they are designed solely with the object of obtaining the maximum brake horse-power out of a certain and limited cylinder capacity. To carry this practice into aero engine design is to quite unnecessarily handicap oneself, because aero engines are not tied down to capacity, the only features being desired are low weight per brake horse-power, low oil and petrol consumption, and absolute reliability.

To ever hope to obtain the same reliability from a hard worked engine as from a lightly loaded one, is of course unreasonable, and for this reason the first type of engine we referred to has had the greatest measure of success so far.

Whilst the highly stressed engine has to be carefully kept in perfect tune by constant attention in order not to show a falling off in power, the engine of very low horse-power per cylinder capacity will run for months without any appreciable drop in revolutions. In fact the average rotary motor has something seriously wrong with it when it has dropped as much as 20 revolutions per minute.

Some Government departments are demanding (and quite rightly) that all engines shall pass a ten hours full throttle test and that the brake horse-power shall not vary more than 3 per cent. above or below throughout the whole ten hours, the control levers not being touched during the run. This will probably do more good in evolving a successful engine than anything else, as it not only compels the designer to make an engine that will run for twelve hours, but covers points with regard to sharp cams and weakening springs, occasional misfiring, badly designed or gummed up piston rings, burnt exhaust valves, loss of compression, &c.

It is generally accepted that we should have been flying twenty or thirty years ago had there been any engines in existence, and just as the birth of the aero engine has made practical aviation possible, so will the advancement of the aero engine on proper lines help to bring about perfection in aeroplanes.

The engine is, of course, a much more difficult proposition than the aeroplane, and whilst aeroplanes can be designed and built in a few weeks with a certainty of flying, and flying well, at the first or second attempt, the engine is only evolved at the expense of many months, and more often years, of experiment.

The use of proper materials is perhaps the first and foremost thing to consider, and it is rapidly being brought home to engine manufacturers that steel is the only reliable and light material for its strength that can be found. Cast iron and aluminium alloy are the two last materials one should think of using when reliability is such an essential feature. Aluminium may be light in itself, but taking weight for strength it is some six or eight times as heavy as good quality steel. Cast iron, on the other hand, is neither light nor strong, and is at the best of times very treacherous and uncertain.

Probably another two or three years will see cast iron, phosphor bronze, cast aluminium, and all such metals entirely discarded by aero engine manufacturers, and it is not surprising to note that the most reliable and consistent, as well as the lightest, engines in use to-day are constructed almost entirely of steel.

Having realised that extreme lightness combined with strength to resist fracture, is the chief factor in aero engine design, one would think it very natural for the designer to ask himself, at the very beginning, "What material is the lightest for its strength and at the same time the most consistent?" The reply would be without hesitation—Steel; and more especially when one realises the enormous tensile strength of some of the steels obtainable to-day. Here is the danger of following automobile practice and in not appreciating the totally different conditions of the two subjects. One can quite easily be led into using cast iron cylinders on cast aluminium crank-cases, when a few moments' thought would convince one that an engine so designed, although it may be excellent in its way, has not the faintest chance in competing in lightness and reliability with the engine using materials some ten times stronger. The sooner we in this country realise this, the sooner shall we be in a position to prevent our orders for engines going abroad. It is interesting here to note that the one part of a racing car engine that is required to be as light and as strong as possible (I refer to the piston), formerly cast iron, is now almost universally replaced by steel.

With regard to the various types of engines already in existence, we all gave our own ideas as to what we think will be the ultimate type, but it is of course impossible for anyone to predict what the future will bring. As to whether or not the air-cooled engine will outlive the water-cooled one, appears to depend entirely upon the question of whether the principle of air-cooling will be so perfected that it can compete with water-cooling in all the latter's best points.

I have no hesitation whatever in saying that if air-cooled engines can be made that will be as economical on oil and petrol for flights of 15 hours or more, that will have valve gear as reliable and free from loss of strength in valve springs and lengthening of valve stems, that will not require any greater amount of attention and tuning up, that will not require dismantling and cleaning out more often, and that will have as long life as the water-cooled engine, then the air-cooled engine will survive. If water-cooling can be done away with without any sacrifice, it will most assuredly not be retained. Water-cooling may be necessary for seaplane work, but even then if the cylinders of an air-cooled engine can be made to withstand, after running for several hours, a cold plunge under salt water without distortion or other damage, water-cooling will die a natural death. Whether the air-cooling advocates will succeed as far as this remains to be seen. At the same time it looks rather unlikely that the believer in water-cooling will stay where he is and let air-cooling catch him up.

At the present time water-cooled engines are at a disadvantage owing to the difficulty of obtaining very light radiators that will stand a little rough usage without leaking, and these same engines have been greatly handicapped in the past through machines not being designed with proper provision for a suitable radiator. The machine has been designed by one, the engine by another, and the radiator by a third, with the result that in assembling the machine the radiator has been hung in some position suitable for the machine, and often quite unsuitable for the engine. This has involved the use of unnecessary and long water-pipes, and of numerous rubber joints, with the result that water leaks and air-locks in the water pipes have occurred, and the engine through no fault of its own has been given a bad name.

The near future promises to remove all this, and automobile practice in this one instance is aiding the water-cooled engine. Radiators of the honeycomb type are now being fitted either immediately in front or immediately behind the engine, with a better head of water above the cylinders, and a great reduction in length and number of water-pipes and joints.

The question of the shape of engine most suitable for an aeroplane does not arise so much from the aeroplane constructor's point of view to-day as it did formerly. The average aeroplane *fuselage* is now so large that any engine within reason can be tucked away without projections to offer head resistance, and the matter of shape lies chiefly with the engine designers, except in the case of some stationary radial engines, which require the air from the propeller to cool them. In this case the cylinders, in order to function properly, must offer head resistance, with a consequent reduction in flying speed. (*To be concluded.*)

BRITISH NOTES OF THE WEEK.

THE ROYAL FLYING CORPS.

The following appointments were announced by the Admiralty on the 21st ult. :—

Carpenter W. A. Hancock, to "Pembroke," additional, for Calshot Naval Air Station, undated.

Royal Naval Reserve.—Henry R. Busteed, appointed Sub-Lieutenant for First Reserve of the Naval Wing of the Royal Flying Corps, Oct. 4th.

Christopher Draper, appointed to "Pembroke," additional, as Probationary Sub-Lieutenant, for course of instruction at Central Flying School, Jan. 27th, 1914.

The following were announced by the Admiralty on the 23rd ult. :

Sub-Lieut. J. R. Smith-Pigott, to the "Pembroke," additional, to date December 20th, and for course of instruction at the Central Flying School, to date January 27th.

Fleet Paymaster F. Lenn, to the "Pembroke," for headquarters of Naval Wing of Royal Flying Corps, to date December 24th.

Assistant Paymasters A. A. Robinson and L. D. McKean, to the "Pembroke," additional, for headquarters of Naval Wing of Royal Flying Corps, to date December 24th ; and R. J. Cosway, to the "Orion," to date December 29th.

The following was announced in the *London Gazette* of the 23rd ult.:

R.F.C.—Military Wing.—*Establishments, Inspection Department.*—Maj. John D. B. Fulton, Royal Artillery, from an Instructor at the Central Flying School, to be Chief Inspector. Dated December 17th, 1913.

The following was announced by the Admiralty on the 24th ult. :

Lieut. B. D. Ash, to "Pembroke," additional, December 23rd, and additional, for course of instruction at Central Flying School, January 27th, 1914.

The following were announced by the Admiralty on the 28th ult. :

Com. F. R. Scarlett, to "Pembroke," additional, for temporary duty as Inspecting Captain of Aircraft, December 23rd.

Sub-Lieut. F. E. T. Hewlett, to "Pembroke," additional, for Isle of Grain Air Station, as Flying Officer, December 23rd.

The following was announced by the Admiralty on the 30th ult. :

Capt. P. Owen, R.M.L.I., to the "Pembroke," for Central Air Office, Sheerness Sub-Depôt, on the "Hermes" paying off.

ROYAL FLYING CORPS (MILITARY WING).

War Office summary of work for week ending December 20th :—

No. 1 Squadron.—Work was carried on as usual during the week.

No. 2 Squadron.—There was a certain amount of flying on B.E.'s and Maurice Farmans, but the week was chiefly devoted to moving aeroplane hangars to the new aerodrome and erecting them there. Capt. Dawes and a passenger flew from Montrose to Farnborough on a M. Farman, arriving on the 18th.

No. 3 Squadron.—The pilots of "A," "B," and "C" flights were flying daily throughout the week—1,174 miles in all were flown. Lieut. Wadham went up to 9,500 ft. with a passenger on a Blériot on the 15th.

No. 4 Squadron.—"B" and "C" flights were at work daily during the week carrying out reconnaissance and instructional flights.

No. 5 Squadron.—The BE.'s and M. Farmans were flown daily. The detachment which has been at Dover for several weeks returned to Farnborough during the week.

Flying Depôt.—Experimental work on various lines was continued. There was some flying on B.E.'s and M. Farmans.

R.F.C. Naval Wing on Holiday.

The fourteen days' leave granted to officers and men at the Naval Flying School, Eastchurch, and the other naval air stations round the coast, expires on Monday, when active work will again be recommenced.

New R.F.C. Appointments.

From the list of appointments to the Royal Flying Corps which appears elsewhere, is will be seen that an inspection department has been created for the Naval Wing, and Commander F. R. Scarlett has been appointed temporarily as the first Inspecting Captain of Aircraft. Similarly, Major J. D. B. Fulton, R.A., who has been acting as an Instructor at the Central Flying School, has been appointed a chief inspector in the Military Wing.

The "Hermes" Paid Off.

Two days before Christmas, the light cruiser, "Hermes," which was commissioned as the parent ship of the Naval Wing of the Royal Flying Corps, was paid off at Chatham, and it is not expected that she will again be employed as a commissioned ship. The headquarters of the Naval Wing have been transferred to the Naval Sub.-Depôt at Sheerness.

A Window of Thanksgiving.

As a thank offering for the safe recovery of Mrs. de Beauvoir Stocks from the effects of the recent smash at Hendon, Mrs. Ernst, her mother, has given a stained glass window to the new church of St. Michael, Golders Green, N.W.

The Sunbeam-engined Farman at Brooklands.

During the week before Christmas, some fine flights were made on the Sunbeam-engined Maurice Farman, piloted by Jack Alcock, the work including one cross-country trip of over two hours with a passenger, and another of an hour and a half, during which the wind was very gusty.

Speed Range on an Avro.

On the 22nd ult., Raynham was flying the 80 h.p. Avro at Brooklands, and with a passenger and three hours' fuel was timed to do a speed of 83 miles an hour, and subsequently 30 miles an hour, showing a speed ratio of 2·77, or, in other words, the high speed was nearly three times greater than the slowest. Raynham also climbed 5,000 feet in 9 minutes, an average climbing speed of over 500 feet a minute. By removing the passenger's and pilot's wind screens he found that the speed was increased by 4 miles an hour.

"Le Tourisme Aérien."

Such is the title of the latest book issued by the Farman Brothers, and it surely conveys a deal of meaning. The book, which is a most beautiful specimen of the printer's art, opens with a description of a trip with Maurice Farman round the Loire Valley, written by G. de Pawlowski, and illustrated by a fine series of photographs, taken from the aeroplane, of the different *chateaux* and other features of interest in the district. This little story emphasises the widespread use which could be made of aeroplanes for touring purposes, and our readers will remember that the brothers Farman have been in the habit of making such a trip as is described practically each week-end during the summer. The second half of the book deals with the Farman schools and works and the different types of Farman machines, and is in fact a catalogue, although, as we have indicated, the beautiful style and arrangement of the book almost precludes the use of such a word to describe it. The mere handling of it conveys the idea of prosperity. Those who wish to have a copy should apply to Farman Freres, Rue de Silly, Billancourt, Seine, or to the Aircraft Manufacturing Co., Ltd., 47, Victoria Street, S.W.

Hucks at Liverpool.

Although the wind was blowing about 50 miles an hour, B. C. Hucks fulfilled his engagement, and looped the loop, &c., at Aintree racecourse on Boxing Day. Gordon Bell also did some clever flying in the high wind, and later in the afternoon, when the wind was still stronger, Hucks went up again for about five minutes.

G. L. Temple at Uxbridge.

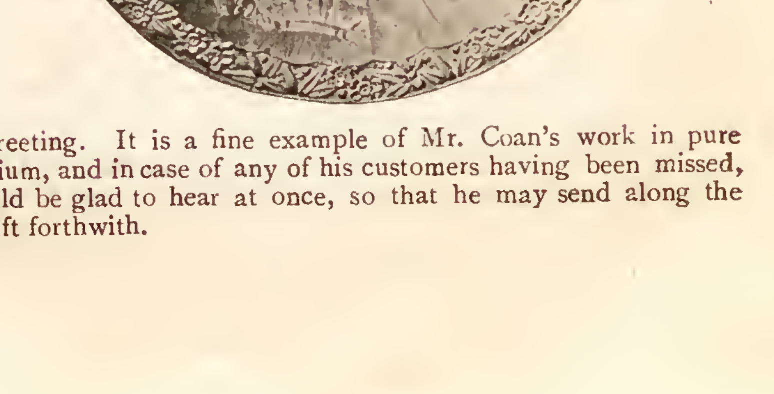
On Saturday, G. L. Temple flew against the strong wind to Uxbridge, the trip taking exactly one hour, and very bad weather being encountered. On arrival there a forced landing was made in an exceptionally small field, it being necessary to bring the machine in between two trees. One wing actually touched a tree, but the machine was quite undamaged.

An Address Wanted.

The Editor would like to have the present address of "Cruiser Squadron" who in June last wrote a letter which appeared in Flight under the heading of "Aeroplane *v.* Dreadnought. There is a communication awaiting him at this office.

Mr. Coan's Season's Greeting.

The little photograph below gives an idea of the charming aluminium fruit dish which Mr. Robert W. Coan, of 219, Goswell Road, E.C., is sending round to his customers by way of a seasonable greeting. It is a fine example of Mr. Coan's work in pure aluminium, and in case of any of his customers having been missed, he would be glad to hear at once, so that he may send along the little gift forthwith.



FOREIGN AVIATION NEWS.

An Italian Height Record.

AT Busto-Arsizio, on the 18th ult., Capt. Picco, on a Nieuport-Gnome, beat the Italian height record by getting up to 3,800 metres. The ascent took half an hour, and the return to earth about fifteen minutes.

Vedrines Reaches Cairo.

LAST Monday afternoon saw Vedrines arriving at Cairo on his Blériot monoplane on which he started from Nancy on November 20th. After a fortnight's rest at Constantinople he left the Turkish capital on December 19th, and made a non-stop flight of 650 kiloms. to Konia. Four days later he stopped, after flying 550 kiloms., at Tartus on the coast of Palestine, and the following morning flew on the short distance to Beirut, where he was accorded an enthusiastic reception. His crossing of the Taurus mountains, the peaks of which were covered with snow, had to be made at a height of 3,500 metres. Last Saturday saw the completion of another 250 kiloms. to Jaffa, while on Monday Heliopolis was reached, a circuit being made over Cairo before descending at the aerodrome. Vedrines now states that it is his intention, after spending a fortnight at Cairo, to start on another stage of his world-flight, and proceed by way of Jerusalem, Aleppo, Bagdad, Bombay, Calcutta and Singapore to Australia. From there he intends to take ship to America and fly across America.

Bonnier also Progresses.

MARC BONNIER, on his Nieuport monoplane, set out from Constantinople to follow Vedrines, on the 20th, but in landing at Eskisher he damaged his propeller, which delayed him a couple of days, when he flew to Konia. He completed a further stage, including crossing the Taurus mountains, to Beirut on Tuesday, and from there will go on to Bagdad.

Paris to the Alps by Aeroplane.

BIDER, the Swiss pilot, who has made many fine flights among mountains, on Christmas Day flew from Buc, near Paris, to Berne on a Blériot-Gnome machine. The total time taken for the journey of 310 miles was 5¼ hours. For the greater part of the journey Bider was at an altitude of 2,000 metres flying above the clouds.

With the Loopers.

ON the 21st ult., a new looper was seen at Buc. Olieslaegers, the Belgian pilot, having returned to aviation after a two years' rest, and studied under M. Blériot, making several successive loops in a very clean fashion. His exhibition was varied by a series of experiments with the Blériot safety parachute with dummies liberated from a machine piloted by Bidot. On the same day "looping" flights were made by Hanouille on his Blériot at Marseilles, Chevilliard on a Farman at Lyon, Garros on a Morane at St. Raphael, Chanteloup on a Caudron at Nantes, and Poulet, also on a Caudron, at the Borel ground at Chateaufort. At the last mentioned place Galtier was also to have given an exhibition on his Caudron, but the weather became too misty. Chanteloup also looped the loop at Rennes on the 28th ult. On Christmas Day Domerjoy gave a display on his Blériot at Madrid, which was witnessed by King Alfonso.

Pegoud Loses Himself.

DURING the afternoon of December 24th, Pegoud gave a display on his Blériot at Buc, and after flying upside down for about two minutes, disappeared among the clouds. As he did not return the neighbourhood was searched by the aid of motor cars, but without result. His friends were relieved to hear the hum of the motor of the returning machine about two hours later, and it then turned out that, having lost his way, he had to come down at Fort Villeras for petrol.

Guillaux Loops the Loop above Paris.

GUILLAUX celebrated Christmas Day by looping the loop above the French capital. Setting out from the Clement ground at St. Cyr on his Blériot, he flew to Issy, then to Buc and back to St. Cyr, making loops at each place, and two loops while flying over the Seine between the Alexandre III and Concorde Bridges. The trip lasted 1 hr. 5 mins. He also looped the loop at St. Cyr on the following day.

Renaux Again Crosses the Channel.

ANOTHER trip across the Channel on a M. Farman seaplane intended for the British Navy was made by Renaux on the 20th ult. Accompanied by Mme. Renaux he started from Boulogne and alighted safely at Harwich.

Testing the New Schmitt Biplane.

IN the presence of Lieut. Cattaneo of the Italian Army, Garaix was testing the Schmitt biplane, which, it will be recalled, has an arrangement for varying the angle of incidence of the wings, at Chartres on the 23rd ult. The fastest speed was 83·736 kiloms. per hour, while the slowest was 39·122 kiloms. per hour, giving a speed range of 1 to 2·12.

Fast Climbing on a Voisin.

TESTING, at Mourmelon, a Voisin biplane fitted with 80 h.p. Gnome, and built for the French Army, Rugere, on the 23rd ult., climbed 1,000 metres in 13 mins. 45 secs. It is claimed that it is the first time that a military biplane fitted with a motor of this power has climbed 1,000 metres in less than a quarter of an hour.

The Blériot School at Pau.

FLYING is now in full swing for the winter season at the Blériot school at Pau, and some very good cross-country work is being done. On the 26th ult., Carnoy traversed the triangle Pau to Saut de Navaille-Orthez and back to Pau; Nautet went to Lourdes and back, as also did Housseland. Carnoy also went to Aire-sur-Adour, and covered the circuit Pau–Lourdes–Tarbes–Pau.

Aerial Touring on Farmans.

ON the 26th ult., Henry and Mme. Farman, Barbaroux, and Senouque on their Farman machines made a fine flight from Buc round Dreux, Chartres, and Orleans, eventually returning to Buc.

Aeroplanes in War in Morocco.

THE Spanish Army are making very effective use of their aeroplanes in the operations against the Moors. Some bombs dropped on the mass of the enemy during a fight near Tetouan on the 17th ult., had terrible effect. Bombs dropped from an aeroplane also effectively put an end to a scheme of blockhouses which the Moors were trying.

A Belgian-German Waterplane Event.

UNDER the title of the Three Rivers Circuit, the Royal Belgian Aero Club, in conjunction with the German Aerial Federation, is organising a contest for waterplanes. It is proposed that the first day the route should be from Brussels to Nimegue, 281 kiloms., the second day to Duisburg and Dusseldorf, 132 kiloms., the third day to Liege, 160 kiloms., the fourth day to a circuit of 340 kiloms. to Mezieres and Charleville, returning to Liege, the fifth day to Rotterdam, 233 kiloms., and the sixth day to Brussels. It is anticipated that the prize money for this event, which should take place at the end of June, will be at least £4,800.

Long Flights in Germany.

IN connection with the prizes offered by the National Fund Committee in Germany, three fine flights were made on December 26th. Heller, at Bonn, made a flight of 4 hrs. 28 mins., while at Lohousen, Beck was up for 8 hrs. 6 mins. Leaving Mayence with a passenger, Schwobn flew *via* Alzey and Mannheim to Heidelberg, a distance of 215 kiloms., in 2 hrs. 4 mins.

Night Flying by Italian Officers.

A GOOD deal of practice in flying after dark is being indulged in by officers of the Italian Army stationed at Rome. One fine flight was that made by Lieut. Raffaeli on a Farman-Gnome last week. Leaving the Santorel Aerodrome at 10.30 p.m. he flew over the city for about an hour at a height of 900 metres.

A New Sikorsky Biplane.

A NEW giant biplane, to take fifteen passengers, has now been built by Sikorsky, and during its first trials it carried four, six, and eventually ten passengers, together with petrol and oil, totalling to 384 kilogs. The machine has a span of 37 metres, it is 20 metres in length, while the lifting surface is 182 sq. metres, and the weight, empty, 3,500 kilogs. The *fuselage* resembles in general appearance that of the Nieuport monoplane. On each side of the *fuselage* are arranged two 100 h.p. Argus motors. As during these first tests the ground was covered with snow, the wheels were removed and the skids relied upon for landing.

Fast Flying in Russia.

NEWS comes from Russia that on Sunday last Capt. Tchekhontoff, on a biplane, covered a distance of 95 versts in 27 mins., which works out to a speed of 139·89 miles an hour.

St. Petersburg to Paris Flight Proposed.

ON the Morane-Saulnier monoplane, on which he recently flew from St. Petersburg to Moscow and back, the Russian pilot Vassilieff proposes to fly from St. Petersburg to Paris by way of returning the visit which Brindejonc des Moulinais made to the Russian capital last July. Up to the present, however, the German authorities have absolutely refused to give any permission to fly over German territory.

A New Russian Prize.

PRINCE ABAMALECK LAZAREFF, who offered the Romanoff prize of £1,000 for a flight from St. Petersburg to Moscow and back in 48 hours, has now offered a similar prize, which will be given to the aviator who flies from St. Petersburg to Sebastopol or *vice versa*, before January 1st, 1915, within a maximum time of 24 hours. The distance is something like 1,500 miles.

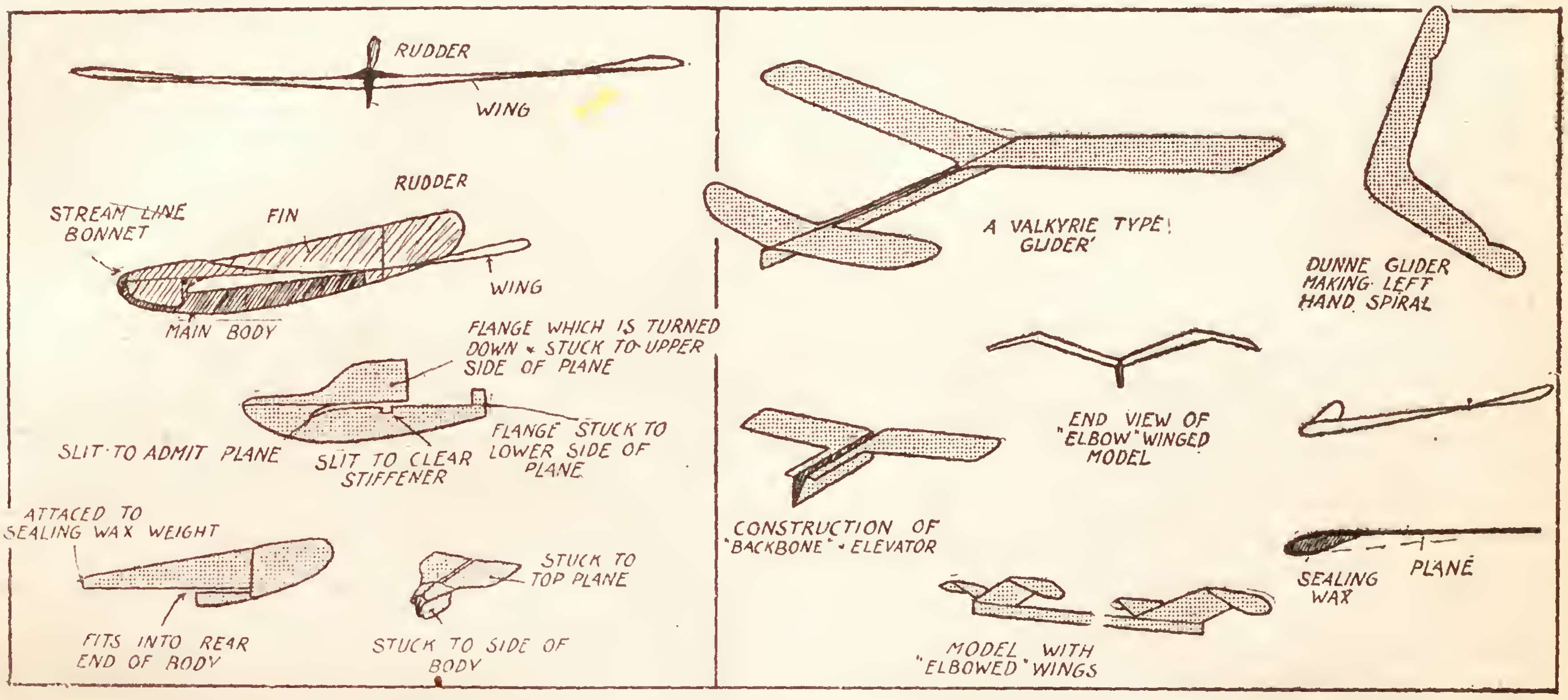
Models

Edited by V. E. JOHNSON, M.A.

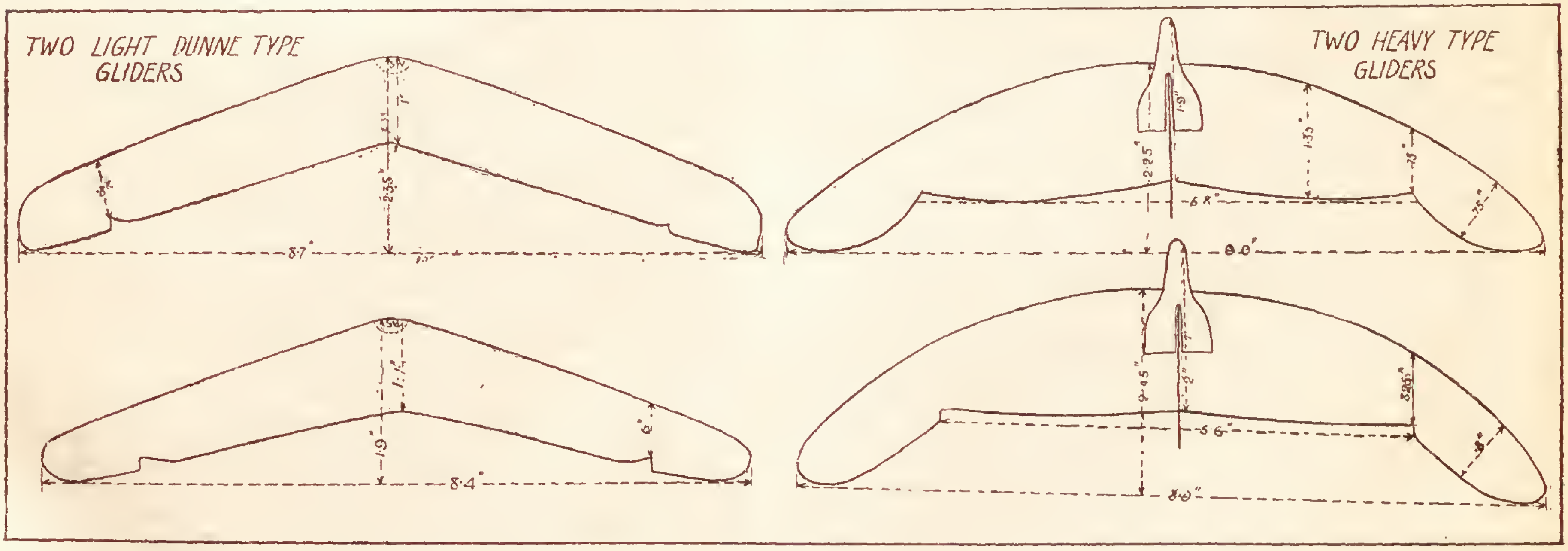
Some Experiments with Paper Gliders.

By R. H. HUTCHINGS.

IT would be interesting to know how many of the well-known types of aeroplanes at present flying were elaborations of experimental models. That in the early stages of flying the model played an important part seems certain. Of all models the glider in certain respects, perhaps, takes quite as prominent a position as any other.


RUDDER
WING
RUDDER
STREAM-LINE BONNET
FIN
WING
MAIN BODY
FLANGE WHICH IS TURNED DOWN & STUCK TO UPPER SIDE OF PLANE
SLIT TO ADMIT PLANE
SLIT TO CLEAR STIFFENER
FLANGE STUCK TO LOWER SIDE OF PLANE
ATTACED TO SEALING WAX WEIGHT
FITS INTO REAR END OF BODY
STUCK TO TOP PLANE
STUCK TO SIDE OF BODY
A VALKYRIE TYPE GLIDER
DUNNE GLIDER MAKING LEFT HAND SPIRAL
END VIEW OF "ELBOW" WINGED MODEL
CONSTRUCTION OF "BACKBONE" & ELEVATOR
SEALING WAX
PLANE
MODEL WITH "ELBOWED" WINGS

For ease of construction and convenience of flying nothing touches paper gliders. They can be constructed in a few moments, flown indoors, altered with the greatest ease and cost practically nothing. A few designs and remarks which I venture to add may therefore, I hope, be of some interest to your readers. The first ones which I constructed were on the Valkyrie principle. They were cut entire from ordinary notepaper of medium thickness and had a certain amount of rigidity. The chief point in their construction was the girder-shaped back-bone, which is one of the lightest and strongest paper constructions possible. I have no dimensions to hand of these models, but the planes were not cambered, had a decided dihedral angle and the ratio of the elevator area to that of the main plane was very nearly 1 : 3. In order to obtain better stability in these models, I tried a gull's wing-shaped plane with a pronounced "elbow." It was certainly an improvement, but as outdoor models none of this type was a success. The gliding angle was about 1 in 4. I found that if the elevator was banked in the direction in which the model was required to turn, the model would turn perfectly well and steadily without any rudder. Fins and rudders, as a matter of fact, were never used with advantage on these models. Cambered planes were not successful, probably, I think, because the models were so light that the increased "drift" resistance was not counterbalanced by any appreciable improvement in the lifting qualities of the planes. I noticed that the longer the body was the more steady the model was longitudinally. My next models were of the Dunne type, and although small (about 6-in. span) they showed a great improvement in stability and later on in gliding angle. These models were made of the same material as their predecessors, but with no "body." They relied on the down turned leading edge for the necessary stiffness of the planes. They were weighted with sealing wax. If the front edge is curved down before the sealing wax is applied, it will hold the plane in its proper position, which saves a lot of trouble with stiffeners, &c. In their most satisfactory form the angle formed by the planes was slightly less acute than that of the actual Dunne monoplane. If the leading edge was too sharply down-turned I found that the models dived straight down, and if the trailing edge was cambered the same thing occurred. The whole plane, with the



exception of the leading edge and the negative tips must be without any angle of incidence whatever. On models of a very small aspect ratio I tried a cambered wing, but with no improvement in gliding angle, and the stability of the models was not nearly so good. The steering and elevation were performed by the wing tips. To turn to the left, for instance, the negative angle of the left tip was increased, the object being to bank the model, which then turns automatically. A very pretty feature in the gliding of these models is their ability to perform perfect spirals. Even the smallest models of this type flew very satisfactorily out of doors as well as in. The larger models travel about 40 to 55 ft. when launched from the hand, with a duration of 5 secs. ; their gliding angle being about 1 in 5·5. Their ability to cope with quite a sharp breeze was really remarkable in such light models. Their chief disadvantage was that if "banked" by a gust they would turn in the direction of the bank before recovering, the consequence being that it was very difficult to get a straight glide into a wind. When gliding with the wind this tendency was less noticeable. Interested by the stability shown by this type of model, I started experimenting with some gliders founded on the Weiss or Etrich principle. The method of construction of these models was almost identical with that used in the Dunnes, with the exception of the different shaped wings. Their behaviour was almost identical so far as stability and management were concerned, but their gliding angle was better—1 in 6·237 being the record for this light type. Considering that the span was only 6 to 8 ins. they may, I think, be considered as on the whole successful. The improved gliding angle may possibly be traced to the more efficient disposition of surface which can be obtained with this type. They are, perhaps, slightly inferior to the Dunnes in stability, but not to any marked extent. I found vertical fins quite ineffective on both these types, which are, I believe, different applications of the same principle. They can, in fact, be flown in the same way, and the same phenomena traced to almost identical causes. By adding a little more weight, and the judicious cutting down of plane area, the speed of these models may be considerably increased, but generally at the expense of the gliding angle. I have often obtained very pretty effects by launching two or more of these models placed one above the other at the same time, care being taken to put the lightest model on top.

I wanted, however, to obtain a type which could be used satisfactorily for gliding from hills or good outdoor slopes. My models so far had been too light, and without sufficient directive sense.

I therefore slightly increased the span, which necessitated the use of a light stiffener, and to increase the weight I added a body which at the same time would give a certain amount of directional sense to the model. The sealing wax weight was carried *inside* the body, which is as far as possible of streamline form ; a rudder and fin were added to counteract the effect of the projecting "nose" in front, and as a result I obtained glides of over 20 secs. duration in quite a fair breeze from my "aerodrome" in Richmond Park. In this type of glider I found the Weiss models superior to the Dunnes. When gliding into the wind the models keep remarkably straight, and I have had more than one instance of models gaining altitude by up currents. At Harnham, near Salisbury, one glider rose to a height of over 30 ft., and after a glide of well over half a minute (I had not a stop watch, unfortunately), landed ten or more feet higher than the starting point. The models, being made only of paper, do not, of course, last very long, about a fortnight being their average life, but considering that the most elaborate take but a quarter of an hour to twenty minutes to construct, one cannot expect them to. I once obtained a glide of 51 ft. 3·5 ins. with one of these when launched from the hand on level ground against a very slight breeze, the average being about 45 ft. This is, of course, nothing wonderful, but is quite good enough to give very good glides off a fairly steep hill. The increased weight and speed of the heavy type far outweighs shortcomings in gliding angle when there is any wind at all. From my experiments as so far conducted, I have come to the following conclusions :—(1) That single plane models of the Dunne or Weiss type are the most satisfactory. (2) That these models will not fly without a decided down turned leading edge. (3) That the main surface of the plane should have no angle of incidence. (4) That negative tips must not be too large in relation to the rest of the model. (5) That fast models are more satisfactory than slow ones. (6) That the weight should be well forward. (7) That the c.g. must be low rather than high. (8) That the wing tips must be depended on for control more than fins or rudders. (9) That the models turn automatically if started with a bank, or so adjusted as to bank themselves. (10) That in models without a "body" no fins are needed, but when one is fitted a counteracting fin is needed. Generally speaking, a stiffener is required only in models of over 8 ins. span. I may add that all the designs submitted can be cut from any suitable piece of notepaper. As a matter of fact, three of the smaller gliders may be cut from a single sheet. When stiffeners are used, they should be cut from wood spills and seccotined to the plane. In my more finished models I varnish the body, but it is not essential. I am proud to be able to say that I have interested more than one person in aviation by my small attempts.

Mr. F. Handley Page's Coming Lecture.

Considerable interest, from an aeromodellist's point of view, is centred in the above lecture on "The Dependence of Aviation on Experimental Model Work," at Caxton Hall, Westminster, on January 9th, and the attendance will, we expect, be a very large one. The chief point of interest probably lies in the fact that the lecturer is so well known in connection with his practical as well as theoretical work relative to full-size machines. In consequence, the pronouncement of his opinions with respect to the value of model work as bearing upon full-size design will be awaited with no little expectancy.

The Coming Exhibition at Olympia.

Aeromodellists who have any intention of exhibiting at the above, which will be held from March 16th to 25th next (both dates inclusive), should already be at work. Full particulars must be sent in by March 4th, to ensure insertion in the official catalogue, after which date no entries will be accepted. Everything sent by rail, &c., must be sent *carriage paid*. Members of the K. and M.A.A. pay a special fee of 2*s*. 6*d*. per model, other exhibitors 5*s*. Every exhibitor will be provided with a free pass to the Exhibition during the whole period. Exhibitors can either exhibit as competitors or non-competitors, *i.e.*, their models are for exhibition but not competition.

Some little difficulty appears to have arisen with regard to the "loading" question (to which reference has already been made in this section), and the writer has been asked to explain it. Judging from the leaflets sent out to intending exhibitors, there does not appear to be anything in the nature of an explanation really required—save in one point only. A *minimum* loading of 4 ozs. per sq. ft. in the case of monoplanes, and of 3 ozs. per sq. ft. in the case of biplanes, means that if your model weighs *complete*, say, 12 ozs., then, if a monoplane, it must not have aggregate sustaining surfaces *greater than* 3 sq. ft., or if a biplane of *more than* 4 sq. ft. This applies to classes 2, 3, and 5, but not apparently to 6—weight-carrying models, since no mention is made of the same. There is, I suppose, the difficulty of the non-lifting tail area, although I have not personally heard this mentioned.

With respect to this I cannot at present make any statement, save that I should certainly vote for it being reckoned as part of the sustaining surface, since at times, at any rate, it undoubtedly acts as such.

A "Record" Quick Rising Model.

"The following may be interesting to readers of the Model section of FLIGHT," writes Mr. Clifford W. Tinson (Bristol) : "A friend and I recently decided to try and build a model, which would get off the ground in less than a metre, there being no restrictions as to size, &c. I have been successful in doing this, the shortest run being 2 ft. 6 ins., or considerably less than two and a half times the length of the model, which is 14 ins. over all. So far as I know this is a record, though I think it is quite possible, with a little care, to reduce this to half that figure. The flights were all *indoor* ones, so there is no question of wind."

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver	85 secs.
Twin screw, do.	Distance	R. Lucas	590 yards.
	Duration	G. Hayden	137 secs.
Single screw, rise off ground	Distance	W. E. Evans	290 yards.
	Duration	W. E. Evans	64 secs.
Twin screw, do.	Distance	L. H. Slatter	365 yards.
	Duration	J. E. Louch	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance	C. C. Dutton	266 yards.
	Duration	J. E. Louch	91 secs.
Do., off-ground	Distance	C. C. Dutton	190 yards.
	Duration	J. E. Louch	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter	60 secs.

Aero Exhibition.—Will all intending competitors send in their names to the hon. sec. at once, so that an idea of the space required can be estimated? Also will all hon. secretaries who wish a stand reserved for their club write stating if possible size of stand required?

Sealed Handicap Competition.—This competition was held on Wimbledon Common on Saturday, 20th ult., but did not attract a large entry. The result was :—1st, A. F. Houlberg, scratch ; 2nd, F. W. Jannaway, 5 secs. ; 3rd, L. D. C. Chown, 15 secs. ; 4th, H. Bond, 5 secs. The judges were Mr. L. Ingram and the hon. sec.

Lecture and Discussion.—Will all affiliated clubs secretaries advise the hon. sec. of the number of seats they wish reserved for their members at the discussion on the 9th inst. ?

Greeting.—The president, Sir John C. Shelley, wishes the Association and the members a prosperous New Year, and he also hopes that all will do their utmost to increase the membership and so strengthen its hands.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Bristol and West of England Aero Club (Model Section) (42, ROYAL YORK CRESCENT, CLIFTON, BRISTOL).

Club Diary.—Jan. 3rd, conclusion of r.f.g. duration competition at Sea Walls, 3 p.m., or following Saturday if the weather is unfavourable. Jan. 10th, steering contest at 3 p.m., at Sea Walls. Jan. 14th, general meeting in clubroom, 8 p.m., when members intending to exhibit at the Olympia Aero Show are asked to make a special effort to attend.

November and December Report.—On Saturdays, Nov. 22nd and 29th and Dec. 13th, 20th and 27th, a duration competition was contested on the Downs, the following members competing:—R. T. Howse, L. J. Jacques, E. Martin, A. E. Pearse, W. A. Smallcombe and N. Gordon Stephens. The durations leading on Dec. 27th were:—W. A. Smallcombe, 46 secs. and 42 secs.; and R. T. Howse, 40 secs. On Nov. 22nd, a flight of 55 secs. was made by R. T. Howse's h.l. model, this being at present the longest flight over level ground timed by an official observer. Two flights of 60 secs. have, however, been timed at the gliding fields at Keynsham and Portbury, the model in one case disappearing from view. On Dec. 27th, R. T. Howse's small twin-screw model made several flights, in each of which it looped-the-loop three times. W. A. Smallcombe's single-screw model was also induced to loop-the-loop. Two flights were made by models carrying "electric sparklers," the effect of these little fireworks being very good. These sparklers cannot set anything on fire, and as they keep alight in any wind for 30 or 40 secs. they are well adapted for illuminated flying.

Croydon and District Ae.C. (158, HIGH STREET, CROYDON).

Monthly Report.—December has been one of the busiest months of the year with this club. A great deal of valuable work has been done, the majority of the models used being heavy ones. Members of this club do not cut down the weight of their models to the absolute minimum in order to obtain the greatest possible duration, as most of them think that a middle or heavy weight model demonstrates the efficiency of plane surface, shape, camber, propellers, stability, general design, &c., far more effectively than does a light one. A noticeable feature of the month's flying has been the low altitude at which the models have flown (with a few exceptions). Possibly this is owing to the damp and misty atmosphere experienced at Mitcham during the winter months, but whatever the cause may be the models have shown a distinct aversion to climbing. Hydros.: Messrs. Bell, C. Smither, Pavely and Hart have been prominent with these models. A competition was held on Mitcham Common for duration on Dec. 7th, under almost impossible conditions, the models being repeatedly blown over. However, this competition was won by Mr. P. Hart with 25 secs., which was not bad under the circumstances. Mr. H. Smither has had splendid flights with his hydro., his average being over 40 secs., as also have Messrs. Bell and Pavely. Tractors: A fine tractor monoplane has been made by Mr. S. Mullins, with which he has obtained flights of over 300 yds. with very good duration. Mr. H. Smither out with a new tractor with complicated though thoroughly efficient chassis. Very spectacular flying has been put up by Mr. Bell's tractor biplane. H.l. models: Mr. C. Smither has distinguished himself by constructing a model that loops-the-loop and then flies for approximately 300 to 400 yds. distance. Mr. Bell has also been out for distance, and has obtained flights of 400 to 600 yds. Probably one of the best flyers yet seen at Mitcham is Mr. H. Smither's single-screw model, with which he has obtained 74 secs., though the model was not built for duration. Its stability and gliding angle is excellent. Mr. Carter has done well with his various models, though his new duration 'bus requires tuning up. There was very little flying at Christmas. Messrs. Bell and Mullins were out on Christmas Day, and obtained good flights with their respective tractor models.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

JAN. 4TH, flying, 10 a.m., on Wanstead Flats as usual. If wet meet at clubroom. Jan. 7th, general meeting, 7.30 p.m., at clubroom. Will all members try and be present at the Model Engineer Exhibition? Prize distribution, Jan. 9th, 7.30, Caxton Hall.

Monthly Report.—On Nov. 30th 26 members met on Wanstead Flats. Messrs. H. Bedford, S. C. Hersom and F. E. Grattan were flying hydros., Mr. Bedford obtaining 42 secs. Tractors were flown with varying success by Messrs. G. Hawthorn, L. McCulloch, H. Bedford and F. Grattan. Six r.o.g.'s were in evidence, flown by different members, and ten h.l. models, the best duration being 80 secs. by Mr. F. E. Grattan. On Dec. 7th only 18 members assembled, but the flying was very good. Mr. H. Bedford obtained 46 secs. with his hydro., and Mr. F. Hawthorn 43 secs. also with hydro. Tractors were flown by Messrs. H. Bond, L. McCulloch, H. Bedford and F. E. Grattan. By hand-launching his model Mr. Bond obtained 50 secs. R.o.g.'s were flown by Messrs. F. Hawthorn, 43 secs., H. Bond, B. Ludlow, C. Hersom, 102 secs., T. Kimpton, 50 secs., and J. E. Louch, who had six flights all over 100 secs., the best being 132. Ten h.l. models were flown during the morning, the highest durations being obtained by Mr. S. C. Hersom and Mr. J. E. Louch. There was a meet of 21 members on Dec. 14th. The weather was unfavourable, but the flying was good, although no durations were taken. Messrs. F. Hawthorn and H. Bedford again accounted for the hydros., both models flying well. Five tractor models were flown, four as last week, and an additional one by Mr. W. Riggs. Six r.o.g.'s were flown by different members, and also eight h.l. models. Dec. 20th was remarkable for the splendid tractor flying. No durations were taken, but there was a Caudron (almost scale) by Mr. W. Hersom, a Handley Page by Mr. G. Hawthorn, a Weiss by Mr. F. Hawthorn, and three others by Messrs. S. C. Hersom, H. Bedford and F. E. Grattan, which were fitted with rectangular wings. All six were rising from the ground and flying high and well. During the morning four were in the air at one time, the result being very spectacular and much appreciated by the crowd. R.o.g.'s were flown by Messrs. F. Wood, S. C. Hersom, F. Hawthorn and H. Bedford. Seven h.l. models were in evidence, and Mr. F. Hawthorn flew his hydro. On Dec. 25th two competitions were held. Members of Section "A" competed with 6-oz. tractors. There were only six entries, and the results were rather poor, both being accounted for by very unfavourable weather. The prizes, which were presented by Mr. Thos. Kimpton, were awarded as follows: Mr. F. E. Grattan, 1st, with 15 points; Mr. H. Bedford, 2nd, with 10 points; and Mr. F. Hawthorn, 3rd, with 7 points. The Section "B" competition was for h.l. models, and also attracted an entry of six. The prizes were awarded as follows: Mr. F. Wood, 1st; Mr. L. McCulloch, 2nd; and Mr. A. Hoare, 3rd. Mr. H. Green was obtaining flights with a tractor model which he had built too light to enter the competition, and r.o.g.'s were flown by Messrs. S. C. Hersom and F. Wood. On Dec. 28th the weather was again very unfavourable, and only 17 members assembled. Messrs. W. Hersom, F. Hawthorn, H. Bedford and F. Grattan were flying tractors with varying success. Mr. F. Wood was obtaining some good flights with his r.o.g.. and ten h.l. models were flown by various members during the morning. The weather throughout the month has been very much against model flying, but the majority of members are enthusiastic, and the club is doing a deal of good work.

N.E. London Model Ae.C. (47, JENNER RD. STOKE NEWINGTON, N.)

THE annual general meeting will be held early in January; members will be notified by post, as date and place have not been settled. Unfortunately, it has been found necessary to reorganise the club, and we hope all our supporters will do their best to assist the reorganisation committee.

Monthly Report.—Mr. Dore has been doing very consistent work with his 9-oz. 'bus, but unfortunately lost it during an illuminated flight several weeks back. F. Burton's ungeared tractor is a very effective high flyer, with a duration average of 50 secs. F. Burton has also been giving looping demonstrations, obtaining eight successive loops. A. Lewin has been flying single and twin-screw machines with very satisfactory results. B. H. Longstaffe has been able to reduce power on his 10-oz. 'bus by double-surfacing the main plane. The camber of the underside is approximately flat, and, together with a loading of 8 oz. per sq. ft., this model is exceedingly fast. P. Cowderoy and H. Sherrat have greatly improved in their work with twin-screws, also great promise is shown by J. Horwood and F. Ramsey with tractors and single-screws.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

JAN. 3RD and 10th, flying at Sudbury, r.o.g. handicap. Annual general meeting at secretary's house, 6 o'clock. The balance sheet and report for 1913 will be read and presented for adoption, and a general discussion will include the club's programme for the Olympia Aero Show and the arrangements of the club for 1914 season.

Monthly Report.—Dec. 6th, raining slightly. M. Levy testing ornithopter, C. C. Dutton putting models through looping-the-loop and upside-down evolutions, F. W. Johnson tuning up twin-propeller r.o.g. model. The following week C. C. Dutton won the r.o.g. handicap, and incidentally gained the first superior certificate awarded by the club with a fine flight of $93\frac{3}{5}$ secs. r.o.g. His other durations were 91, $86\frac{1}{5}$ and 83 secs. W. Evans' best flight was $55\frac{3}{5}$ secs. (single propeller), and F. W. Johnson's $50\frac{1}{5}$ secs. Dec. 20th, r.o.g. handicap won by W. Evans with 65 points, F. W. Johnson 61, and M. Levy 55. Boxing Day, an inter-club contest between the Wimbledon Aero Club and Paddington Aero Club was held at Sudbury. Result, a win for Paddington. It was blowing half a gale, and in such adverse weather ordinary durations were out of the question. The best duration was by M. Levy (Paddington), the flexible wings of whose model appeared to give to every gust, thus maintaining the model on an even keel. Six members from each club took part. The return match was held on the following day on Wimbledon Common, and although the wind was still strong it was not so gusty. Paddington again won Times were as follow:—For Wimbledon: Laing, 58 secs.; A. F. Houlberg, 56 secs: Powell, 55 secs.; and Tucker, 33 secs. Average, $50\frac{1}{2}$ secs. For Paddingdon: C. C. Dutton, 83 secs.; T. Carter, 54 secs.; W. Evans, 51 secs.; and M. Levy, 27 secs. Average, $53\frac{3}{4}$ secs.

Reigate, Redhill and District (THE COTTAGE, WOODLANDS AVENUE, REDHILL).

Monthly Report.—The junior members' competition was won by Mr. Hooton with 38 secs., after fine flying in tricky air; Mr. Greenhead was second and Mr. Hoyle third. The latter had the misfortune to smash his biplane during previous tuning up; it should have given a good account of itself. He, however, procured a mono. from workshop for competition. Mr. M. Wilson smashed during competition. However, the competition was considered a success, as it has been the means of bringing these men forward. The prizes were:—First. electric torch, presented by Mrs. Neville Meier; second, 2*s.* 6*d.*; third, pliers. A prize of accessories has been kindly offered by Messrs. J. Bonn and Co., for which a periodical competition has been arranged. R.o.g. machines are to be used, and the existing club record of 45 secs. has to be surpassed before March 1st, 1914. An extremely interesting lecture has been given by Mr. Houlberg, and was much appreciated. It has been decided to exhibit at the forthcoming show at Olympia, also to enter the team contest. Mr. Sutton has been out with floating tail h.l., also 6-oz. and 9-oz. tractors loaded over 6 ozs. to 1 sq. ft. His best result with floating tail was 544 yds.; this has been found to possess a great amount of inherent stability, he having launched it in all positions, including upside down, and it invariably rights itself; he has also carried out experiments on 6-oz. tractor with different tails and propellers, getting best results with "S" curve tail and 11 in. instead of 10 in. tractor screw; he has also had 300 yds. with 7-oz. r.o.g. Canard. Mr. Hoyle has built new type of *fuselage* for biplane, and has had good results; also with 7-oz. r.o.g. mono. Mr. Hooton has been doing good work with 7-oz. r.o.g. mono.; also 9-oz. r.o.g. biplane Canard, which had floating tail also, but has been improved by removing tail. Mr. Norton has been tuning up a "make up" h.l. mono. for the purpose of testing double surfaced plane and different propellers. The Wilson brothers have been getting 400 yds. and 35 secs. with 7-oz. r.o.g. monos. at Buckland, later improving this with different propellers and less power. Mr. Young has had 30 secs. with h.l. mono. at Salford. Mr. Kennard has also been tuning a r.o.g. mono. All members have been busy in workshop preparing for Rawson Cup competition and Bonn prize, not to mention Olympia. Mr. Greenhead has had 38 secs. with r.o.g. mono.

Wimbledon and District (165, HOLLAND ROAD, W.).

JAN. 3RD and 4th, 1914, flying as usual.

Monthly Report.—A good deal of flying has been done this month in spite of adverse weather. On Dec. 26th, an inter-club contest with Paddington and Districts was held at Sudbury, resulting in a win for Paddington. Owing to the inclement weather the durations obtained on either side were very poor. In the return match at Wimbledon, on the following day, the results were as follows:—For Paddington: T. Carter, 54 secs.; C. Dutton, 83; M. Levy, 27; W. Evans, 51—average, $53\frac{3}{4}$ secs. For Wimbledon: A. F. Houlberg, 56 secs. L. Tucker, 33; D. Laing, 58; F. Powell, 55—average, $50\frac{1}{2}$ secs. Only four machines a side were flown, as two of the visiting team had unfortunate smashes. Great interest has been aroused by Mr. Easdale's large tractor, which has been out on several occasions. This machine, which weighs over 13 ozs., is 4 ft. long with a span of 4 ft.; the frame consists of a large section hollow-spar bound with fabric and supported on an elaborately sprung chassis. It gets off in fine style, climbing in large circles and gliding well when run out. The best duration so far is 47 secs., but it is expected that this will be exceeded at an early date, when a more suitable screw has been fitted. Mr. Hayden, who on Nov. 22nd captured the twin-screw h.l. record with a flight of 137 secs., has now fitted a chassis to his model; the best duration so far is 112 secs., but this was done in calm weather, and as the machine is very slow for wind this figure has not yet been exceeded. Mr. Houlberg has been flying a h.l. machine with his usual success, obtaining durations of over 100 secs., all his flights being made at a great height. Great interest is taken in the electric lamp for night-flying, with which he is now experimenting. The complete outfit weighs $1\frac{1}{2}$ ozs., and his large machine takes this with ease. The lamp gives a good light, and for practical purposes is far superior to the "Sparkla" fireworks hitherto used. However, these latter are very suitable for spectacular flying, and several members, including Messrs. Laing, Powell, Easdale and Chown, have done some fine night flying. The best durations thus obtained were: H.l., F. Powell, 83 secs., and r.o.g., D. Chown, 65 secs. Mr. Laing has had out two new twin-screw models. His new A frame machine is a very fine piece of work, the frame being composed of two channelled spars tapering at each end, and braced on top, and the wing, which is of bamboo, is very rigid, though light. The machine, which gets off in a very taking way, does about 65 secs. duration. He has also had out a machine with hollow spar of the "portmanteau" type, as introduced by Mr. Hayden, and this machine should do good durations when tuned up. Mr. Powell has continued his experiments with his large surfaced machines of 0–1–1–P2 type with great success, obtaining durations of 80 to 100 secs., flying very high and steadily. Fitted with a chassis one of his machines gave good results, the duration being about 60 secs. Mr. Tucker has had out a tractor of his usual type with geared motor, which showed signs of good durations, as it climbed very well, but unfortunately a collision with Mr. Laing's machine while rising from the ground fractured its main spar with fatal effect, the frame doubling up. Mr. Lych, a new member, has had out a well-built tractor machine with triangular *fuselage*, but the frame was unable to stand the strain of the rubber, giving way after a few flights. With his hollow-spar machine, however, he had better success, and when the original heavy tail was replaced by one of lighter construction, the machine flew well, the wing being of the swept-back type, giving good stability.

UNAFFILIATED CLUBS.

Edinburgh Aeronautical Society (41, DRUMSHEUGH GARDENS).

COL. MASSEY, C.B., of the Aerial League of the British Empire, is giving two lantern lectures on "The Development of National Aviation" in the Oak Hall, Edinburgh Café, Princes Street, on Thursday, Jan. 8th, at 3 p.m. and 8 p.m. Gen. H. T. Arbuthnot, C.B., R.A., in the chair. Admission is free, but there are a few reserved seats (price 1*s.*) to be obtained at the Café.

Finsbury and District (85, UPPER TOLLINGTON PARK, N.).

As an effort is being made to create a "tip-top" club, worthy of the North of London, new members—especially those with new ideas for experiments—will be welcomed, and should write the secretary.

Monthly Report.—Some good flying has taken place this month by Mr. Savage (with twin-screw machine), and Messrs. Steer (with "Steer's" monoplane), R. Mullins (Etrich type), H. Mullins ("M.G.M." model), B. H. Barnard (who, with his "seagull" wings, looped-the-loop), S. Gibbs ("M.G.M." monoplane), S. Pratt and S. C. Barnard. Mr. Essex (with his "switch-backers") and Mr. Dowsett have also made a good show. The new members enrolled this month include Mr. Savage (who early in 1913 carried off the Grahame-White Trophy and aeroplane tuition), Mr. Dowsett (of the Windsor Club), and Mr. Bell.

Liverpool Aero Research Club (62, CEDAR GROVE, LIVERPOOL).

THE hon. sec. will be pleased to hear from any reader interested in kites, as it has been suggested to form a section for same. In view of the approaching season, the club will be pleased to hear from intending members, the subscription per annum being at the nominal fee of 5*s.* payable quarterly.

Monthly Report.—Work is now mainly confined to workshops, tractor machines receiving a fair share of attention. Mr. Payne having in hand one of 30 in. span, 10 in. tractor screw, the chassis being very neat. G. Kilshaw just completed another 47 in. span, 8 in. chord, 15 in. propeller. The general meeting, November, provided considerable discussion. The visit of Mr. Bennet helped to make things interesting, for besides being a modelist of no mean degree, he is an accomplished kite-flyer. The suggestion made regarding the club possessing a petrol-driven model received approval, and will most likely be carried out. W. Beale has been making a series of experiments with electrical apparatus for models with encouraging results, G. H. Kilshaw trying an acetylene motor of ingenious design.

Scottish Ae.S. Model Aero Club ("ROCHELLE," LIMESIDE AVENUE, RUTHERGLEN).

JAN. 17TH and 31st, Paisley Racecourse. All types.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

JAN. 3RD, Woolwich Common, 3.30 p.m. until dusk. Jan. 4th, Blackheath, 7.30—10 a.m.; Lee Aerodrome, 10.30 a.m. to 12.30 p.m.

Monthly Report.—With the appearance of this report the S.E.M.Ae.C. celebrates its first year as a club, and it is a great pleasure to be able to state that it is in a very healthy condition with regard to its members, officers, and financial position, and the quantity and quality of the models turned out. In common with many other clubs, the S.E.M.Ae.C. is now embarking upon a more ambitious programme—in which the popularising of model aviation is a feature—and the managing committee take this opportunity of wishing its kindred clubs and aero modellists in general a Happy and Prosperous New Year, and many of them. In connection with the South-Eastern Trophy, it has been decided to hold the following competitions during 1914:—Jan.-Mar. quarter, weight-carrying competition for r.o.g. models of not less than 8 ozs. in weight. April-June quarter, an r.o.g. contest for models of a fixed weight and with a stated amount of surface. July-Sept., an r.o.g. and water biplane competition. Oct.-Dec., competition for r.o.g. twin-tractors. The first indoor exhibition will be held in the Central Hall, High Street, Peckham, on Thursday, the 29th inst.; every member is expected to exhibit, and will greatly facilitate the work of the organising committee by sending a complete specification of his exhibit to the hon. sec. before Saturday, the 24th inst. Despite the somewhat boisterous weather to which the past month has treated us, the attendances at the numerous flying exhibitions and meetings have been well up to the summer's average, and several new machines, new in both design and construction, have made their appearance. G. Brown has flown a h.l. twin-prop. mono. with very flexible double-surfaced planes, and a r.o.g. collapsible model fitted with a plane of rather unorthodox design. A tractor with a boat-shaped *fuselage* and a floating tail mono. have been flown by E. W. Brunton, and two rather large tractors by C. Beere. A. Beere has obtained some excellent flights from a diminutive tractor monoplane, and F. Beere has exhibited a similar model. A. F. Chinnery's "gull's-wings" still maintain their high standard of efficiency; E. Campbell has flown another rather notorious tractor, while A. B. Clark's various monoplanes have been creating something like a sensation, one, an all-metal model, like B. C. Hucks, loops-the-loop with the utmost regularity, but once at the completion of a loop, it started to loop again, then turned over laterally and continued to fly in the ordinary way; another of his floating tail monoplanes has been going in for altitude, in which it has proved itself an adept. F. Dixson's "Wake-up England" r.o.g. "A" frame has been flying with its usual consistency, and F. W. Evans has been kept busy with a scale Blériot and a twin-prop. elevator leading mono.; a floating tail model has been exercised by S. E. Grimstone and a tractor by L. Hatfull, who has also flown a small single-prop. machine. A very efficient "A" frame, which includes "looping-the-loop" amongst its accomplishments, has been flown by W. Jones, and a similar mono. by C. H. Morgan, who has also flown a tractor. W. A. McLaughlin is still a devotee of the single-screw type of model, his latest design being over 4 ft. in length. A. D. Nicholls has had considerable success from a hollow spar floating tail monoplane and a twin-propeller 3-oz. biplane. The spectacular Morane-Saulnier mono. constructed by W. R. Prance is now reaching the end of its tuning-up tests and some good results are expected. F. Plummer's 4 ft. 3 in. hollow spar machine is still on its best behaviour and has made some of the longest flights ever seen on Blackheath or Mitcham Common; the altitude of these flights was also very good. This member's huge tractor mono. (holder of South-Eastern Trophy) has also been greatly in evidence. Another particularly busy member is W. H. Westwood, who has flown numerous excellent tractors, a twin-tractor, and a twin-prop. elevator leading mono. G. Lee has had successful flights from an all-metal mono., and F. W. Edwards has flown various "A" frames, one with twin-geared propellers and another which climbs spirals.

Southend, Westcliff and Leigh Model Aero Club (96, VALKYRIE ROAD, WESTCLIFF-ON-SEA).

Monthly Report.—This club has made good progress during the month both in construction and flights, also greatly increasing its membership. A competition was held on Boxing Day for a trophy presented by a member, Mr. H. Watson, and was won by E. Prockter, H. C. Statham being second. The winner of the prize presented by Mr. Padgett was L. Ryan; winner of the prize presented by Mr. Statham, E. L. Gage. All doing excellent work.

Stony Stratford and District Kite and Model Ae.C. (OLD STRATFORD).

JAN. 2ND.—Buckingham Branch, discussional meeting. Topic: "Some points on Model Design." Jan. 16th.—Building evening; Stony Stratford and Wolverton, discussional meeting. Topic: "Designing for Olympia." Jan 7th.—Building evening.

Monthly Report.—Nov 19th, the second annual general meeting and an exhibition of models was held; the exhibits numbered 20 model aeroplanes and 4 kites. The election of officers was as follows: J. J. Atkinson, Esq., C.C., F.R.A.S., president; Rev. S. Cheshire and L. C. Hawkins, vice-presidents. Chairman, Mr. E. Brown. Ground and Asst. Sec., Mr R. W. Elmes. Committee: Messrs. R. Benbow, T. Haseldine, H. Mennell and W. Palmer. Hon. Sec. and Treas., Mr. O. Hamilton, Junr. The club is able to report a balance in hand. There has been a fair amount of flying during the two months of November and December. Several members at Stony Stratford and Buckingham are trying new machines, the most active members being Messrs. Brandon, Palmer, Whitbourn, Elmes, Mennell and Hamilton. The following meetings have been held at Buckingham: two building evenings, two discussional meetings. Topics: "H.-L. Machines," and a paper on "The Building of the Model." Two meetings have also been held in connection with the parent club, the first being a building evening and the second discussional. Topic: "The Building of the Model." Dec. 27th, a members' competition was held at Buckingham, and the following competed: Messrs. Palmer, F. Whitbourn, B. Sturgess, W. Sturgess and O. Hamilton, Junr., and, in spite of a rough gale of wind, &c., Mr. Palmer 1st with 394 ft.; Mr. O. Hamilton, Junr., 2nd, 274 ft.; W. Sturgess 3rd, 248 ft. On the secretary's wish the judges' ruling was that the placing be Mr. Palmer 1st, Mr. W. Sturgess 2nd.

* * * *

CORRESPONDENCE.

Aeronautical Courses for Students.

[1818] The letter from Mr. H. Posner, which you publish in your issue of December 20th, may give rise to two misapprehensions: (i) That the Northampton Institute is the only Polytechnic in England to offer to its students a complete aeronautical course. (ii) That the club which is to start operations during the course of the next year, under the auspices of the above Polytechnic, will be the first of its kind.

I shall therefore be much obliged if you will be good enough to do justice where justice is due, and to make it known—

(i) That the Regent Street Polytechnic was the first institution in the world to organise full and complete courses in aeronautical engineering; that these courses have been regularly held since the 1909–10 session; that they have always been very well attended, and that many Polytechnic students now hold responsible positions in the aeronautical industry; and that, in fact, the first officer to practise aviation in actual warfare (with the Italians in Tripoli) received his first aeronautical notions at the Regent Street Polytechnic.

(ii) That at the Regent Street Polytechnic there has been a flying club now for nearly two years; that a good amount of practical work, in actual construction and flying, has already been done by the members; and that, under certain conditions, those interested in the practice of aviation, but who do not follow the Polytechnic Aero-Engineering Course, may be admitted as members of the Polytechnic Flying Society.

L. BLIN DESBLEDS,
Lecturer in Aeronautical Engineering at
the Regent Street Polytechnic.

December 20th.

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CONTENTS.

Editorial Comment: PAGE
The "Suicide Club" and Naval Aviation ... 27
Of Moment in the World of Flight: Miss Trehawke Davies ... 29
Armchair Reflections. By The Dreamer ... 30
The Paris Aero Salon ... 31
The D.F.W. Biplane (with scale drawings) ... 34
Royal Aero Club. Official Notices ... 39
From the British Flying Grounds ... 40
Flying at Hendon ... 42
Eddies. By "Will o' the Wisp" ... 43
Foreign Aviation News ... 46
Aero Engines. By Granville E. Bradshaw ... 47
A New Military Voisin Biplane ... 49
Correspondence ... 50
Models. Edited by V. E. Johnson, M.A. ... 51

EDITORIAL COMMENT.

The "Suicide Club" and Naval Aviation.

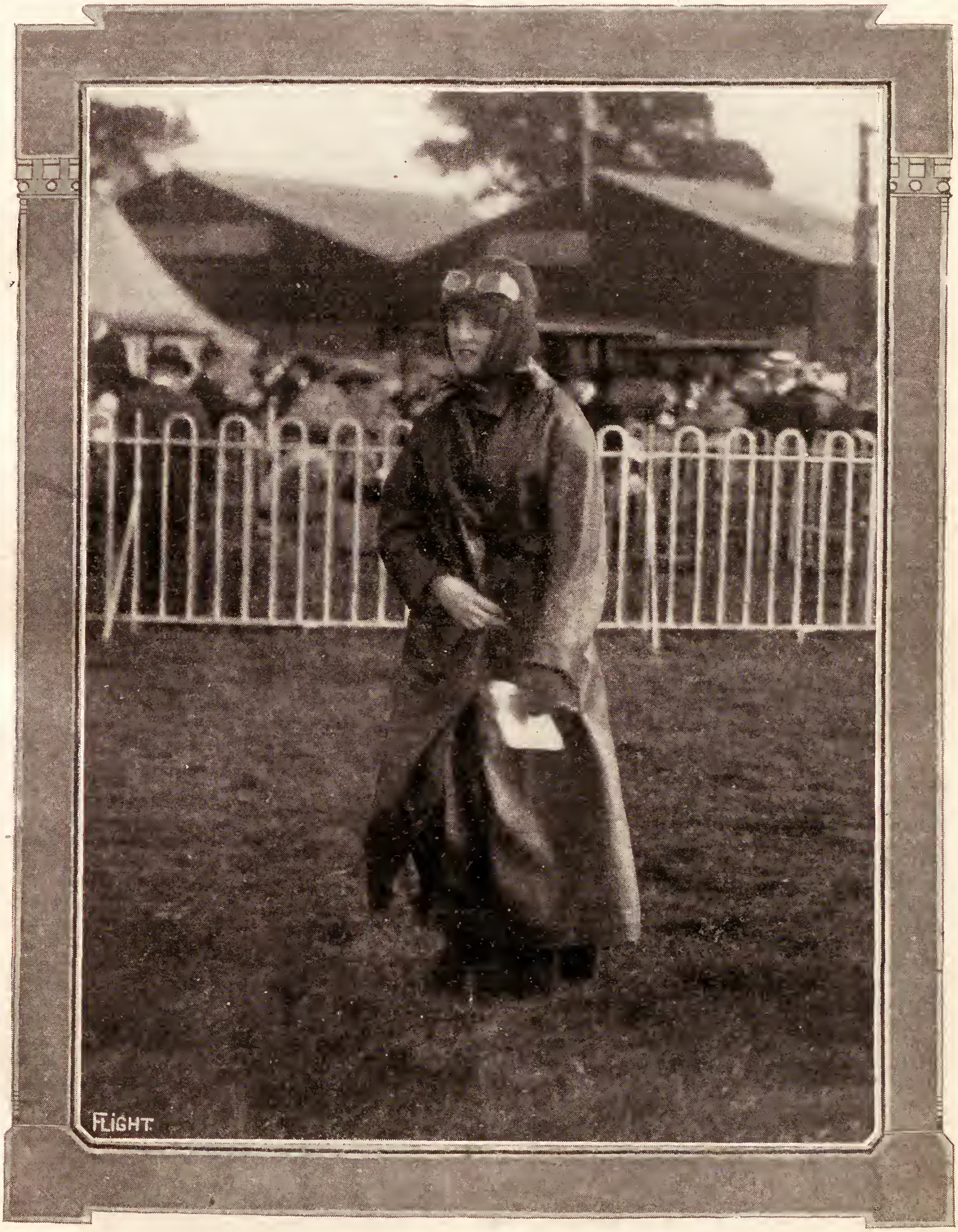
The present seems to be a good time for all those who regard the safety of the Empire as our most precious possession to keep a careful eye upon the doings of what are described in a circular letter of the Navy League as "the joint factions of peacemongers, anti-Imperialists, and Norman Angellites." It is scarcely necessary for us to traverse the whole controversy between the Little Navy-ites and those who believe that the best guarantee of peace is an unquestionably supreme British Navy. It is all so recent that it is perfectly fresh in the public mind. From our own point of view, however, there is this to be said. A supreme Navy argues something more than the two keels to one in capital ships which is the slogan of the Navy League. It means that not only must we be prepared to spend money on Dreadnoughts and battle-cruisers, but that our battle-fleets must be supplemented with a corresponding strength in lighter craft, down to destroyers and submarines. Therefore, it is for the country to keep careful watch that it is not deluded into the belief that because we have a superiority over our most probable enemy in the ships that lie in the line, all is well with us. To point the moral, it is only necessary to go back a few years, when it seemed that if we were to be involved in war with a first-class Power, that Power would be France, now our very good friend and ally. There arose in that country a school of naval thought which believed that, it being impossible to overtake Great Britain in the strength of her battle fleets, the best chance of success in a naval war with us was in the possession of an enormously strong torpedo flotilla. It was argued that torpedo warfare, in which instantaneous action and surprise are the principal factors, was eminently suited to the temperament and qualifications of the French seamen. Therefore, France set to work and built torpedo craft in numbers, until she possessed a flotilla which has never been surpassed since by any naval Power. Fortunately, there was no war, and it is, consequently, impossible for us to say what effect on the respective fortunes of the two countries might have been exercised by the enormous preponderance over our own of France's torpedo craft. If the French school was right, it might have meant defeat and all its consequences for us. If, on the other hand, our own experts were right and victory in naval war belongs to the Power owning the strongest battle fleet, then France must have been swept from the seas. But the point is that there are no lessons available to show us which way things might have happened, and the argument to be deduced is that both France and ourselves were risking a good deal, France in her hopelessly inferior position in the matter of large ships, we in our inferiority in small craft. To continue the argument to its logical conclusion, to be absolutely safe, we must be armed at all points—in no detail or department of our naval service must we be outclassed by our most probable opponent. It does not matter whether the comparison be taken in the matter of battle-ships, cruisers, torpedo craft and submarines or aircraft, the result is the same.

It is here that the watching is necessary. There is not a doubt but that Mr. Lloyd George and his followers will make a determined and reckless attack on the Navy Estimates when, in a few months they come before Parliament. If they do not intend such an attack, then why all the talk about organised insanity, and the pleas for disarmament of which we have heard so much during the past few weeks. Fortunately, in Mr. Churchill we have a First Lord of the Admiralty who is perfectly alive to the necessities, and who may be trusted to get what he wants or to accept the one alternative of a Minister who finds himself in disagreement with Parliament. But in order that he may be able to enforce his views of what is necessary, it is essential that he should have public opinion behind him, and it is here that those who view with apprehension the policy of the disarmament party can help. So far as our own part in the controversy is concerned, we hold strongly to the view, that without a preponderance of strength in aircraft, our superiority in ships must be very largely discounted when the day of trial arrives. Aircraft have—or by the time "the day" arrives will have become—to some extent, substitutes for fast craft as the eyes and ears of the fleet, setting free our cruiser squadrons for the work of protecting the trade routes and destroying the enemy's seaborne trade. It is necessary that this aspect of the matter should be kept in mind, else it might be argued by implication that we might save money on our Estimates, by building aircraft rather than fast cruisers. That is not our argument at all, firstly because it is one of those matters upon which we do not feel disposed to dogmatise, and, secondly, because to argue thus opens up a line of controversy, which we have no desire to see initiated. Moreover, we have nowhere seen it suggested by any responsible naval authority that aircraft are likely to become substitutes for fast cruisers in the full sense of the word. In the nature of things they will at most act in relief of the cruisers in the matter of gaining early touch with the enemy, and reporting his movements to the flag. That they will at the present time be used aggressively, or that aggression will be a primary part of the functions of aircraft in naval war is not to be seriously supposed. Their uses will be different, but nevertheless valuable—nay, indispensable—to the fleet, and it may safely be predicated that, provided always that the superiority in capital ships is not positively overwhelming on the one side, the commander-in-chief, possessing a marked inferiority in aircraft, who sets forth to find and defeat his enemy, will take the seas with an enormous handicap against him.

All this being so, the importance of every Britisher who has not lost his reason circumventing the avowed intentions of what has been aptly termed the "Suicide Club" becomes apparent. On our part, what we and all believers in the future of aircraft have to do is to use all our endeavours to so strengthen the hands of the First Lord and his advisers that the Estimates relating to the air service for the Navy may not be subjected to any cutting down at the hands of the Chancellor of the Exchequer and his fellow members of the Club. What is behind the movement we are unable to discern, but it does seem to us to be somewhat significant that the list of names published as those of the "Suicide Club" should contain the names of so many of "dose barties" who have seen fit to adopt this as the country of their naturalisation, but who, especially in the light of their recently avowed "naval policy," cannot be altogether acquitted of the suspicion that they might possibly prefer the methods of Col. von Reutter to those of their adopted country. This is hard talk, we know, but if the inference is incorrect, then what other deduction is to be drawn from things? It would be interesting to see the supporters of the "Suicide Club" analysed, with particulars of their immediate forefathers, birth, and connections, commercial and otherwise. It should be highly illuminating to have such details of these "peacemongers, Anti-Imperialists and Norman Angellites."

Miss Trehawke Davies handing Mr. Gustav Hamel his goggles prior to making an ascent on the latter's Blériot machine. Miss Davies was the first woman to loop the loop in Great Britain going through this evolution with Mr. Hamel on his Morane at Hendon on Friday, January 2nd.

OF MOMENT IN THE WORLD OF FLIGHT.



MISS TREHAWKE DAVIES.

ARMCHAIR REFLECTIONS.

By THE DREAMER.

SOMEWHERE, at sometime, I have read something about a man being a prophet in his own country. I don't remember quite what it is all about, but its substance is that if you want to be a somebody, you must bang, bang, bang on the drum, but the drum wants to be in any country but that of the banger. Nor is it even necessary that the drum and the banger should be in one and the same country at the same time. It is quite possible to live in one country, and make a noise in another; to such giddy heights have modern wonders elevated us.

If I were to write this page for the Timbuctoo Flight, I might be mistaken for a genius: who knows? Here in London I am simply a dreamy dreamer. I know, that even here, my wonderful writings will be stored up through the ages to come, but this is not out of any respect for myself, nor for any quality in the writings themselves; it is simply that a copy of FLIGHT has to be sent to the British Museum, and my page has to be accepted with the rest.

If one wants to live in England, and make a noise in a far-off land, there is one country best left alone—America: Silas P. Plunket has a way of meeting a right half-hook with a straight left.

Only a week or two ago, on November 29th, to be exact, I ventured to recount to you that little story about Mr. Frank Goodale and the green air-serpent which he encountered aloft when he got nearly frightened out of his wits. I knew I was on treacherous ground, and tried by all the tactics known to journalism to screen myself. I said right away that it was not my story, that I had gleaned it from Everybody's Paper, who admitted that they got it second or third hand. I even dared not to say I did not believe it: I simply said its details were picturesque, and gave it as I got it. This finessing did not save me. Almost before I had time to recover from my feeble half-hook, back comes the American straight left in the shape of a letter from Denver, Colo., which my American friend in the picturesque language of his country would call a "peach." I am not going to tell you what he said to me in that letter, at least not all of it, but he made several plain, very plain statements to the effect that he had never heard of Mr. Frank Goodale: that even if there were such a man, he never said or did anything of the kind attributed to him: that allowing that he did see a serpent, it was only one: and that anyway he didn't believe that any such paper as Everybody's Paper existed except in my own fertile brain, and that so far as being "picturesque" was concerned, England could give America four blocks start and a hiding. He enclosed with his letter, a few pages torn from Everybody's Magazine: being a short illustrated story about a whole jungle of air-serpents located over England. It was written by one of our best-known English writers, a man whose name is known throughout the world.

I wish I could show you the pictures, they're—Oh! dear, I hope I shall never go up high above the clouds, if that is a fair specimen of what may be found there. The story is in the form of a diary, picked up on the borders of Kent and Sussex, after the writer had gone aloft never to return. Somewhere about 41,000 ft. high, the airman first saw the serpents, or whatever they were. He describes the first one, as being something like a jelly-fish, larger than the dome of St. Paul's, and as being of a light pink colour, veined with a delicate green, and having two long drooping green tentacles. Later he got amidst a whole fleet of them: some small and some large, but the majority being about the size of a balloon.

Later he says: "But soon my attention was drawn to a new phenomenon—the serpents of the outer air. These were long, thin, fantastic coils of vapour-like material, which turned and twisted with great speed, flying round and round so fast that the eyes could hardly follow them. Some of these ghost-like creatures were twenty or thirty feet long." The airman did not come to any harm on this occasion, as he dived to get away from them, but he realised that he could not tell the story to the world without proof, so later he went up again, taking a shot-gun with him. From this journey he never returned, but on the last page of his diary they found: "Forty-three thousand feet. I shall never see earth again. They are beneath me, three of them. God help me, it is a dreadful death to die."

I think I won't bother about that altitude record just yet; I don't like this sort of thing at all, and I don't mind admitting to my American friend that, so far as being picturesque is concerned, we hold the cup up to now.

England and Altitude Records.

I have often wondered why it is that time and again the altitude record is made and beaten abroad. It is true, we have various little records for altitude with a certain number of passengers, but they are not in the first rank as records. Personally, when I read "with three passengers" or more, as the case may be, it always has the taste of an excuse for not going higher. Is it that we do not care about the altitude record? I admit it is not much good to whoever gets it, nor are any records for that matter, but we, I think, often defend ourselves that our men and machines are as good as any, yet we never seem to do much worth shouting about.

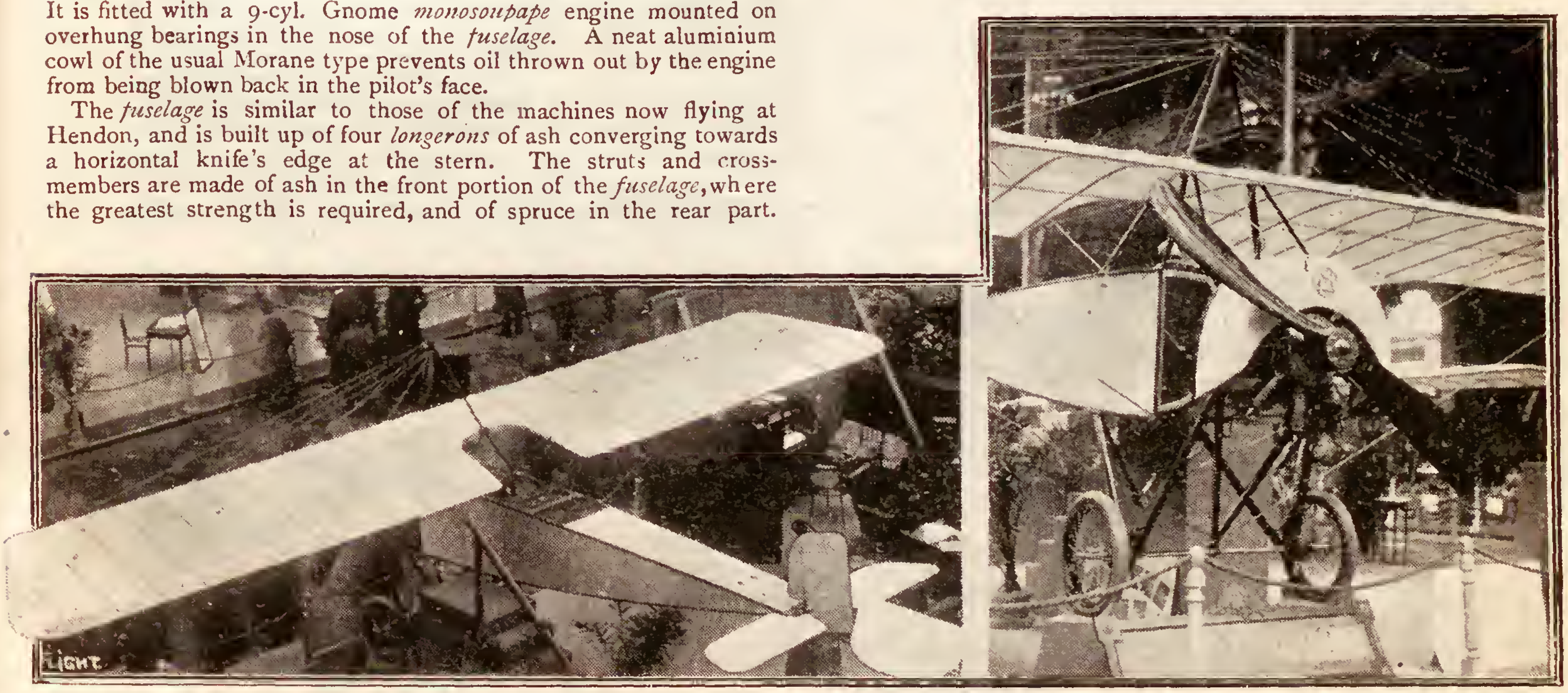
After all, there is public opinion—the stepping-stone by which we must reach, if we ever hope to reach, anything approaching a premier position in the world of aviation, and public opinion bases its vote or veto principally on public opinion, very much after the manner of getting a flock through a gate. Few men have the courage of their opinions sufficiently strong to stand out for them against the majority, and will flow with the tide rather than try to swim against it. In short, public opinion is but the reflex action of the opinion of those who, knowing that it is good for them, are clever enough to so arrange matters that the public shall ask for it themselves. Again, is it because we are an island nation that we never put up any distance flights such as are being done daily on the Continent? Surely the way to show the people of England what can be done with the aeroplane is to go out and do it. The main thing that is done with the aeroplane in this country is to stunt round pylons. This in itself is all right, because it provides somewhere where people can go to see machines in the air, who would probably not otherwise get a chance to see them at all; but having interested them in the art, it is a pity not to be able to move them up into a higher class—the class that teaches national defence.

FIFTH ARTICLE.

MORANE-SAULNIER.

THE Morane-Saulnier exhibit is one of the most artistically-arranged, as well as being very interesting, from a technical point of view. The three machines shown are a single-seater similar to the machine flown by M. Garros across the Mediterranean, a tandem two-seater military monoplane, and the "Parasol." Interesting as the two first-mentioned machines are, though they are standard types, we think that the "Parasol" is the most interesting on this stand, as it represents radical alterations in design and construction. It is fitted with a 9-cyl. Gnome *monosoupape* engine mounted on overhung bearings in the nose of the *fuselage*. A neat aluminium cowl of the usual Morane type prevents oil thrown out by the engine from being blown back in the pilot's face.

The *fuselage* is similar to those of the machines now flying at Hendon, and is built up of four *longerons* of ash converging towards a horizontal knife's edge at the stern. The struts and cross-members are made of ash in the front portion of the *fuselage*, where the greatest strength is required, and of spruce in the rear part. The chassis is of the ordinary Morane type, which is already known to our readers through descriptions in the columns of FLIGHT. The most striking departure from standard design is in the wings, or rather in the mounting of the wings. Instead of bolting these to the sides of the *fuselage*, they have been raised a couple of feet above the *fuselage*, and are mounted on a structure of steel tubes, which converge to form a three-cornered *cabane* above the wings



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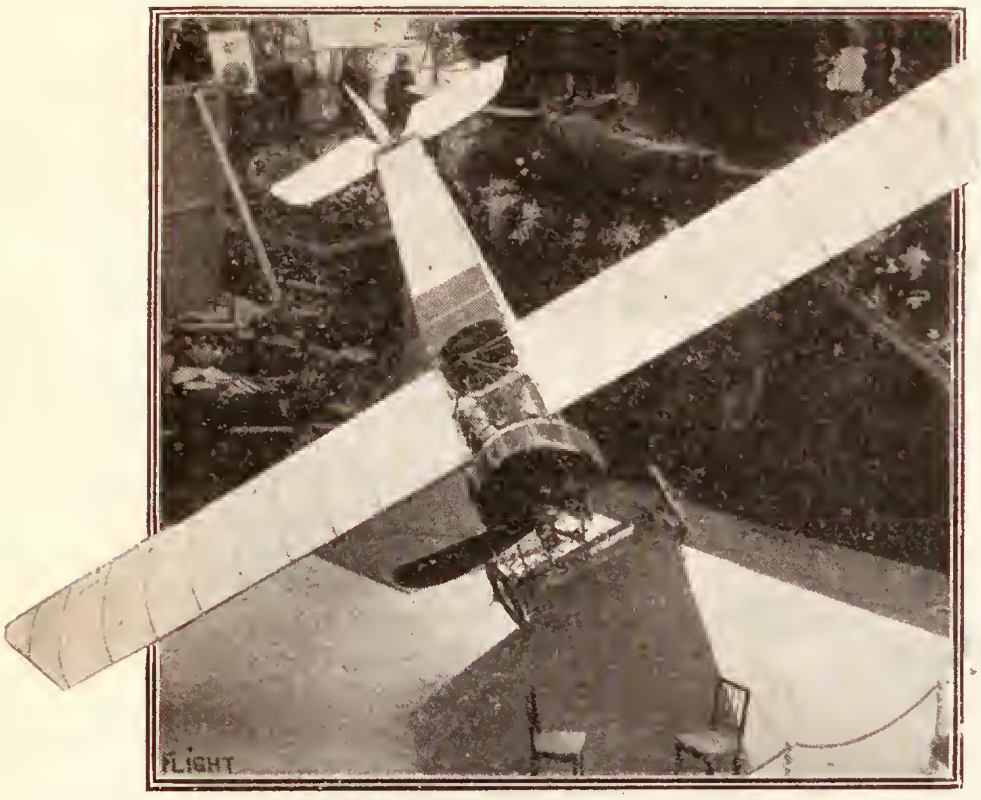
The Morane-Saulnier "Parasol," and a view of the chassis and engine mounting.



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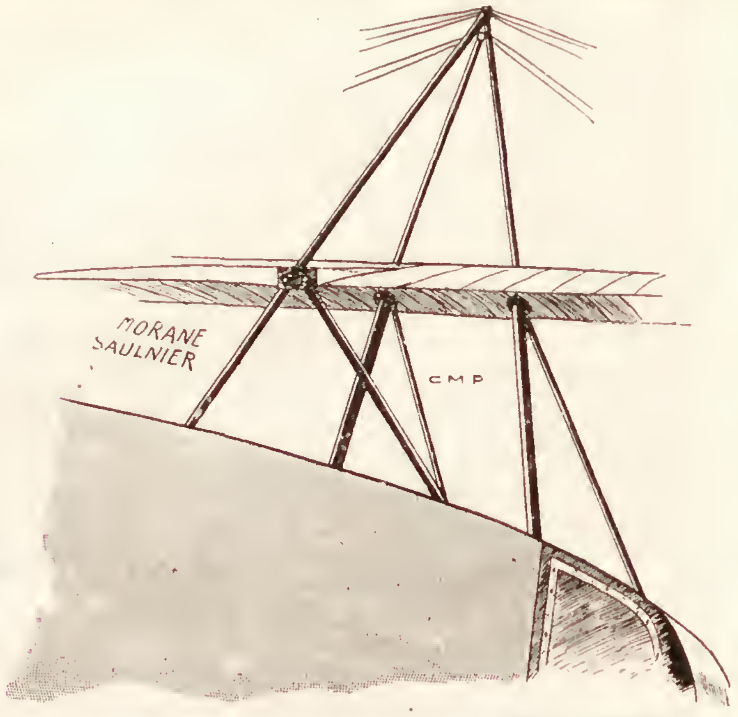
A neat way of exhibiting a machine—one of the Morane-Saulnier monoplanes.

and which have their lower extremities bolted to the upper *longerons* of the *fuselage*. By having the wings mounted in this manner, the machine must of necessity have a very low centre of gravity, but the makers claim that it is very stable and this arrangement certainly has the very great advantage for military purposes, that an unrestricted view of the ground is obtained. Another advantage is that the angle of the lift cables is exceptionally good, the outer cable running to the chassis, whilst the centre and inner cable are taken to the lower *longeron* and the nose of the *fuselage* respectively.

Arranged tandem fashion inside a very comfortable cockpit are the pilot's and passenger's seats, the pilot being in front. Control is by means of a central tubular column for warp and elevator, and a pivoted foot-bar for the rudder. In front of the pilot are mounted the instruments such as compass, altimeter, speed indicator, clock, revolution indicator, and map case. Let into the floor of the *fuselage* behind the passenger's seat is a specially constructed camera, the lens of which is pointed vertically downwards. By simply pulling a cord the observer exposes a plate, and when the cord is released the camera automatically changes the exposed negative and substitutes in its stead an unexposed plate. The workmanship of the "Parasol" as well as the other two machines exhibited is of the very highest order, and every detail is beautifully finished. The white fabric on the wings and *fuselages* in connection with the black enamelled steel parts and engine cowls, renders this exhibit the most graceful at the Show.



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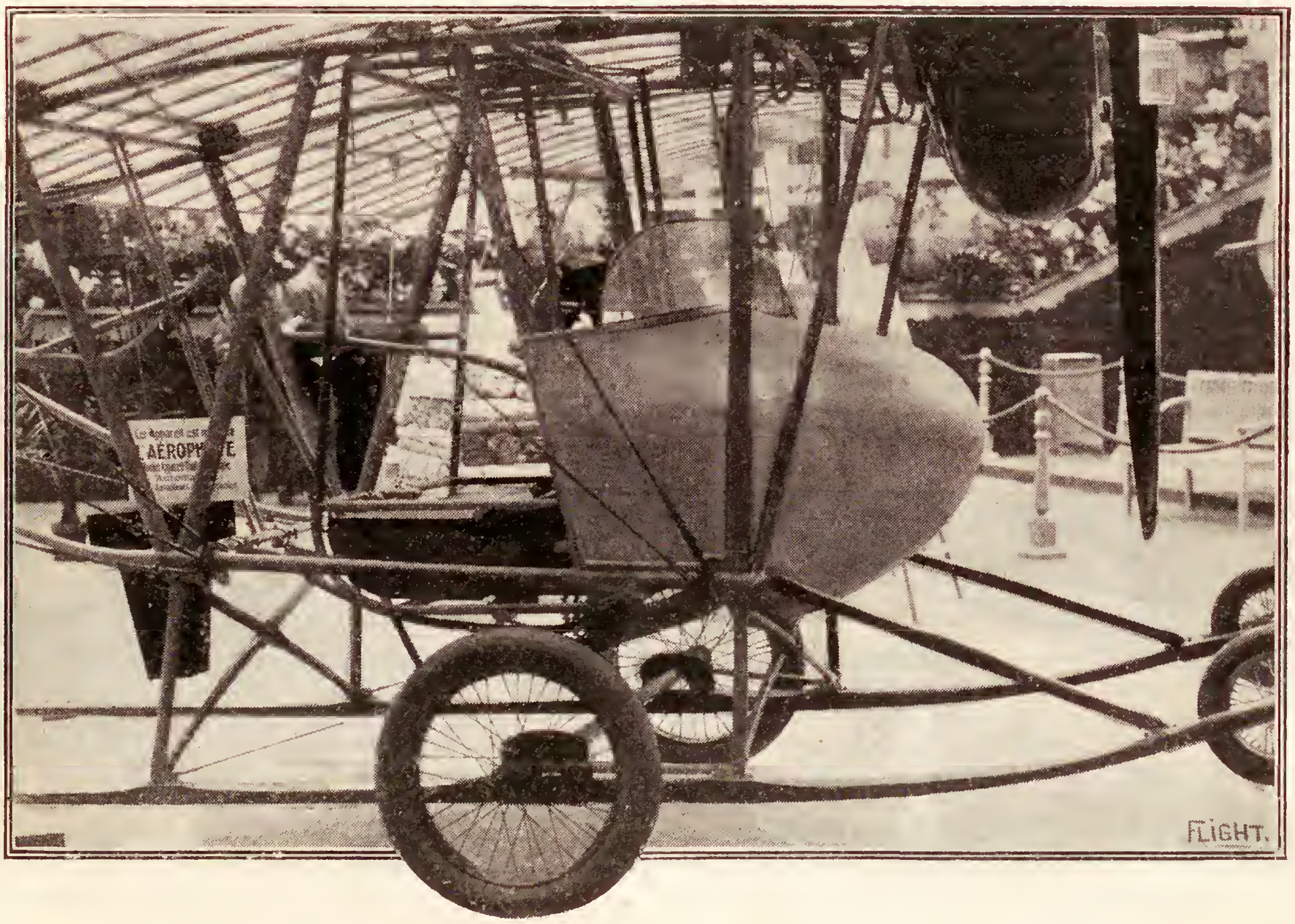
Attachment of wings to *fuselage* on the Morane-Saulnier "Parasol."



The Moreau "Aerostable."

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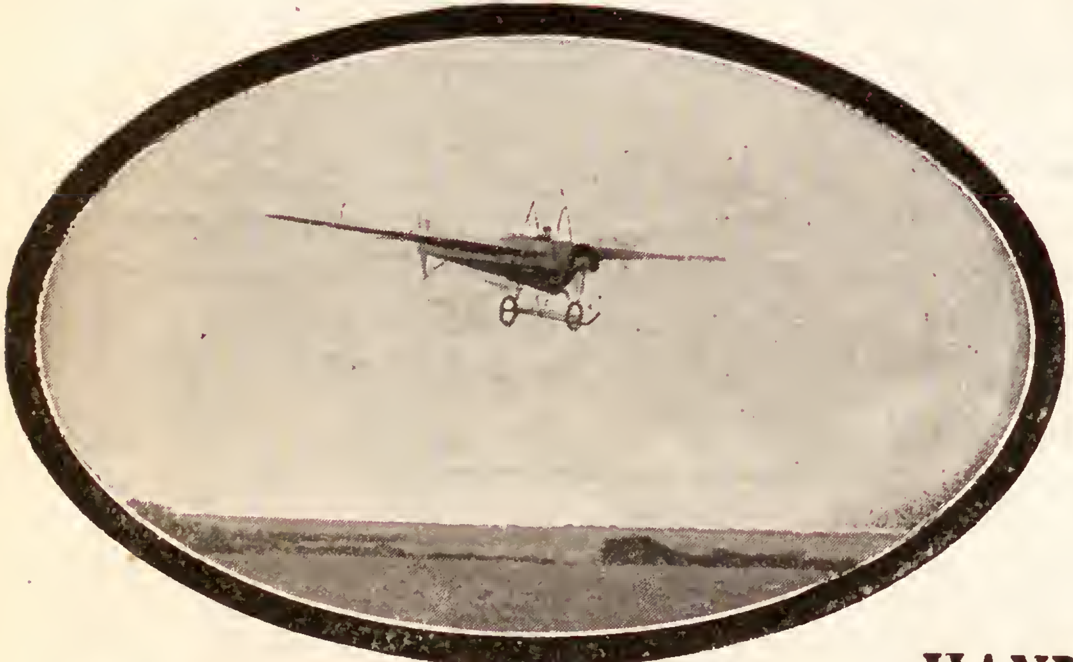

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MOREAU.

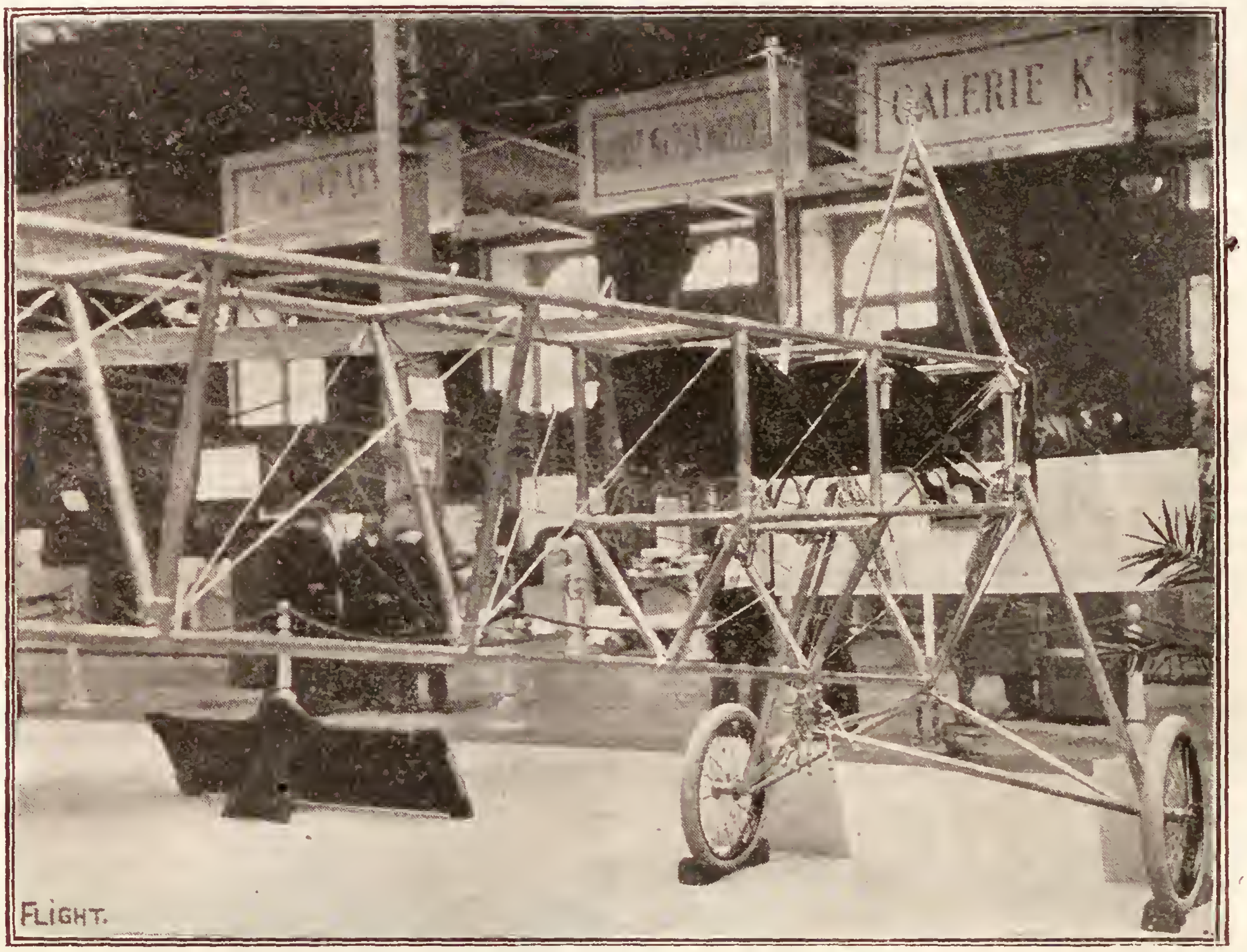
On the Emaillite stand was shown the Moreau aerostable, which, it will be remembered, won the Bonnet stability prize. The whole machine seemed unnecessarily complicated, consisting, as it did, of a veritable forest of steel tubes. The automatic stability was purely longitudinal, the shape of the wings being supposed to render the machine automatically stable laterally, although *ailerons* are fitted. This lateral stability was greatly increased by judicious use of the rudder, as it is quite possible to keep a machine on an even keel without the use of the warp simply by increasing the speed of the dropping wing by turning the machine in the opposite direction. As for the automatic longitudinal stability, this is possessed by nearly every well-designed machine, and is secured simply by means of the longitudinal dihedral angle formed by the difference in the angle of incidence of the wings and the tail plane. In any case one would think that this longitudinal control by means of slinging the pilot's seat could be obtained in a much simpler way.

Constructionally the machine was built of steel almost throughout, the pilot's seat being slung by means of steel tubes underneath the main planes, thus giving the machine a very low centre of gravity.

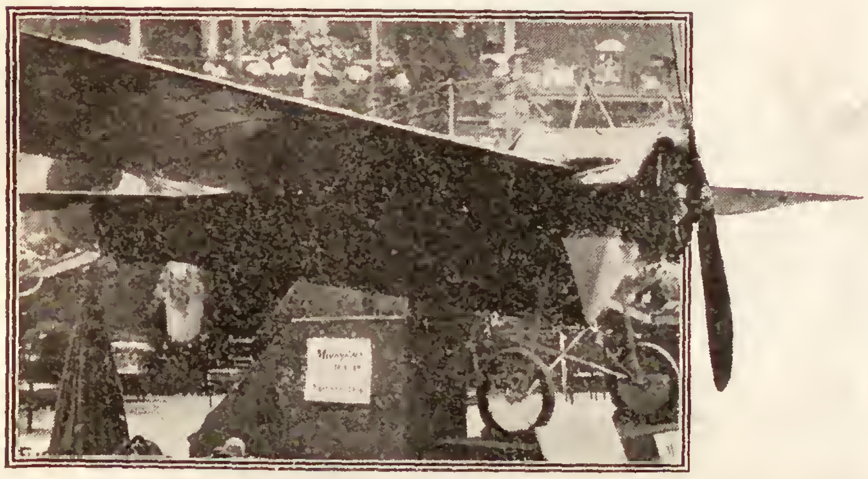
This was partly counteracted by mounting the engine up in front of and on a level with the leading edge of the wings. On top of the wings was mounted the petrol tank, from which petrol is fed to the carburettor by gravity. The engine was partly covered by an aluminium shield enclosing the lower part of the engine, whilst the upper part had been left uncovered for cooling purposes.

R.E.P.

To most of the visitors to the Paris Show it was a surprise to find that the R.E.P. firm were showing, in view of the fact that Mr. Robert Esnault-Pelterie definitely retired from aeroplane construction last year. However, one was glad to see that he had been induced to alter this decision, as it would have been a great loss to aviation generally if the withdrawal had been permanent. Of the two machines shown, one was a single-seater monoplane, fitted with an 80 h.p. Gnome engine, which did not differ materially from the earlier R.E.P. machines, already known to our readers. It was built of steel tubes throughout, and the high quality of the workmanship was readily appreciated after an inspection of the skeleton *fuselage* which completed the exhibit on the R.E.P. stand. The joints were not soldered, but were in most cases either bolted or welded by acetylene welding. Control was by means of a single central lever for the warp and elevator, and a foot-bar for the rudder.



The skeleton of the all-steel R.E.P. *fuselage*. "Flight" Copyright.



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The R.E.P. monoplane.

The chassis was sprung in the usual R.E.P. way by a cross-arm sliding up along one of the struts in the side of the *fuselage*, and carrying the rudder shock absorbers, and the wheels were carried on two stub axles pivoted on the lower *longeron* on the *fuselage*. The wings were supported on the *fuselage* by fitting the spars in hinged lugs, so that no bending strain was imposed upon the rear spar when warping the wings. The upper bracing cables to the front spar were attached to the top of a triangular pyramid formed by steel tubes, whilst those to the rear spar were attached to a single tube. They do not run over pulleys in the usual manner, but were fixed rigidly to the tube which rocks laterally when the wings were warped. The lower front lift wires were secured to the keel of the *fuselage*, on which were also situated the pulleys for the lower warp wires.

The whole machine had been designed with a view to facilitate dismantling, and all parts had been standardised so that in case any part becomes damaged it could be easily and quickly replaced.

(*To be concluded next week.*)

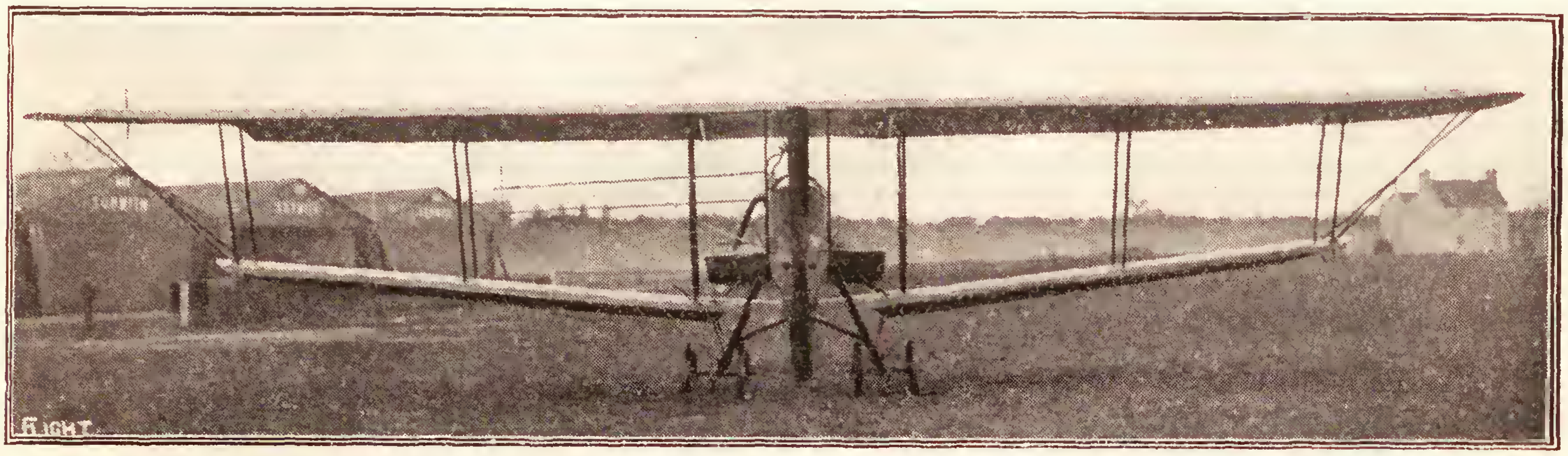
THE D.F.W. BIPLANE.

If the D.F.W. biplane may be considered as being representative of German aeroplane construction—and the prominent position occupied by the German Aircraft Works (Deutsche Flugzeug Werke), of Lindenthal, near Leipzig, certainly justifies this assumption—aeroplane construction in Germany has made tremendous strides during the last year or so. In this country, steel construction has been comparatively little employed, and if for no other reason this new arrival to our shores would be of great interest. There are, however, a great number of other things to attract one's attention, both as regards design and new details incorporated in the construction.

Like the majority of German machines, this biplane is of the tractor type, with the weights of engine and pilot situated comparatively far apart. The engine, a 100 h.p. six-cylinder Mercedes, is mounted on stout ash bearers in the front portion of the *fuselage*. The radiator in conjunction with the lower front portion of the *fuselage* forms a very good entry for the air, which is allowed to flow along the gently tapering sides until it meets again behind the pointed stern.

Constructionally the *fuselage* is built up of three tubular *longerons* connected by a system of three-ply wood cross-members, a construction which, apart from being very strong, possesses a certain amount of elasticity, which greatly minimises danger of distortion due to shocks. Steel wires running longitudinally and supported on the cross-members serve to form the streamline shape of the lower portion of the *fuselage*, whilst a turtle back of three-ply wood runs from a point behind the pilot's seat to the rudder post. An aluminium cover, black enamelled, extends from the engine housing to a point just to the rear of the pilot's seat. This cover is attached to the upper *longerons* by means of ordinary bonnet fasteners, and can be easily removed for the purpose of examining the controls, &c. In front of the pilot's and passenger's seats this cover is swept slightly upwards in order to deflect the air and thus form a wind-screen for the protection of the occupants.

The two seats are arranged tandem fashion, the pilot occupying the rear seat, from where he has, due to the position well to the rear of the trailing edges of the wings, a practically unrestricted view in all directions. The passenger's seat is situated sufficiently far forward to enable him to look over the leading edge of the lower plane, and thus has a good view in a downward and



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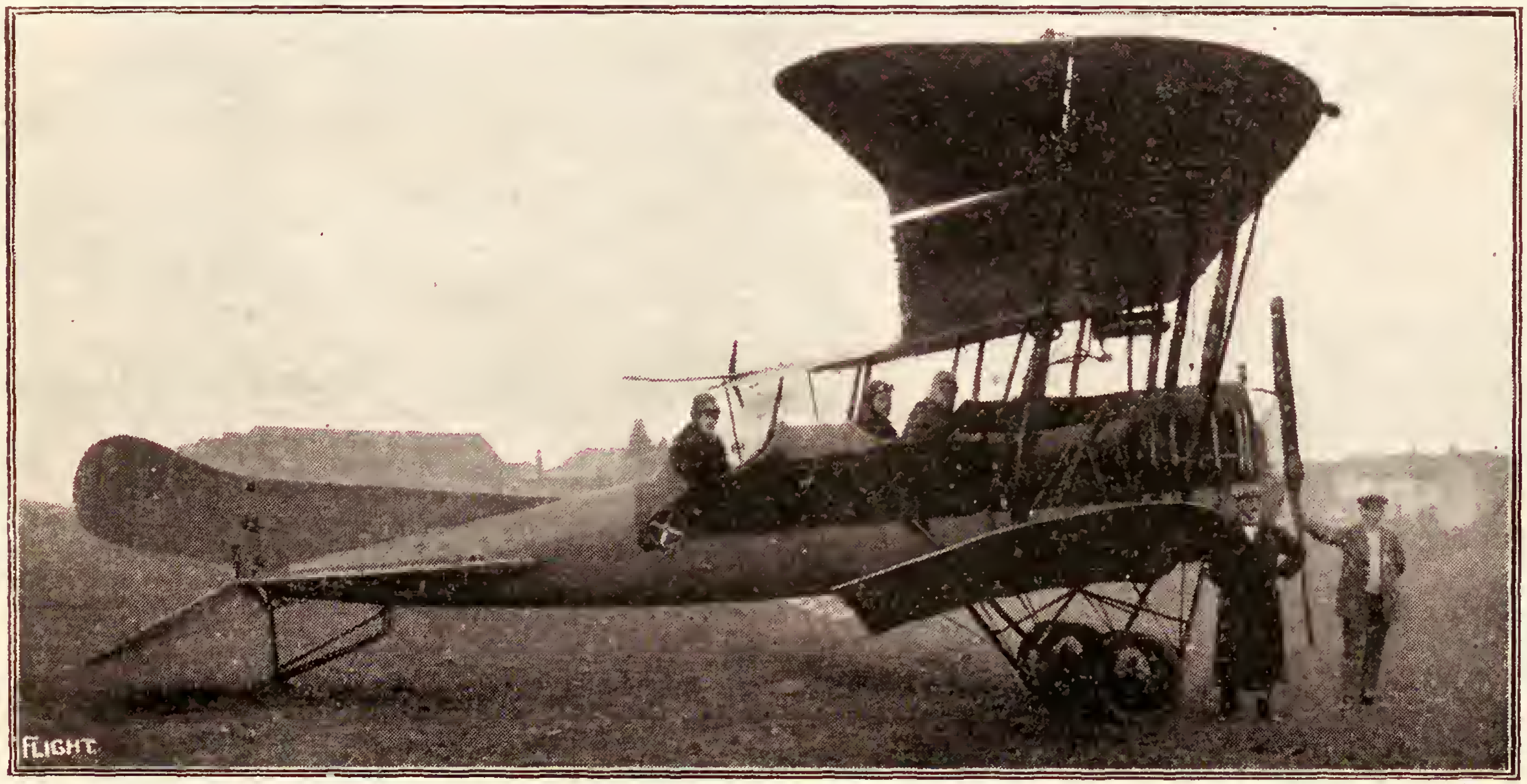
The D.F.W. biplane from the front.



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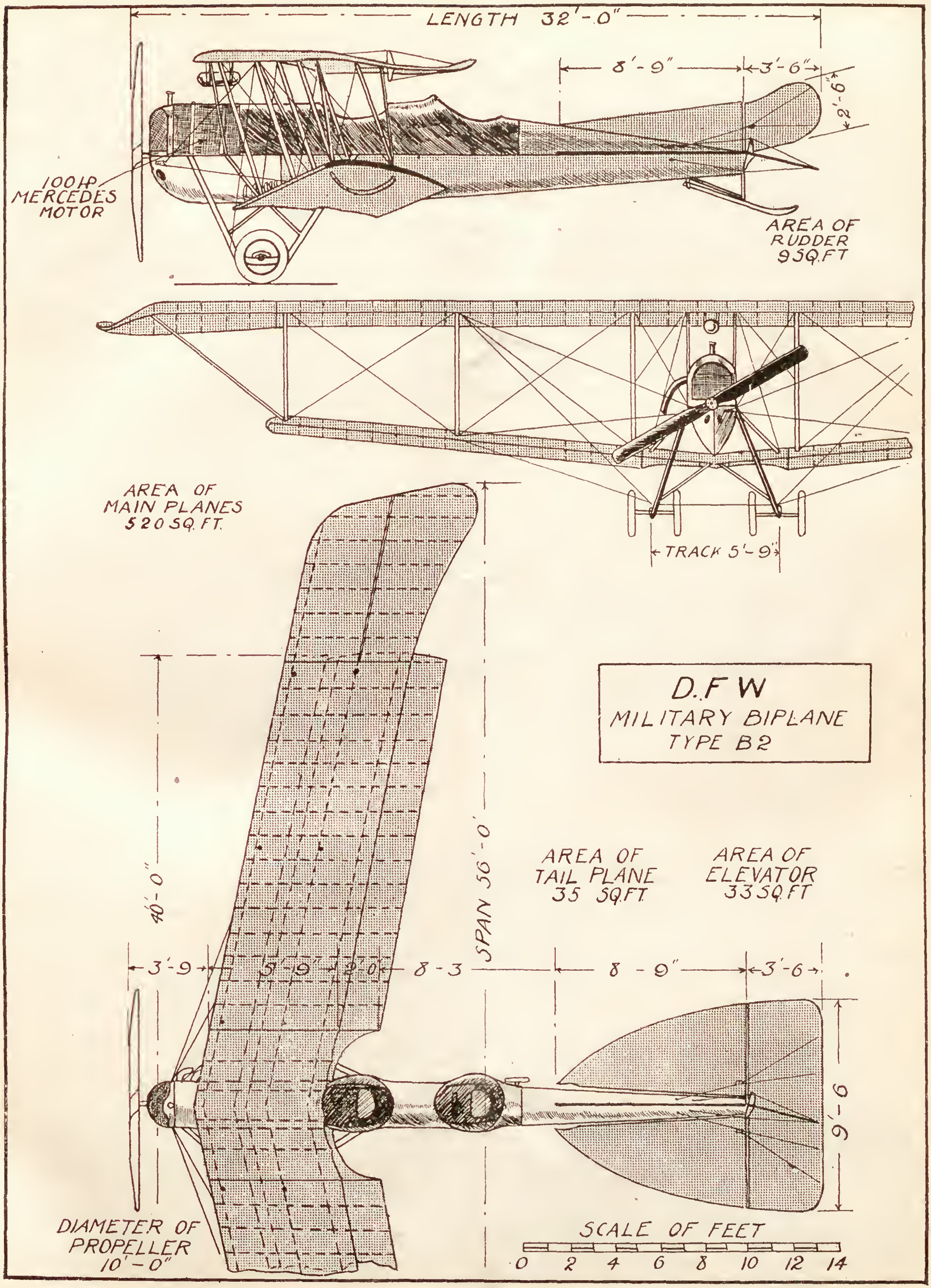
The D.F.W. biplane, as seen from the side.



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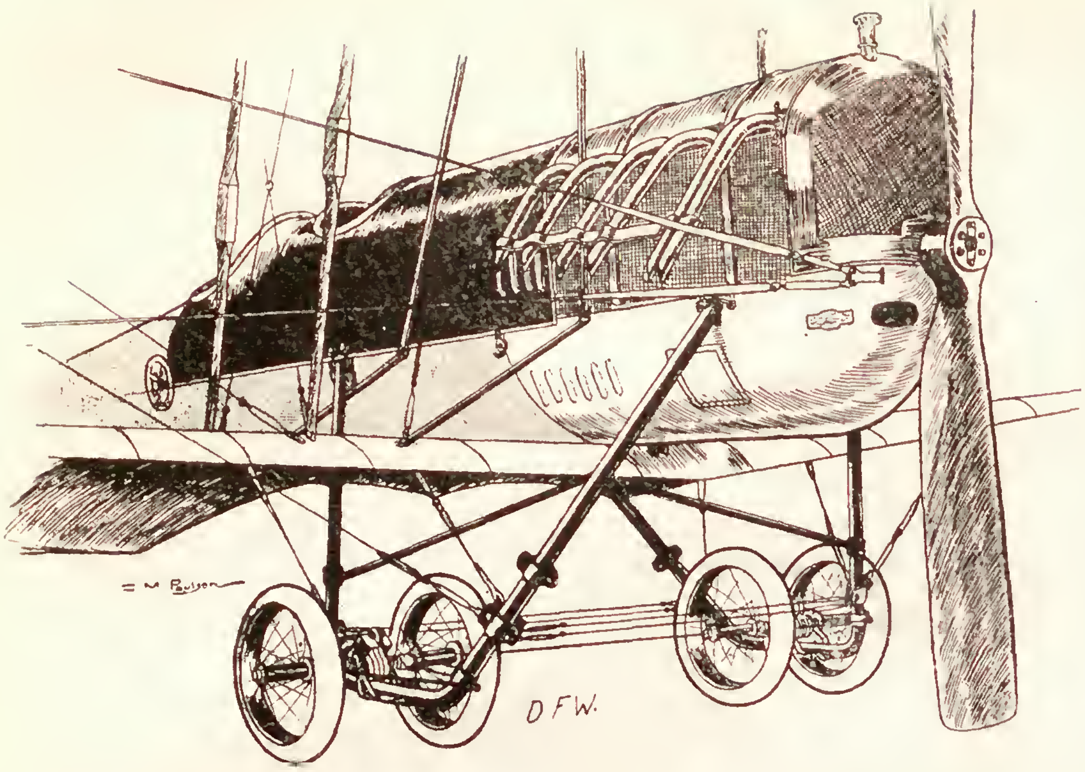
THE D.F.W. BIPLANE.—Plan, side and front elevations to scale.



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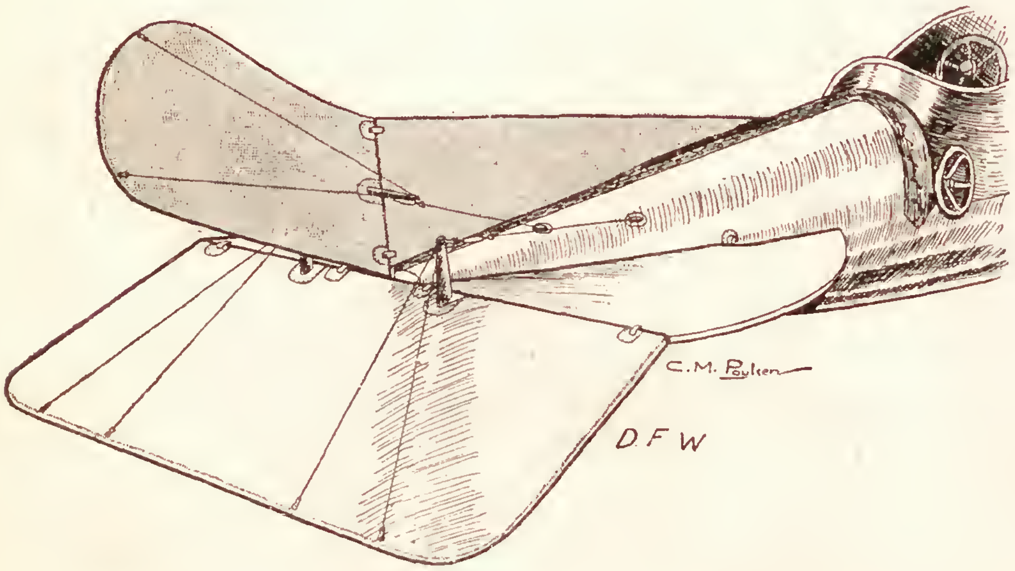
Sketch showing front part of *fuselage* and landing chassis of the D.F.W. biplane.

forward direction, while an unobstructed view straight downwards is obtained by cutting away the trailing edge of the lower plane in the vicinity of the *fuselage.* Mounted on a very neat dash in front of the pilot are an uncommonly complete set of instruments, not the least interesting of which is a very small, compact Bosch self-starter, which is in reality a small dynamo, hand operated, by means of which the pilot can start his engine with one or two revolutions of a small handle, without any necessity of swinging the propeller. This is, of course, on the assumption that there is sufficient gas in the cylinders, which seems to be always the case with the excellent Mercedes engine, for on the twenty odd times that we have seen the engine started the device never failed to work.

The controls are of the usual type, consisting of a vertical tubular column on which is mounted a hand-wheel, the rotation of which operates the *ailerons*, whilst the to-and-fro movement actuates the elevator. The rudder is controlled by means of two foot-pedals



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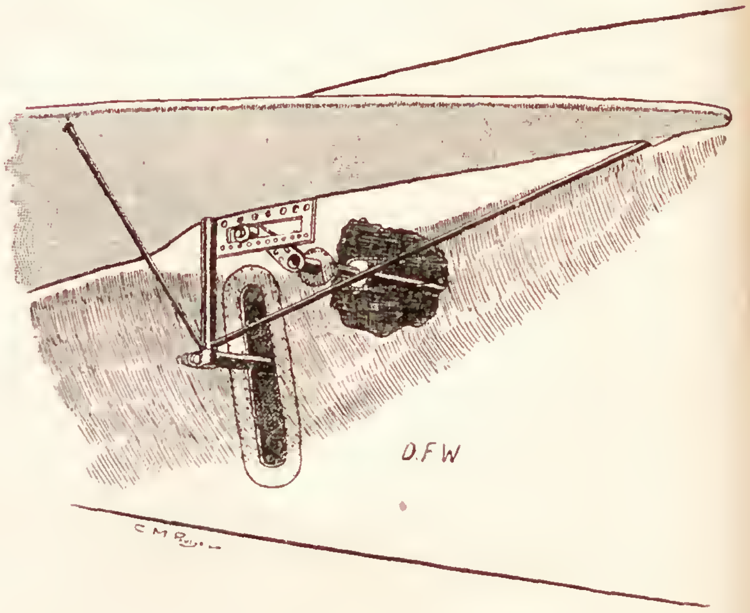
THE TAIL PLANES OF THE D.F.W. BIPLANE.—Note the wheel outside *fuselage* by means of which the angle of incidence of the tail plane may be altered during flight.



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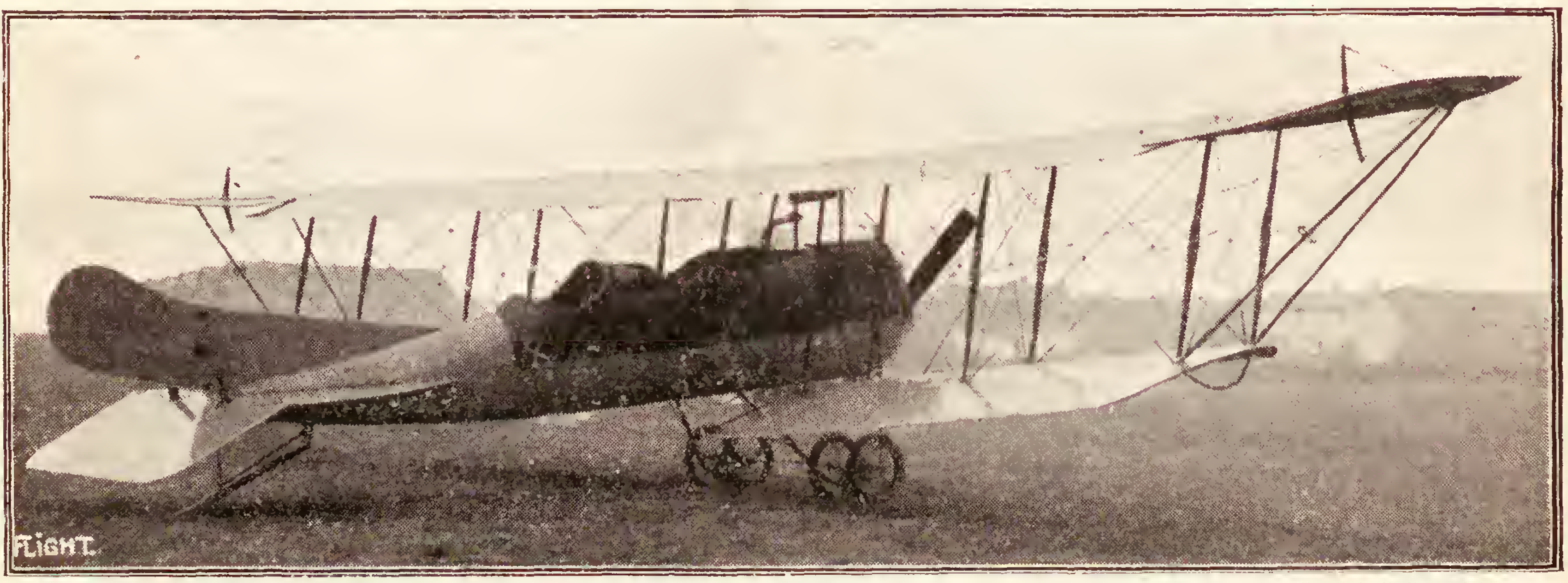
Sketch showing how angle of incidence of D.F.W. tail plane is altered.



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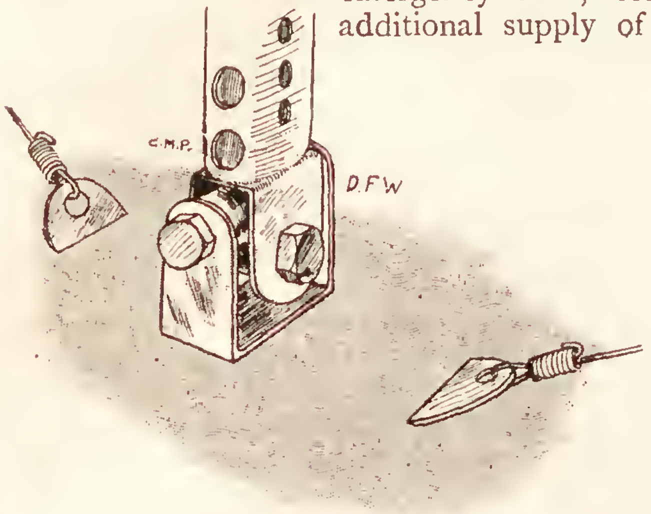
THE D.F.W. BIPLANE.—A three-quarter view from the back.

similar to those used on motor cars. Two sets of controls are provided, so that either pilot or passenger may take control of the machine at any time. If desired the passenger's controls may be easily put out of action.

Between the engine and the passenger's seat is a large petrol tank containing about 50 gallons of petrol, which is fed to the two carburettors by gravity. A smaller emergency tank, containing an additional supply of about four gallons, is slung underneath the top plane. Six exhaust pipes project through the *fuselage* covering on the right hand side of the machine, and they are made of sufficient length to ensure that no exhaust gases are blown back in the faces of the pilot and passenger. In order to keep these pipes cooler they are not exactly in line, the front one projecting more outwards from the body than the rear one so that the air is allowed to flow freely round all of them. A gauze bonnet is fitted over the engine so as to allow of easy inspection.



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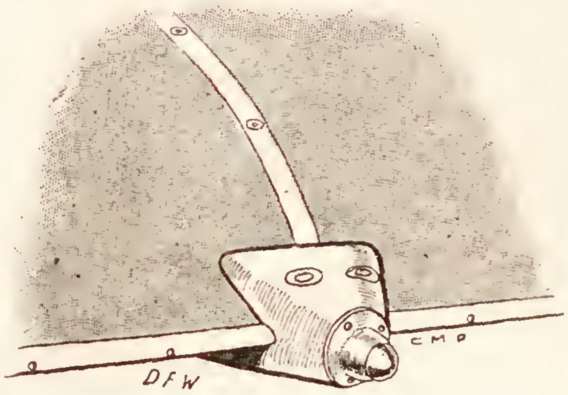
Universal-joint on end of struts of D.F.W. biplane.



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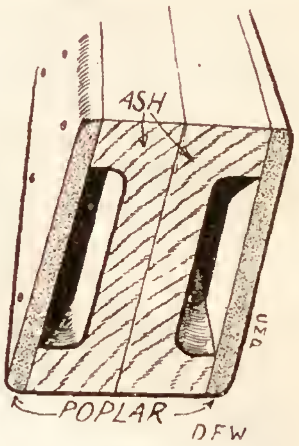
One of the "Domes of Silence" fitted on leading edge of D.F.W. wings to facilitate moving them about inside hangar.



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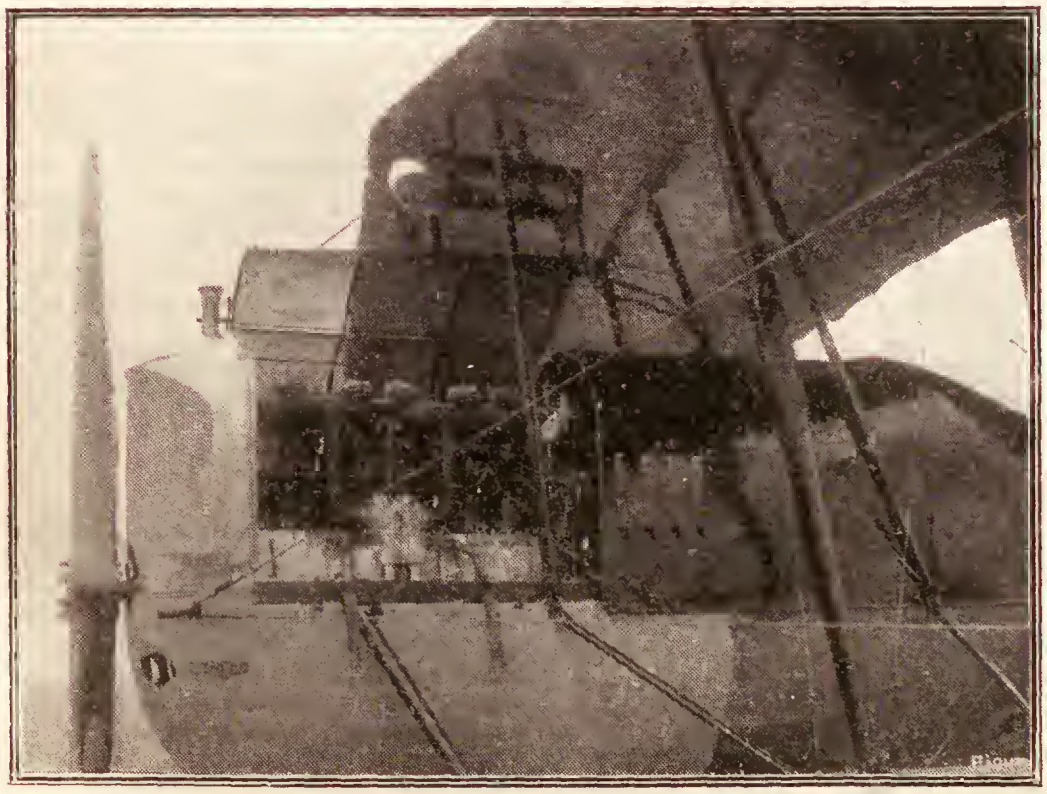
Section of D.F.W. wing spar.

The main planes, which have a very decided slope backwards, are built up of ash spars of I section with side pieces of poplar, over which are built the ribs, which have webs of three-ply wood and flanges of lime wood. The upper plane is straight—that is to say, it has no dihedral angle—whereas the lower plane has a dihedral of four degees. Six pairs of struts connect the main planes, and these struts are unusual in that they are hinged in the centre so that they can be folded, thus allowing the two planes to be laid flat against one another, when the machine is dismantled. This is accomplished without in any way interfering with the cross bracing of the planes, so that these can be erected again without any adjustment whatever. The top plane has a considerably larger span than the lower one, and the two extensions are supported, when the machine is on the ground, by steel tubes running from the upper wing tip to the lower ends of the outer pair of plane struts. For accommodation in a small hangar these two extensions of the top plane can be easily folded down, thus reducing the overall span to about 40 feet. Along the leading edge of the wings we noticed some little fittings, the purpose of which evidently is to allow the wings to be rolled along the floor of the hangar without the necessity of lifting them, an operation which, if not carefully carried out, is apt to strain the wings. To the rear spar of the top plane are hinged two *ailerons*, which are set at a negative angle of incidence normally, and thus serve the same purpose, to a certain extent,



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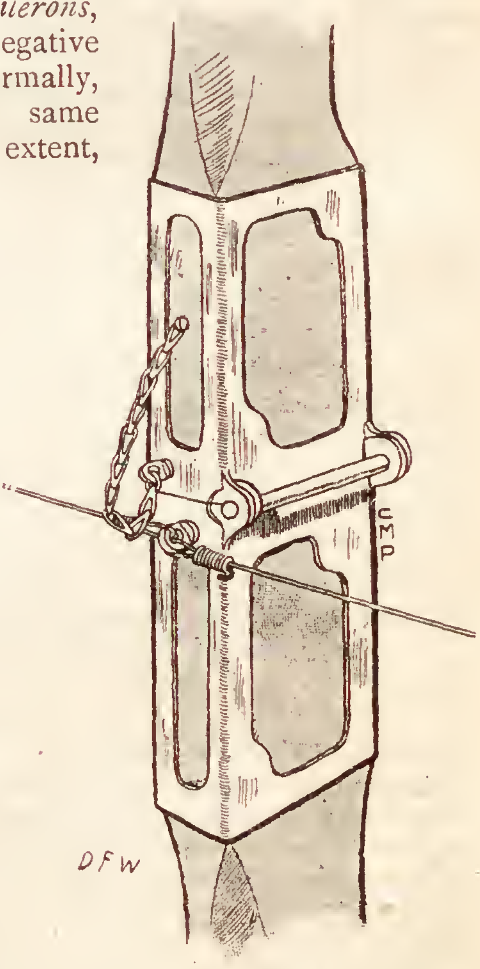
The front part of the D.F.W. biplane, showing the engine in place.



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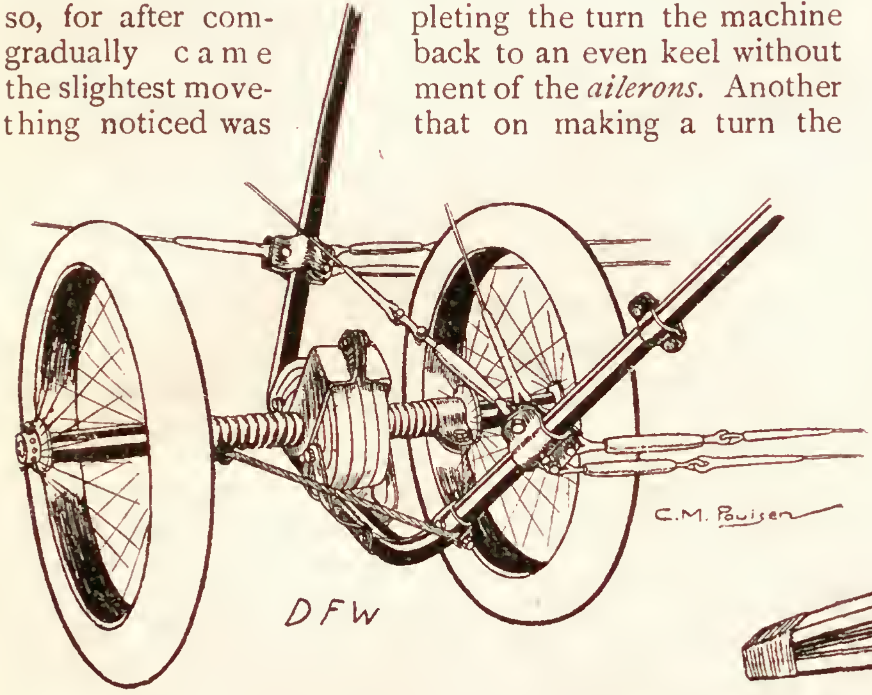
Sketch showing how plane struts are hinged in the centre of the D.F.W. biplane.

as the upturned wing-tips of the Etrich and Handley Page machines. There seems, however, to be very little necessity of using these *ailerons*, for during a flight of about twenty minutes' duration on which we accompanied the D.F.W. Company's chief pilot, Herr Roempler, a careful observation of the *ailerons* revealed the fact that the pilot did not have to move them once during the whole flight. We did a steeply-banked right-hand turn only a short height above the trees just outside the track at Brooklands, where gusts and *remous* are known to be practically always prevalent, and we fully expected that here at least the *ailerons* would be called into play, but evidently there was no necessity to do so, for after completing the turn the machine gradually came back to an even keel without the slightest movement of the *ailerons*. Another thing noticed was that on making a turn the machine seemed to bank automatically to just the right degree, for we did not feel the tendency to lean towards the higher side generally experienced on a machine where warp or *ailerons* are employed to increase or counteract the bank; the amount of banking must, therefore, have been at least fairly correct for the particular speed and curve.



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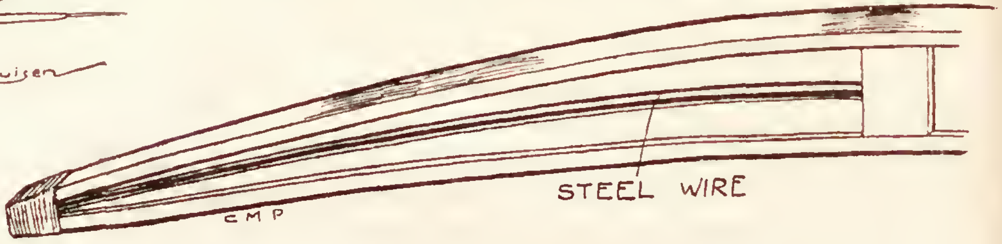
One side of landing chassis showing mounting of wheels.

On landing, the good qualities of the chassis were demonstrated, for on running into a small mound in the ground the machine simply bounced slightly and alighted again without any shock. The chassis consists of two pairs of U-shaped steel tubes held rigid by a pyramid of four shorter and thinner steel tubes having their apex underneath the lower main plane where the keel of the *fuselage* rests on it, and secured to the U-tubes by steel clips. The chassis tubes are attached to the upper *longerons* by clips and bolts passing outside the tubes, which are therefore not weakened by piercing. Each of the two pairs of wheels is mounted on a short tubular axle, and sprung by means of rubber shock absorbers. Coil springs on each side provide for a slightly sideways travel of the machine on alighting. Instead of the usual radius rods, short stranded cables are used to keep the wheels in their normal position.

In order to provide a certain amount of speed variation the angle of incidence of the tail plane can be altered while the machine is in flight. The method of doing this is illustrated by one of the accompanying sketches. The tail plane, which is pivoted round a transverse steel tube in the stern of the *fuselage*, is divided into two halves, and does not fit tightly on to the sides of the *fuselage*, sufficient space being provided to allow of the upward and downward movement of the tail plane. A short tubular axle, working in bearings in the sides of the *fuselage*, carries two short crank levers, which work in slotted steel plates on the tail plane. On this axle is mounted a sprocket wheel, from which a short length of chain and stranded cables run to an autoloc wheel mounted on the outside of the *fuselage* just behind the pilot's seat. By rotating this wheel the axle, which carries the cranks, is revolved, and the front of the tail plane moves up or down according to the direction in which the handwheel is rotated. To the trailing edge of this tail plane is hinged the elevator, which is of the undivided type. On top of the *fuselage* is mounted a small vertical fin, which has hinged to its trailing edge the rudder.



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The flexible rear portion of the D.F.W. ribs.

Leather edgings around all these hinges allow of easy inspection of the hinges, and in a similar way the fabric with which the *fuselage* is covered can be removed by undoing the lacing. A short rubber-sprung tail skid is pivoted below the tail planes. Stranded cables are used throughout for the wing bracing,

The weight of the machine empty is 1,460 lbs. and its speed is in the neighbourhood of 68 miles per hour. With a supply of fuel sufficient for seven and a half hours' flight, and with pilot and passenger, the machine climbs about 300 ft. per minute, and its gliding angle 1 in 8·5. The machine appeared to require a comparatively long run before taking the air, but Herr Roempler contends that there is no reason for taking a machine off too soon provided there is room enough to give it a longer run, and when required the machine will, we understand, get off in under 50 yards. Mr. Cecil E. Kny who is the designer and manager of the German Aircraft Works, intends either to erect shops for building the machines in this country, or else to arrange with some large armament firm to build them under licence.

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With the Bristols in Roumania.

The twelve Roumanian officers who were taught at the Bristol Schools last year and then returned to their own country to form the backbone of the Roumanian Flying Corps, have taught a large number of their brother officers to fly, and a good many are still being taught. The Roumanian Army has a full complement of Bristol monoplanes and biplanes, including some of the latest 80 h.p. tractor biplanes, which are always fully employed.

Besides devoting or giving their attention to instructing pupils, these officers do quite a lot of cross-country flying. Capt. Popovici has made several trips of 200 miles and over, having a passenger with him, and has shown himself to be an accomplished flyer. With Lieut. Pascanu as passenger, this officer in one of the 80 h.p. Bristol tractor biplanes, flew to Botosani and back, a total distance of 750 miles. Lieut. Beroinade reached a height of 3,500 ft. on a similar type machine, with full load and passenger, whilst on the following day he took one of these machines up to 12,000 ft., flying on this occasion for upwards of an hour. Lieut. Pascanu made several fine flights on the same day, two of them being cross-country of a duration of two hours each.

On December 21st, Capt. Popovici set off for a cross-country circuit and covered 83 miles in 50 minutes with a following wind, being at the rate of just over 100 miles an hour.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A meeting of the Committee was held on Tuesday last, January 6th, 1914, when there were present: Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Major J. D. B. Fulton, C.B., R.F.A., Prof. A. K. Huntington, Mr. C. F. Pollock, Mr. T. O. M. Sopwith, and the Secretary.

Congratulations to Major J. D. B. Fulton, C.B.—The Chairman, on behalf of the Committee, congratulated Major J. D. B. Fulton on the honour, Commander of the Bath, conferred upon him by His Majesty the King.

Mr. A. Mortimer Singer.—A telegram was received from Mr. A. Mortimer Singer, who is at Cannes, wishing the Club a happy New Year, and offering cups for balloon races as in previous years.

New Members.—The following New Members were elected:—John Baron, Noel Pemberton Billing, Dr. Maxime Goldberg, Sub-Lieut. John D. Harvey, R.N., Ronald Falshaw Morkill, and Lieut. C. L. N. Newall.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

706 William Henry Elliott (Avro Biplane, Shoreham Flying School, Shoreham). Nov. 22nd, 1913.
707 Sergt. John Roland Gardiner (Short Biplane, Central Flying School, Upavon). Dec. 11th, 1913.
708 Ian Cameron Macdonell (Bristol Biplane, Bristol School, Brooklands). Dec. 17th, 1913.
709 Robin George Duff (Vickers Biplane, Vickers School, Brooklands). Dec. 18th, 1913.
710 James Leonard Finney (Bristol Biplane, Bristol School, Brooklands). Dec. 19th, 1913.
711 Capt. Hugh Caswall Tremenheere Dowding, R.A. (Vickers Biplane, Vickers School, Brooklands). Dec. 20th, 1913.
712 Sergt. Frederick George Bateman (Maurice Farman Biplane, Royal Flying Corps, Netheravon). Dec. 20th, 1913.
713 Lieut. Charles Edward Ridgway Bridson (3rd Battalion King's Own Regiment) (Bristol Biplane, Bristol School, Brooklands). Dec. 20th, 1913.
714 Sub-Lieut. Geoffrey Rhodes Bromet, R.N. (Bristol Biplane, Bristol School, Brooklands). Dec. 22nd, 1913.
715 Lieut. Rowland Edward Brian Hunt (E.A.C. Biplane, Eastbourne Aviation School, Eastbourne). Dec. 22nd, 1913.
716 Lieut. Edmund Digby Maxwell Robertson, R.N. (Bristol Biplane, Bristol School, Brooklands). Dec. 22nd, 1913.
717 Andrew Delfosse Badgery (Caudron Biplane, Ewen School, Hendon). Dec. 22nd, 1913.
718 Lieut. Robert Crosby Halahan, R.N. (Bristol Biplane, Bristol School, Salisbury Plain). Dec. 24th, 1913.
719 Cecil Francis Webb (Grahame-White Biplane, Grahame-White School, Hendon). Dec. 31st, 1913.

Under New Regulations.

720 Robert John Lillywhite (Grahame-White Biplane, Grahame-White School, Hendon). Jan. 1st, 1914.
721 Sub-Lieut. Franklin Geoffrey Saunders, R.N.V.R. (Bristol Biplane, Bristol School, Brooklands). Jan. 1st, 1914.
722 Hugh Barnes Martindale (Vickers Biplane, Vickers School, Brooklands). Jan. 1st, 1914.
723 Edmund James Fulton (Vickers Biplane, Vickers School, Brooklands). Jan. 3rd, 1914.

Britannia Challenge Trophy.—It was decided to defer the award till the next meeting.

Mortimer Singer Long Distance Balloon Race.—The Committee considered the log sheet of Balloon Trip made by the Hon. Mrs. Assheton Harbord, accompanied Mr. C. F. Pollock, on December 19th, 1913, when the ascent was made from Battersea and the descent near Taunton, Somerset, a distance of about 130 miles. This being the longest distance accomplished in the Competition, the Cup was unanimously awarded to the Hon. Mrs. Assheton Harbord.

Aerial Navigation Regulations.—The report of the British Manufacturers' Sub-Committee on the Aerial Navigation Regulations was received.

Flying to the Danger of the Public.—At the invitation of the Committee, Major F. Lindsay Lloyd, the Manager of Brooklands, attended the meeting and gave his views on this subject. Mr. R. T. Gates, the General Manager of the London Aerodrome, Hendon, was at the last moment prevented from attending the meeting, but has promised to be present at the next meeting, when the matter will be further considered.

British Manufacturers' Sub-Committee.

A meeting of this Committee was held at the Club on Tuesday, January 6th, 1914, at 4 p.m., when there were present:—Mr. J. E. Hutton (Wolseley Tool and Motor Car Co., Ltd.), in the Chair, Capt. H. Lutwyche (A. V. Roe and Co.), Mr. Fred May (Green Engine Co.), Mr. T. O. M. Sopwith (Sopwith Aviation Co.), Mr. Howard T. Wright (J. Samuel White and Co.), and the Secretary.

The Committee discussed the Aerial Navigation Regulations.

Britannia Challenge Trophy.

The Britannia Challenge Trophy, presented to the Club by Mr. H. Barber, will be awarded to the British aviator who, in the opinion of the Committee, shall have accomplished the most meritorious performance in the air during 1913.

The Committee of the Club will consider the award at its next meeting on the 20th inst., and would like Members of the Club, and others interested in aviation, to send in particulars of any performance which, in their opinion, should be taken into consideration by the Committee in making the award. The Committee will also be glad to have suggestions from aviators themselves as to the respective merits of various performances which they may consider worthy of attention, as the opinion of practical fliers will naturally be of great assistance to the Committee. Letters should be addressed to the Secretary, Royal Aero Club, 166, Piccadilly, London, W., and should reach the Club not later than Monday, the 19th inst.

Airship Pilot Certificates.

Under the New Regulations, which are now in force, a candidate having an Aeronaut's Certificate must make 20 ascents in an airship. In the case where the candidate does not hold an Aeronaut's Certificate, 25 ascents in an airship must be made. These ascents must be made on different dates. Candidates are also required to pass a technical examination, the main feature of which is taking the sole control of the airship in a satisfactory manner in three of the above mentioned ascents, from the time of leaving the ground to the time of landing. These three ascents must be of a duration of not less than 15 minutes each. Candidates must be not less than 21 years of age.

The Jacques Schneider Maritime Aviation Cup and Prize, 25,000 frs.

Mr. Jacques Schneider has given a trophy of the value of 25,000 francs and a cash prize of 25,000 francs for three years for international maritime aviation competition.

The Aero-Club de France, having won the prize last year, has organisation of the race for 1914. The Prize will be competed for over a distance of 150 nautical miles. The Contest will take place exclusively at sea, outside any port, and over a course of not less than 5 nautical miles. Further details will be announced later.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Gordon-Bennett Aviation Cup.

RULES FOR 1914.

The Race for the Gordon-Bennett Aviation Cup will take place in France this year.

The Race will be over a distance of 200 kilometres on a course having a minimum distance of 5 kilometres.

Competing aircraft, before taking part in the Race, will have to pass the following preliminary tests:—

A flight in a straight line out and back of about 2 kilometres, without touching the ground, at a constant height of not more than 30 metres. The speed of the test shall be the mean of the speeds of the flights out and back, which must not exceed 70 kilometres per hour. In this test the aircraft must carry sufficient petrol and oil to cover the whole course of 200 kilometres. Three attempts will be allowed to each competitor.

After the qualifying tests have been passed, no modifications may be made to the aircraft. Repairs will only be allowed with the permission and under the control of the Officials.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Gordon-Bennett Balloon Race.

The cup having been won by a representative of the Aero Club of America, the race for 1914 will take place in America. The exact time and place will be announced later.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero Club of America, and such challenge must be sent in before February 1st, 1914.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, January 20th, 1914, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

HAROLD E. PERRIN, Secretary.

166, Piccadilly, W.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

MONDAY, Christmas week, Capt. Courtney made some trips on Short 65. Lieut. Rainey on Bristol tractor 43 was flying well, taking as passengers some of the small working party left at the school.

Lieut. Rainey, on Sopwith 43, making two good prolonged flights Wednesday. Capt. Courtney went up on same machine later, but soon came down, complaining of the extreme cold, it freezing hard then. Courtney made very short flight on Dep. 36.

Sir Brian B. M. Leighton, Bart., who recently secured his *brevet* at Hendon at the Grahame-White School. Sir Brian has served 24 years in the Yeomanry, and has been in four campaigns.

Thursday, Lieut. Rainey flying well on Bristol 43, carrying passengers. Fog stopped further work.

On Monday, last week, Professor Huntington was out in very high wind. At first he only succeeded in giving his chassis very severe usage. Later, he made one short flight against the wind, and though moving very slowly his machine kept wonderfully steady. After doing one or two more wicked bumps, which would have smashed most other machines, he thought it wise to rehouse the machine.

Brooklands Aerodrome.

ON New Year's Day the new regulations of the Royal Aero Club came into force for *brevets*, and there was great keenness between the Bristol and Vickers Schools as to who should be the first to pass a pupil through under the new conditions. Mr. Sanders was the first on a Bristol biplane, taking his ticket in good style, followed a few minutes afterwards by Mr. Martindale on a Vickers biplane, who passed his tests in a most workmanlike manner, rising to 500 ft. in the first part, to 800 ft. in the second, whilst in the altitude test he executed a magnificent glide down from a height of 1,000 ft. with engine shut off, and effected a very clever landing within 10 ft. of the mark.

On Friday no less than three of the pilots left for Farnborough, Mr. Gordon Bell on a 50 h.p. Short biplane, intended for school work in the R.F.C., Mr. Pixton on a Sopwith tractor biplane, and Mr. Alcock on the Maurice Farman (100 h.p. Sunbeam).

On Saturday there was some excellent flying, Herr Roempler taking Mr. Cecil Kny up to an altitude of nearly 6,000 ft. on the D.F.W. biplane, descending in a long glide with a well-judged landing. This machine is making more friends each week, and everyone who has had the pleasure of a flight in it is much impressed by the comfortable seating accommodation, and the behaviour of the machine in the hands of its skilful pilot. Mr. Merriam was busy with his pupils on Bristol biplanes, one pupil being taken for a cross-country trip to add to his experience. Messrs. Barnwell, Elsdon, and Knight made some good flights on Vickers biplanes with and without pupils. The Martinsyde monoplane was also flying very well. Mr. E. J. Fulton passed his *brevet* tests well on a Vickers biplane at an altitude of 500 ft., gliding down with engine shut off, and making a good landing.

On Sunday, owing to the strong wind blowing, only four machines were out. The Martinsyde monoplane was just starting when a burst tyre caused a wheel to buckle, placing the machine temporarily *hors de combat*. Mr. Merriam was next out on the Bristol biplane, but only made two or three flights. Mr. Barnwell was on the new Vickers gun-carrying biplane, and Mr. Pixton was testing the engine of a new Sopwith biplane. The winner of the ballot for the free passenger flight, Mr. F. H. Armstrong, Baker Street, Weybridge—postponed his trip until next week, owing to the weather.

2nd Lieut. T. L. S. Holbrow, R.E., who recently went through his *brevet* tests in good style on a 35 h.p. Caudron biplane at the W. H. Ewen School, Hendon.

Bristol School.—Monday and Tuesday, last week, too windy for flying. Wednesday, Merriam for test, then with Lieut. Piggott (new pupil) as passenger, also with Lieuts. Watkins and Sanders on straights and circuits. Halford twice with Lieut. Cull (new pupil). After breakfast, Halford out twice with Lieut. Piggott on circuits, and once with Lieut. Cull. Merriam sitting behind Lieut. Watkins for two flights, and then Lieut. Sanders giving tuition in figures of eight and *vol plané* landings from 400 ft., concluding by taking Lieut. Cull for a high flight. Merriam in afternoon out with Lieut. Piggott for test, and then behind Lieuts. Watkins and Sanders in straights, circuits, and eights. Halford giving tuition to Lieut. Cull.

Halford made flight for test, Thursday, and then with Lieuts. Piggott and Sanders. Merriam behind Lieut. Watkins on figures of eight, pupil having full control, then with Lieut. Cull. Halford with Lieut. Piggott on circuits, and Merriam behind Lieut. Sanders twice, the pupil having controls. Merriam with Lieut. Piggott and Lieut. Sanders, after which the latter pupil went for his certificate, which he obtained very steadily, making a *vol plané* landing from over 500 ft., this being the first certificate taken under the new regulations. Merriam finished the morning's work by giving tuition flight to Lieut. Watkins. In the afternoon, Halford made a test and Merriam followed with Lieuts. Cull and Piggott (sitting behind the latter). Afterwards sitting behind Lieut. Watkins giving landing practice. Dusk then terminated a good day's flying.

Friday, Merriam out for trial, afterwards giving two flights to Lieut. Watkins and one each to Lieuts. Cull and Piggott for landing practice. Halford then with Lieuts. Piggott and Cull on straights. Merriam and Halford with Lieuts. Watkins and Cull respectively and the latter instructor with Lieut. Piggott, after which the wind was too bad for further tuition. At 3 p.m. Merriam made two tests and Halford one, the latter then taking Lieut. Cull for tuition. Merriam twice with Lieut. Piggott and once with Lieut. Watkins. Too bumpy for further work.

Halford with Lieut. Cull for test Saturday, and afterwards with Lieut. Piggott (twice) for straights and circuits, Lieut. Watkins (figures of eight) and Lieut. Cull (straights). Merriam with Lieut. Piggott, Lieut. Cull and Lieut. Watkins, after which he sat behind the latter pupil, who reached 1,000 ft., Merriam showing him how to make a *vol plané* landing from that height with engine off. After giving practice flights to Lieuts. Cull and Piggott, instruction went on in the hangars for the remainder of the morning. In the afternoon, Merriam took Lieuts. Piggott, Cull, and Watkins for tuition flights, and then finished the day's work with a solo to the sheds.

Mr. A. Delfosse Badgery, who has just passed his tests for his Royal Aero Club certificate, in excellent style, on the 35 h.p. Caudron biplane at the W. H. Ewen School, Hendon.

Vickers School.—Wednesday, last week, Knight and Elsdon on biplanes 20 and 21, with Messrs. Fulton, Creagh and Martindale. In afternoon with same pupils, also Messrs. Dawson, Martindale and Fulton solos. Elsdon test No. 5 mono. Mr. Waterfall solo.

New Year's Day, Elsdon and Knight on biplanes Nos. 20 and 21, with Mr. Creagh. Messrs. Martindale and Fulton solos. Barnwell with Mr. Duncan. Barnwell and Elsdon on No. 5 mono., also Mr. Waterfall. In afternoon, Mr. Martindale on biplane for *brevet*, getting through in splendid style. Barnwell and Knight with Mr. Creagh. Messrs. Chataway and Dawson solos, also Mr. Fulton.

In morning, Friday, Knight and Elsdon on biplanes 20 and 21 with Mr. Creagh and Mr. Fulton. Mr. Fulton then solo. Mr. Barnwell testing Blériot mono. and gun-carrying biplane. In afternoon, Mr. Elsdon with Messrs. Creagh and Martindale, on biplane. Knight with Mr. Creagh and Mr. Dawson.

Knight on biplane 21 with Mr. Fulton, Saturday. This pupil then for *brevet*. Messrs. Elsdon and Webb on No. 5 mono.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday and Tuesday last week, too windy for school work. On Wednesday Mr. Webb circuits and figures of eight, afterwards flying for and obtaining his pilot's certificate. Mr. Lillywhite solo circuits. On New Year's Day Messrs. Lillywhite and Cripps solo circuits and figures of eight, afterwards Mr. Lillywhite going in for and obtaining his *brevet*.

Next day Mr. Piercy rolling and doing straights with Instr. Manton. Mr. Norris solo circuits. Messrs. Moore, Cowley, Parker and Norris straights with Instr. Manton in passenger seat. Mr. Bjorkland circuits with Instr. Manton in passenger seat.

Lieut. Halahan, who has recently secured his ticket at the Bristol School, Salisbury.

Saturday, Mr. Norris circuits. Messrs. Piercy and Moore straights with Instr. Manton in passenger seat.

W. H. Ewen School.—Owing to the holiday season proper school work did not commence until the first day of the year, when M. Baumann and F. W. Goodden, put in some excellent flying on the 60 h.p. Caudron, taking several of the pupils for passenger flights for air and height experience. On Friday last week school was out at 7.50 a.m., when M. Baumann, after testing the 35 h.p. Caudron biplane handed the machine over to Mr. Cooper, who did some good straights and half-circuits, while Mr. McGregor and Mr. Murray were doing half-circuits and circuits in good style. Mr. Goodden was also busy with pupils; after testing machine he handed it over to Lieut. Kinnear and Mr. Banks-Price, who were doing nice straights, while Messrs. Busk and Freshney were showing good improvement in rolling practice.

On Saturday, 3rd, Messrs. Baumann and Goodden were out testing the school machines, but found it too windy for pupils.

Hall School.—Thursday, last week, J. L. Hall flying high on Caudron, also giving exhibitions during afternoon. On Friday he was flying for three-quarters of an hour on No. 1 Caudron, executing a spiral *vol plané*, with propeller completely stopped, and on Saturday exhibitions on No. 1 Caudron.

School re-opened after Christmas holidays on Monday, this week. No. 2 Caudron having in the meantime been thoroughly overhauled and the wings entirely re-covered.

Salisbury Plain.

Bristol School.—Monday last week no flying owing to high wind and snow storms throughout the day.

Busteed on Tuesday for test in the morning, and then for two long tuition flights with Mr. Stutt, a new Australian pupil. In the afternoon Voigt made three flights to test conditions, but found the weather too bad for tuition. At 3.38 p.m. Sippe, with Mr. A. E. Stone as passenger, arrived from Filton on an 80 h.p. Bristol tractor biplane. Commenced landing with four spirals from 6,000 ft. and then a *vol plané* with engine cut off from 4,000 ft., landing perfectly, close to the hangars. The pilot reported having received a few bumps *en route*, snow covered ground all the way, rather misty and very cold.

Voigt out first Wednesday for trial, and then with Mr. Gilligan and Mr. Stutt for tuition. Mr. Garnett make a solo on the biplane. After breakfast, Voigt gave four long tuition flights to Mr. Stutt, one being of half-hour's duration. Mr. Garnett did three good solos. Sippe went out on 80 h.p. Bristol tractor accompanied by

Mr. Gilligan as passenger for tests, but the weather proved unfavourable. In the afternoon Voigt took Mr. Stutt for a long tuition flight, and Mr. Garnett did two solos.

New Year's Day Busteed out with Mr. Stutt and Mr. Gilligan for tuition, and in the afternoon sitting behind the latter pupil. Air-Mechanic Locker did one solo. Friday, Voigt made a solo to test conditions and then gave tuition to Mr. Gilligan (two flights) and Mr. Stutt (one flight). Mr. Gilligan then made his first solo excellently, and later followed with another equally good. Busteed with Mr. Stutt for tuition. Voigt giving landing practice to Mr. Gilligan and then twice with Mr. Stutt. Voigt testing conditions Saturday, afterwards giving two tuition flights to Mr. Stutt. Jullerot then tested each biplane and the side-by-side monoplane. Sippe giving tuition flight on side-by-side monoplane to Voigt, who then went out alone on the same machine,taxying and hopping. During the morning Mr. Garnett put in six solos, flying and landing excellently. In the afternoon Jullerot with Mr. Stutt on the biplane, and Voigt with Air-Mechanic Locker (twice), and Mr. Stutt (once), after which Air-Mechanic Locker did a good solo.

On Thursday afternoon Busteed, with Sippe as passenger, made a flight on the 80 h.p. tractor biplane to the Netheravon school for demonstration flights.

FLYING AT HENDON.

What were, as far as we are aware, the last flights in 1913 and the first in 1914, were made by Messrs. R. T. Gates and R. H. Carr at the Hendon Aerodrome last week. On New Year's Eve these two pilots ascended on 50 h.p. G.-W. 'buses some ten minutes before midnight, and continued flying until they were well into the New Year. The night was exceedingly dark and cold, but very clear, and guiding lights were mounted on the pylons, enclosures, &c., as well as on each machine. Both pilots expressed themselves delighted with their experience, and said that the lights of London were plainly visible at a height of a few hundred feet. When Mr. Gates switched off to land *en vol plané*, he heard the church bells ringing distinctly.

On Friday, the 2nd inst., some New Year's records were put up by Gustav Hamel, who looped the loop with Miss Trehawke Davies on his 80 h.p. Morane-Saulnier monoplane. This not only constitutes the first time that a pilot has looped the loop with a passenger in this country, but it is the first time on record that one of the fair sex has participated in this feat. Previous to looping the loop with Miss Davies, Hamel made a number of loops, semi-loops, and steeply banked turns and many other startling evolutions. He also took up Miss Gladys Cooper, the popular actress, for a flight. At four o'clock Miss Davies and Hamel were securely strapped in their seats. He climbed to a height of 1,000 ft., and at this height executed one loop and what has been called a "side loop," in which he turns the machine over sideways until it is on its back, and then nose-dived to regain the normal position. From the passenger point of view this performance was all the more remarkable when it is remembered that Miss Davies had practically left her sick bed to loop the loop, and, in fact, after it was all over she returned home, where her doctor was to perform a minor operation.

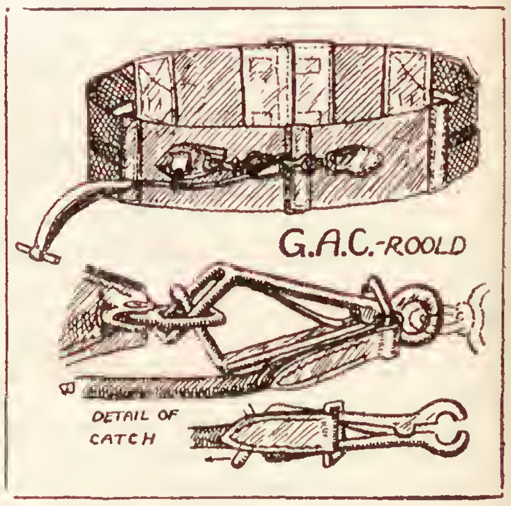
On Saturday last the first of a new series of weekly meetings was held, under the title of the New Year Meeting, and as far as the "gate" was concerned was a promising beginning. It was originally intended to fly a 16-mile cross-country handicap, but owing to the mist that prevailed this was abandoned, and a speed handicap round the aerodrome substituted. Punctually at 2.30 p.m. six machines ascended one after the other, and flew around the aerodrome together for some time. This flock of six consisted of R. H. Carr and Marcus D. Manton on 50 h.p. G.-W. 'buses, Louis Noel with a passenger on the 70 h.p. Maurice Farman, E. Crawshay on a 50 h.p. Blériot, F. Goodden on a 45 h.p. Caudron, and E. Baumann on a 60 h.p. Caudron. Manton in descending executed some of the best spirals we have seen him do. Noel also put up a star turn by making a pretty, hovering glide with his propeller stationary. Crawshay made some really excellent bankings and spirals. After this Goodden did some flying over the course by way of practice, whilst Carr took up a passenger on the 50 h.p. 'bus. J. L. Hall also came out on his 35 h.p. Caudron, and Claude Grahame-White went up on the Maurice Farman. Philippe Marty came out next on the 50 h.p. Morane-Saulnier, Pierre Verrier ascending immediately after on a 70 h.p. Maurice Farman, taking with him a passenger. A start was then made for the speed handicap, which was flown in two heats of four laps and a final heat of six laps. Four started in the first heat as follows: R. H. Carr on the 50 h.p. G.-W. 'bus (2 mins. 59 secs.), F. Goodden on the 45 h.p. Caudron (2 mins. 57 secs.), Louis Noel on the 70 h.p. Maurice Farman (1 min. 57 secs.), and Philippe Marty on the 50 h.p. Morane-Saulnier (scratch). The only exciting incident in this heat was when Marty flew very low in passing two of his rivals, his wing tip coming within but a foot or so of the ground. Goodden proved an easy winner, being 23 secs. to the good. Noel came in second, 5 secs. in front of Marty, who obtained third place by 4 secs. Only three started in the second heat, viz.: Marcus D. Manton on the 50 h.p. G.-W. 'bus (1 min. 7 secs.), E. Baumann on the 60 h.p. Caudron (17 secs.), and Pierre Verrier on the 70 h.p. Maurice Farman (scratch). This heat resulted in another win for the Caudron fraternity, for Baumann soon obtained the lead, which he retained throughout. Verrier was close behind, however, and came in second 8 secs. after Baumann, whilst Manton arrived "home" some half a minute after. The final heat was a very good race, and was made up as follows:—Louis Noel (1 min. 7 secs.), F. Goodden (1 min. 1 sec.), E. Baumann (20 secs.), and P. Verrier (scratch). Noel kept ahead until the end of the first lap, when he was overtaken by Baumann, who again crossed the line first 5 secs. ahead. Goodden did not make quite such good time as before, and so came in last, Verrier getting third place by 7 secs. After the race numerous exhibition and passenger flights were made, one passenger taken up by Grahame-White being Mr. Marconi. The proceedings were brought to a magnificent close by another hovering glide, with the engine stopped, by Noel, lasting some three or four minutes, from a height of 500 ft. This was one of the most impressive sights seen at Hendon for some time, for not a sound came from the biplane, which was at times quite motionless.

Speed Handicap (Final. 6 laps).

		Handicap.	Handicap Time.
		m. s.	m. s.
1.	E. Baumann (60 h.p. Anzani-Caudron biplane)	0 20	10 38
2.	Louis Noel (70 h.p. Renault-Maurice Farman biplane)	1 17	10 43
3.	Pierre Verrier (70 h.p. Renault-Maurice Farman biplane)	scratch	10 56
4.	F. Goodden (45 h.p. Anzani-Caudron biplane)	1 1	11 3

A NEW SAFETY BELT.

Nowadays, such positions are assumed by pilots in their machines that there is every likelihood of the one parting from the other unless there are some means of holding the pilot in his seat, by a safety belt, for instance. Although it has been proved time after time that in the case of an accident a pilot's life can be saved if he be strapped in his machine, there are times when he should be able to get clear of the latter without delay, especially should the machine catch fire. Some sort of quick release gear on a belt, therefore, is essential, but it must be one that will remain fastened until the right moment. One of the latest belts of this kind is the G.A.C.-Roold, which has been put on the British market by the General Aviation Contractors, Ltd., of 30, Regent Street, London, S.W. Our sketch of this belt shows both the general arrangement and the action of the release clip very clearly, so that it is only necessary to add that on pulling the leather thong at the side of the belt, the jaws of the clasp are opened, against the action of a spring, freeing the eye and releasing the pilot. The belt is made of strong canvas, reinforced with leather, and the sides are elastic. At the back are strong rings, securely fastened to the belt, for attaching the latter to the machine. The price of this belt is 45*s*., but several other patterns are made, including a cheaper model.



EDDIES.

VEDRINES seems to have made up his mind to be the champion "stunt" flyer of the age. Not content with his magnificent flight from Nancy to Cairo, his project now is to fly practically round the world. Should he carry out, and bring to a successful conclusion, his intentions, he will have passed over the following countries:—France, Germany, Austria-Hungary, Servia, Bulgaria, Turkey, Asia Minor, Syria, and Egypt. This part of the journey being already accomplished, there remains:—Mesopotamia, Persia, Baluchistan, India, Burma, Malaya, Dutch East Indies, Australia, Chili, Peru, Ecuador, Colombia, Panama, Costa Rica, Nicaragua, Salvador, Guatemala, Mexico, and the United States; surely enough to put up a record that will want a lot of beating, even when aeroplanes have become the recognised means of rapid transport. In addition, the National Aerial League have ask him to continue his journey from Cairo to the Cape, and the necessary supplies of motor spirit have already, I understand, been despatched to the proposed landing places, for if Vedrines does not feel inclined to proceed south, in view of his greater flight, another pilot, possibly Bonnier, will take his place. The route proposed is along the Nile to Wadi Halfa; follow the railway to Abu Hamed, whence the Nile will again be followed to Khartoum. After leaving Fashoda, the airman will have to cross the Bahr el Ghazal swamps, where for 250 miles there is no possibility of landing. The route will then lie over Lake Albert Nyanza, Port Florence, across the mountains to Mobasa, and thence down the coast by Zanzibar and Mozambique to Beira, from whence the railway may be followed to Cape Town. I don't think that awful swamp of Bahr el Ghazal ought to be crossed! It is tempting providence. Even with the best machines we have to-day, little things will go wrong on occasion: petrol pipes break, oil pumps refuse to work, engines, even the best of them, give trouble sometimes, and 250 miles over a country such as this, where the slightest thing necessitating a landing means death, is rather too much, and I sincerely hope that no one will try it. We want our airmen to be brave and ready to face dangers, but there is no reason why they should unnecessarily court disaster and death.

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Seeing the old year out and the new one in, took on a new phase at Hendon, when Richard Gates and Reginald Carr went up in their respective machines a little before twelve last Wednesday week, and flew into 1914. I don't mean literally flew into the new baby-year, though our artist has depicted it that way. He says an artist must have licence! I agree with him: but it ought to be something we could endorse. I have seen the old year out in so many different ways, that this year I went to bed, and was just dreaming that the Lewis Automatic Gun was firing on the enemy's aeroplane fleet, from the top of No. 1 pylon, when some railway men on the line that runs near my house celebrated the passing of 1913 by running a truck over a few hundred fog signals. Gee! as our cousins say.

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Speaking of the new year, I see the Grahame-White Company have again been first to get a pilot through his *brevet* tests under the new regulations. Mr. Lillywhite went up early on January 1st, and secured the coveted ticket in fine style, including the descent with the engine cut out. He made a fine glide from 650 ft., making a perfect landing with the "prop" stationary.

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Oh! Why did Ewen look so pleased
On Saturday?
And why did Baumann smile as well?
And J.C., better known as "Shell?
Was it because the Caudron—? well
It wasn't very hard to tell
On Saturday.

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An aeroplane that cannot capsize, and yet flies at 150 miles an hour, that is the latest by Dr. Robiola, of Turin. What with that, and the automatically-stable machine produced by the Orville Wright factory, I really think I shall have to go in for my own *brevet*. Foolproof—that's what my machine will have to be, but I fear I shall have to get measured for it. I'm rather hard to fit.

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So Miss Trehawke Davies has been the first woman to loop the loop after all. Keen on it? Well, she left a bed of sickness, drove to the aerodrome, looped the loop—or did the Apple Turnover, as they call Hamel's stunt down Hendon way—and was back in bed when the doctor called to perform a minor operation. Oh! no, not keen; meant to be first, that's all.

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"What is really the matter with men and affairs at Hendon," asks the *Daily Mirror*. I don't know; nothing so far as I have noticed, unless it is that the gate eases off slightly sometimes, which they must expect at this time of the year, and that it is jolly cold, which is also in the nature of things as they must be. I don't think even Billikin, the god of things as they ought to be, could warm up an aerodrome in January. Speaking of cold, I wonder whether "Aunt" was as innocent as she pretended to be, when she sent "Nephew" a Christmas box of a pair of knitted knee-caps and a foot warmer, together with a letter that he ought not to have shown to his best friend; in which she said she had been informed that he always felt cold right up to his knees when flying. Mind you, I don't say this was at Hendon—though it might have been—there are others.

Eastbourne aerodrome seems to be a perfect hot-bed for pupil stunters. No sooner does the capricious Rainey leave off hovering over hotels with his engine cut out, or scraping the paint off gasholders, than along comes pupil J. E. B. Thornely, whose special brand of stunt is charging dykes after getting up steam by a "vol" from 2,000 ft. Really, friend Fowler will be getting quite *blasé* directly, By the way, F.B.F., don't forget to take the advice given in last week's Eddies, and write to me, with all the Eastbourne news. If, owing to the multiplicity of your duties, you can't find time, let Mrs. F. do so. I know there is one—now.

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"Sopwith Aviation Company, Ltd. December 15th, 1913. £26,000 (£1) (6,000 six per cent. cum. pref. and 2,000 ord.) to take over, &c." Um—sounds all right. Fast little beggar that new Baby-plane. Good Hydro. too, that one that nearly got round the circuit. Clever chap T.O.M., clever men with him, too: what are we going to see in 1914?

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The Army Orders for the month just issued state that sanction has been given to the formation of an Inspection Department for aeronautical material under the direct control of the Director-General of Military Aeronautics. The headquarters will consist of a Chief Inspector, an Inspector of Aeroplanes, an Inspector of Engines, and two Assistant Inspectors, with a subordinate staff of Chief Examiners, Examiners, and Writers, and will be stationed at South Farnham.

That's right! A move in the right direction. Now get a really decent fleet of machines for them to examine, and we shall all be happy.

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An Aldershot correspondent states that with the weeding out of the discontents and strikers a complete feeling of satisfaction again exists amongst the employees of the Royal Aircraft Factory at Farnborough. A responsible head of one of the departments has stated that the existing conditions are entirely beneficial to the men, who now enjoy the privilege of smoking in the non-dangerous buildings during overtime.

I was afraid this was not all going to end in smoke, but I am glad. But weren't there other bones of contention? *Is* everything satisfactory?

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Overheard at Hendon.
She: "But what happens if his engine stops?"
He: "Why, he biplanes down, of course."
She: "But suppose it's a monoplane, you idiot?"
He: "Look here! What the ——"
Megaphone man: "Ladies and gentlemen ——"

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I am sorry about that little incident in Cairo between Vedrines and Roux. Evidently, from the letters and comments in the French papers, it is little more than a misunderstanding about the use of certain stores of petrol, &c., fanned into something worse by the short temper of Vedrines, than any serious cause for complaint in the first place. In any case, it shows at least a want of tact, not to say good manners, on the part of Vedrines, to openly spurn the friendly advances of Roux before the people gathered to do honour to them both, and that, before he had, by all accounts, troubled to verify his grievance. As a French contemporary very aptly puts it (freely translated): "To make French aviation triumph is all very well, but to provide before foreigners the spectacle of a quarrel between Frenchmen—a quarrel that could easily have developed into a free fight, if Mr. Roux were not the gentleman he is—is far from flattering to our *amour propre*. Also, Vedrines has succeeded in putting an ugly finish to a story that up till then had been perfectly glorious. What France needs abroad is not only to be upheld by the deeds of her modern heroes, but just as much by an attitude and behaviour worthy of our proverbial politeness." "WILL O' THE WISP."

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The Britannia Challenge Trophy.

An excellent line is being taken by the Royal Aero Club in connection with the award of the Britannia Trophy, which it will be remembered was offered for the most meritorious performance by a British aviator during 1913. It will be seen from the official notices on page 39 that all who are interested are invited to write to the Club giving their views as to the various flights which have been made, and the practical views of pilots are especially sought for. Letters should be addressed to the Secretary, Royal Aero Club, and they will be considered at the meeting of the Committee on the 20th inst.

Well-Deserved Honours.

Congratulations to Capt. Godfrey M. Paine, M.V.O., R.N., Capt. Murray F. Sueter, R.N., Major J. D. B. Fulton, and Brevet Major H. M. Trenchard, D.S.O., upon whom the honour of C.B. have been conferred. Capt. Godfrey Paine is the Commandant of the Central Flying School, Capt. Murray Sueter the Director of the Air Department of the Admiralty. Major Fulton, who was an Inspector at the C.F.S., has been appointed Chief Inspector of the new Inspection Department formed in connection with the Military Wing of the Royal Flying Corps, while Major Trenchard is the Assistant Commandant at the C.F.S. In the New Year list of Naval promotions it was announced that Lieut. N. F. Usborne had been promoted to the rank of Commander.

Rapid Climbing with a Bristol.

It is with considerable satisfaction that we learn from the Bristol Co. that in tests prior to being handed over to the Admiralty, one of the 80 h.p. Bristol tractor biplanes, piloted by Lieut. Rainey, R.N.R., and carrying a passenger, and petrol and oil sufficient for 3½ hours' flying, climbed to 1,200 ft. in 58 secs., which it is understood is a record performance.

G. Lee Temple at Uxbridge, &c.

On Saturday, George Lee Temple flew to Uxbridge, and gave a series of exhibition flights there, and also at Lord Hillingdon's grounds, Hillingdon Court. During these flights he at times rose above the clouds, and also executed many steep banks and vertical dives. He received a tremendous ovation from a large crowd.

Flying to the Hunt.

On the 1st inst., followers of the Pevensey Harriers at a meeting at Pevensey were surprised to see an aeroplane arriving and on its descent it turned out that the pilot was Mr. F. B. Fowler who had availed himself of his aeroplane to fly across from Eastbourne in order to attend the meet.

90 Miles an Hour on a Bristol.

Mr. Harry Busteed made a very fine flight on a Bristol 80 h.p. tractor biplane on Monday last. Leaving the Bristol works at Filton at 2.50 p.m., he headed off in the direction of Salisbury, at an altitude of 3,500 ft., arriving at 3.30 p.m., thus covering the distance of 46 miles in 30 mins., which is at the rate of 90 miles an hour.

Hucks and Raynham at Manchester.

On Thursday, Friday and Saturday of last week some fine flying by Hucks on his Blériot and Raynham on the 80 h.p. Avro was seen at the Belle Vue Gardens, Manchester. On the first day Hucks did a loop very low down, and on Saturday he did his 100th loop. Raynham took up a large number of passengers on each day.

Sunbeam Activity at Brooklands.

On Friday of last week, the M. Farman, with 100 h.p. Sunbeam engine, piloted by J. Alcock, was flown over to Farnborough and back in order to deliver some spare engine parts. A passenger was carried. Most of the time the machine was 3,000 ft. up. Some fine cross-country flights with passengers were made on the previous Wednesday and Thursday.

THE ROYAL FLYING CORPS.

The following appointments were announced by the Admiralty on the 1st inst. :—

Lieuts. E. T. R. Chambers, H. A. Williamson and R. J. Bone, to "Pembroke," additional, for Isle of Grain Naval Air Station, temporary, as Flying Officers, December 17th.

Capt. C. F. Kilner, R.M.L.I., to "Pembroke," additional, for Isle of Grain Naval Air Station, temporary, as Flying Officer, December 17th.

Lieut. C. H. Collet, R.M.A., to "Pembroke," additional, for Isle of Grain Naval Air Station, temporary, as Flying Officer, December 17th.

Lieut. E. R. C. Nanson, R.N.R., to "Pembroke," additional, for Isle of Grain Naval Air Station, temporary, as Flying Officer, December 17th.

Probationary Sub-Lieut. Ian H. W. S. Dalrymple Clark, R.N.R., confirmed as Sub-Lieut., with seniority of July 1st, 1913, and appointed to "Pembroke," additional, for Isle of Grain Naval Air Station, temporary, as Flying Officer, December 17th.

The following were announced in the *London Gazette* of the 2nd inst. :

R.F.C.—Military Wing.—The undermentioned Flying Officers to be Flight Commanders. Dated January 1st, 1914: Capt. Gordon S. Shephard, the Royal Fusiliers (City of London Regiment); Lieut. Ernest V. Anderson, the Black Watch (Royal Highlanders), and is granted the temporary rank of Captain; and Lieut. Francis F. Waldron, 19th (Queen Alexandra's Own Royal) Hussars, and is granted the temporary rank of Captain.

Lieut. Ralph M. Vaughan, the Royal Inniskilling Fusiliers, from the Reserve, is appointed a Flying Officer, and to be seconded. Dated December 18th, 1913.

Special Reserve of Officers.—Second Lieut. Samuel Pepys Cockerell, from London Balloon Company, Royal Engineers, Territorial Force, to be Second Lieut. (on probation). Dated January 3rd, 1914.

The following were announced in the *London Gazette* of the 6th inst. :—

R.F.C.—Military Wing.—*Inspection Department.*—Second Lieut. Geoffrey de Havilland, Special Reserve, Military Wing, to be an Inspector. Dated December 17th, 1913.

A charming photograph received by the Editor of FLIGHT by way of a Christmas greeting from one of our most esteemed subscribers, connected with the official aeronautical world. The greeting and the legend accompanying the photograph is as follows:—

"Here's to wish you and FLIGHT a Prosperous New Year. The seven squadrons of the R.F.C., 1914. This snapshot was taken in 1913. There is every promise of their getting better wings in 1914, and as we are all enthusiasts, all our geese are swans. I may add that these are Royal property too."

R.F.C.—Military Wing.—The undermentioned Lieutenants to be Flying Officers. Dated December 17th, 1913: Donald S. Lewis, Royal Engineers; Henry Le M. Brock, the Royal Warwickshire Regiment, to be seconded; Robin Grey, Warwickshire Royal Horse Artillery, Territorial Force, to be seconded; Cyril G. Hosking, Royal Artillery to be seconded; William G. S. Mitchell, the Highland Light Infantry, to be seconded; Richard E. Lewis, the West India Regiment, to be seconded; Francis J. L. Cogan, Royal Artillery, to be seconded; John Empson, the Royal Fusiliers (City of London Regiment), to be seconded; and Gilbert W. Mapplebeck, 4th Battalion the King's (Liverpool Regiment), to be seconded.

Special Reserve of Officers.—Owen Bulmer Howell to be Second Lieutenant (on probation). Dated January 7th, 1914.

The following was announced by the Admiralty on the 6th inst. :

Chief Artificer Engineer.—F. Williams, to the "President," additional for service in Air Department, to date January 1st.

R.F.C. Inspection Department.

Army orders issued on the 2nd inst. announced the formation of an Inspection Department for the Military Wing of the Royal Flying Corps. The department will be under the direct control of the Director General of Military Aeronautics, and the Headquarter Staff will consist of 1 Chief Inspector, 1 Inspector of Aeroplanes, 1 Inspector of Engines, and 2 Assistant Inspectors. Major J. D. B. Fulton, R.A., has been appointed Chief Inspector and Secretary, Lieut. Geoffrey de Havilland, Inspector of Aeroplanes, and, as already announced, it is understood that Capt. R. K. Bagnall Wild, R.E., will act as Inspector of Engines.

No. 1 Squadron R.F.C.

Following on the transference to the Naval Wing of the airships which formerly belonged to No. 1 Squadron of the Military Wing of the Royal Flying Corps, that squadron has now been reorganised as an aeroplane squadron. All airship work will be for the present allotted to the Naval Wing.

ROYAL FLYING CORPS (MILITARY WING).

War Office summary of work for week ending January 3rd :—

Flying Depôt. Farnborough.—The week was devoted to experimental work and repairs.

No. 1 Squadron. Farnborough.—The bulk of the airship *matériel* of this squadron was handed over to the Navy on January 1st.

No. 2 Squadron. Montrose.—The squadron was employed in moving to the new flying ground and in overhaul and repair work. The weather being very rough has entailed the expenditure of much time clearing snow from the sheds, &c.

No. 3 Squadron. Netheravon.—During the week a number of reconnaissance and instructional flights were made.

No. 4 Squadron. Netheravon.—Three new BE. aeroplanes were taken over from the Depôt at Farnborough and flown to Netheravon.

No. 5 Squadron. Farnborough.—Instructional flights were made by the pilots of the squadron, and overhaul and repair work carried out.

* * * *

The Wright Stabiliser.

Considerable attention has again been attracted to the Wright Stabiliser by reason of the Aero Club of America having awarded the Collier Trophy to Orville Wright in recognition of his work in connection with it. The stabiliser in principle is the same as that fully described in Flight of July 10th, 1909, the controls being operated by a compressed air apparatus actuated by a vane for longitudinal stability and a pendulum for lateral stability. There have been several detail improvements, and in the latest machines a little windmill above the top plane feeds the compressed-air cylinder.

An Austro-Hungarian Circuit.

The Royal Aero Club of Austria is co-operating with the Hungarian Aeronautic Federation in the organisation of a three days' circuit, to be held either in April or May, and for which prizes amounting to £4,200 will be offered. On the first day the route would be from Vienna to Prague, Leitmeritz, Brunn, and back to Vienna; the second day would take the competitors to Budapest via Presbourg, Gyor and Esztergom, while on the third day there would be a non-stop flight back to Vienna. The total distance is about 1,090 kiloms.

Mr. Churchill at Buc.

Accompanied by Mr. Holt Thomas, Mr. Winston Churchill was at Villacoublay on Tuesday, and paid a long visit to the Astra airship works. Later he went to the Farman works and displayed keen interest in the process of construction of the various types of machines.

FOREIGN AVIATION NEWS.

New Year's Honours in France.

THE New Year list of appointments to the Legion of Honour included the names of several military aviators. Cols. Ramazzotti and Bouttieaux were promoted to officers, while among those appointed chevaliers were Capts. Bordage, Jeannerod, Lenoir, Lagarde, Massol, and Lieut. Varcin.

Some 1913 Winners.

THE competition for three French prizes ended with the close of last year. For the International Michelin Cup, Helen, with a Nieuport monoplane stands first with his record of 16,096·6 kiloms., flown between November 2nd and December 2nd, while for the Ae.C.F. Criterium, A. Seguin is first with his non-stop flight on a 80 H. Farman from Paris to Bordeaux and back, a distance of 1,042 kiloms. For the Coupé Femina, Mme. de Laroche leads with 323 kiloms. made on her Gnome–H. Farman.

With the Loopers.

ON Sunday last looping the loop exhibitions were given by Chevilliard on his Farman at Rouen, by Pegoud on his Blériot at Prague, by Hanouille on his Blériot at Algeria, by Chanteloup on his Caudron at Crotoy, by Guillaux on a Blériot at St. Cyr, and by Garros on a Morane at St. Raphael. Chevilliard also gave a display at Rouen on Saturday, while Pegoud gave exhibitions at Prague on December 27th and 28th. Guillaux's flights at St. Cyr, on Sunday, included loops in both directions, sometimes with the wheels inside the circle and sometimes with the wheels outside. Garros took up both Leon Morane and Audemars and looped the loop with them.

The German National Fund Prizes.

IT has been decided that for the future, flights, to earn any of the bonuses offered by the Committee of the German National Fund, must be made across country, the start and finish taking place at an aerodrome. A speed of at least 30 k.p.h. must be maintained, and the machine must not fly over the same course twice. The bonuses now offered are £50 for 2 hours' flights, £100 for 3 hours, £165 for 4 hours, £245 for 5 hours, £340 for 6 hours, £450 for 7 hours, £575 for 8 hours, £715 for 9 hours, £870 for 10 hours, £1,040 for 11 hours, £1,225 for 12 hours, and so on in proportion. There is another scheme under which the aviator who makes the longest non-stop flight, with 6 hours' duration as a minimum, will receive a monthly allowance of £100 for 5 months, or until a longer flight is made, and the pilot who makes the longest cross-country flight with a minimum of 500 kiloms. will receive a monthly allowance of £200 for 5 months, or until his record is beaten. In accepting any of these prizes, a pilot must agree to place his services at the disposal of the military authorities in the event of war, and to undergo three weeks' military training in the current year.

A Fatal Accident at Johannisthal.

WHILE a military pupil, at a school at Johannisthal, was flying over a wood in the vicinity on the 30th ult., the fabric of one of the surfaces of the biplane gave way, and the machine fell about 3,600 ft. on to the trees. The pilot, named Remus, died of his injuries later in the day.

Flying Forbidden over Russian Frontier.

AN order has been issued by the Russian Minister of War, with the approval of the Council of Ministers, forbidding the crossing of the western frontier of Russia. This order will remain in force until July 14th next.

The St. Petersburg to Paris Flight.

THE Russian Ambassador at Berlin has succeeded in getting permission for Vassilieff to fly across Germany during his proposed flight from St. Petersburg to Paris, providing he keeps clear of fortresses. The attempt, which will be made on a Morane-Saulnier monoplane, will be made as soon as possible.

Marc Pourpe in Egypt.

ON his Morane-Saulnier monoplane, Marc Pourpe set out from Cairo on his flight to Khartoum on Sunday morning. After flying 300 miles, he landed at Sohag, to attend to the engine. On Tuesday he progressed to Luxor, bringing his machine down in the desert, near the Karnak temple. The next day he arrived at Wady Halfa.

Mr. McClean Starts.

THE first stage of Mr. F. K. McClean's trip up the Nile to Khartoum, was made on Saturday last, when accompanied by two passengers, Mr. McClean piloted the 160 h.p. Short waterplane from Alexandria to Cairo, the distance of about 160 miles taking 2 hrs. 55 mins. Restarting from Cairo on Tuesday morning, with three passengers on board, the machine had to battle with the wind and eventually a stop was made at Minieh.

Bonnier to Fly to the Cape.

CONTINUING his journey from Beirut on Wednesday week, Bonnier on his Nieuport monoplane, which is fitted with Gnome engine and Integral propeller, flew to Jerusalem, where his machine, the first to land at the Holy City, attracted a good deal of attention. The next morning he flew the 250 miles to Port Said and later in the afternoon arrived at Cairo. The French National Aerial League have now asked him to continue his flight from Cairo to the Cape.

Prize for Cape to Cairo Flight.

A prize of £500 has been offered by the *Johannesburg Sunday Times* for the first aviator, who, before November 1st, flies from Cairo to the Cape. Vedrines having refused to undertake the trip, it is probable that Bonnier will continue his flight across Africa.

Flying in Persia.

ON Sunday an aeroplane was seen in flight for the first time at Teheran, the Russian aviator, Kouzminsky, piloting his Blériot monoplane over the drill square, the novel spectacle attracting a great crowd of natives.

An Aerial Ferry in America.

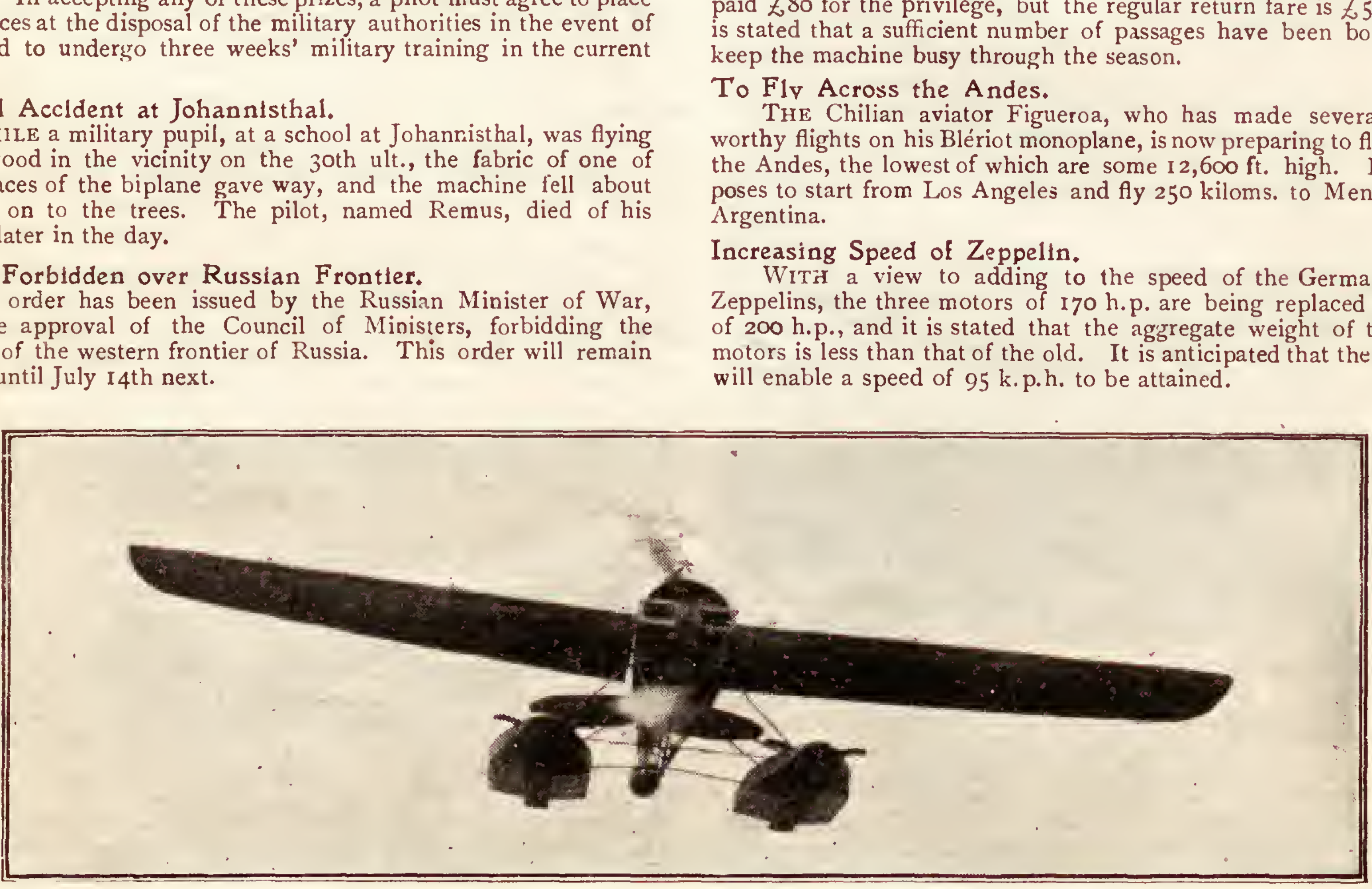
A DAILY aeroplane service has been inaugurated between Tampa, Florida, and Petersburg, which is on the other side of Tampa, about 17 miles distant. The first passenger is said to have paid £80 for the privilege, but the regular return fare is £5, and it is stated that a sufficient number of passages have been booked to keep the machine busy through the season.

To Fly Across the Andes.

THE Chilian aviator Figueroa, who has made several noteworthy flights on his Blériot monoplane, is now preparing to fly across the Andes, the lowest of which are some 12,600 ft. high. He proposes to start from Los Angeles and fly 250 kiloms. to Mendoza in Argentina.

Increasing Speed of Zeppelin.

WITH a view to adding to the speed of the German Army Zeppelins, the three motors of 170 h.p. are being replaced by four of 200 h.p., and it is stated that the aggregate weight of the new motors is less than that of the old. It is anticipated that the change will enable a speed of 95 k.p.h. to be attained.



A Nieuport hydro-aeroplane in full flight.

AERO ENGINES.

By GRANVILLE E. BRADSHAW. (*Concluded from last week.*)

As far as the engine designer is concerned, the shape of the engine makes quite a lot of difference, chiefly in the balance of moving parts. Unbalanced parts are not often found in aero engines, as the number of cylinders adopted is usually large, and it is easy to arrange the cylinders in such a manner that the moving parts balance one another. There are, however, quite a number of engines in which balance weights are fitted, namely, the stationary cylindered radial, and although simple rotary balance weights will correct the unbalance of the pistons and connecting rods in this particular type of engine, to design an aero engine that requires balance weights at all seems to be deliberately burdening oneself with an altogether unnecessary handicap. In one well-known radial engine, a balance weight of something in the neighbourhood of 60 lbs. is fitted.

An engine with rotating cylinders does not require balance weights, and with the exception of its lack of economy with consequently increased weight for long flights, it is an excellent engine for aviation purposes in every way. The criticisms levelled at this engine with regard to gyroscopic force when turning do not appear to have been discovered in practice.

The six-cylinder vertical engine is being favoured by many at the moment, but it is not a design that lends itself to lightness of construction, on account of the length of crank-case and crank-shaft.

A four-cylindered engine also has the same disadvantage, the weight of crank-case, crank-shaft, cam-shaft, &c., being large in proportion to the cylinder capacity. A "V" type engine is superior in this respect, as twice the number of cylinders can be fitted to the same length of crank-case and crank-shaft, with a consequent reduction in weight per brake horse-power developed.

Three, four, and five cylinder air-cooled semi-radial engines appear to be disappearing altogether, and on account of their lack of balance, their need for heavy balance weights, their uneven torque, and their head resistance, they are not likely to survive for any length of time.

Turning to the question of materials, we find that whilst the car engine designer, in order to obtain better balance and more power, turned to fitting steel pistons in his cast-iron cylinders, the aero engine designer was not long in discovering that the exact opposite is superior both in theory and in practice. It was found in car practice that in fitting steel pistons in place of cast-iron ones, more clearance between the piston and cylinder walls had to be allowed in order to prevent the piston seizing, owing to steel having a greater coefficient of expansion than cast-iron. Aero engine practice is to fit the metal which expands most on the outside, and this in practice gives a remarkable freedom from tight pistons and seizure. With piston clearances cut down to the smallest working fit, the author has found that it is almost impossible to detect any tightness of the pistons, or any tendency to seize.

More particularly is this evident in the case of air-cooled engines —the hotter the piston and cylinder become the more the cylinder expands away from the piston.

One of the greatest difficulties the aero engine designer has to contend with is the tendency for cylinders and other details to warp when heated, owing to their extreme lightness and the thinness of the walls. The cylinders have to be proportioned with the utmost care and designed so as to be of exactly equal thickness round the bore. For this reason side valves such as are general in automobile engine practice are now practically discarded in favour of overhead valves, as the latter allow the cylinder to be machined accurately both inside and out. In the case of water-cooled engines, the direction of flow of the cooler water from the radiator through the cylinder is an item of no small importance, and any inaccuracy in this very quickly shows itself in uneven wear of the cylinder. In the Gnome revolving cylindered engine, it is interesting to note that the cylinder bore and the circular radiating fins round the outside are eccentric, in order to compensate for the unequal amount of cooling air that comes into contact with the different parts of the cylinder.

Built up parts in any shape or form are undesirable, and because these have often resulted in failure, we now see elaborate details carved out of the solid forging. Cylinders are invariably machined from the solid billet, with the cooling fins turned or milled on them, whilst in the case of water-cooled engines the valve ports are milled out and spun coppers, or electrically deposited copper jackets are fitted. In other cases acetylene welded steel jackets are used with great success; the whole cylinder can in this case be carefully annealed and treated and the bore reamered out last. It is very important to provide for the unequal expansion and contraction of the cylinder and water jacket, and this is done by using either a corrugated jacket or flexible flanges on the cylinders. Heat treated steels which obtain their tensile strength and other qualities by being so treated, are unsuitable for the manufacture of cylinders, as these cylinders are more liable to distortion, and should the engine run really hot by any chance, they are robbed of their qualities. The steel must show a high tensile strength, with preferably a percentage of elongation that is not too high, the most important item being to have a steel which gives a hard bright surface after running.

The aero engine valve is on the average much thinner and lighter than that used in automobile practice, although in both cases the exhaust valves run red hot the whole time.

The author has found that extremely long valve springs, so much advocated by long stroke designers, are directly opposed to valve gear reliability, and the one feature of the long spring, *i.e.*, the small amount of increase in pressure of the spring when the valve is lifted, is at the best a disadvantage. In aero engines valve heads are unusually large, being generally in the neighbourhood of 3 ins. in diameter, and owing to extra weight and complication it is impracticable to fit two smaller valves. The great disadvantage of a large valve is its tendency to dish in the head during a long run on full throttle, unless made of considerable thickness which is prohibited on account of the weight. The strength of a valve spring is usually made slightly in excess of that force required to accelerate the valve and valve parts in a given time, which time is determined by the speed of the engine and the shape of the cam. The force required to bring the valve to rest immediately it touches its seating on the return is very much in excess of the force required to accelerate the valve, because it is decelerated in a very much shorter time, unless the cam is arranged so as to give a slow drop.

It is practically impossible to calculate the length of time taken by the valve stem to decelerate, because this depends upon so many unknown factors, such as spring in the head of the valve, &c., but there can be no doubt that the greatest stress in any valve comes either in the neck just under the head, or in the centre of the head itself (whichever is the weaker), just at the instant of the closing of the valve.

From this it will be seen that the more metal there is in the valve stem, cotter, collar and spring, the greater is the stress in the valve stem under the head, as a greater amount of weight has to be brought to rest in the same period of time.

The author's experience is that the chief contributing factor to valve breakage is length of valve stem. This would apparently increase in a greater ratio than directly as the length of the stem, because as the length of stem (and consequently the weight) is increased, so the weight and strength of the spring necessary to operate it are increased.

The average length of valve stem in the automobile engine is somewhere in the neighbourhood of seven or eight inches, and sometimes even more than this, whilst in aero engines the stem is cut down to the shortest possible, and one highly successful aero engine that the author has come into contact with, has a 3-in. exhaust valve with an extremely light head, the stem of which is only 1¼ ins. long.

Of course it is quite agreed that a long spring is in itself more reliable than a short one, but it would appear that that design is best which enables both spring and valve to have the highest possible freedom from undue stresses.

It appears that theoretically a valve stem ought to have its smallest diameter just below the cotter (in the case of an overhead valve) with the diameter increasing all the way, and running into a big radius under the head of the valve; such, however, is impracticable, the best compromise being to drill the valve stem up from the cotter end in order to reduce the weight of this part.

As regards the ratio of cylinder bore to stroke, aero engines do not appear to be following automobile practice. It is not usual to find an engine with very long stroke, as it has been found that a heavier engine results. Increasing the stroke necessitates a larger diameter crank-case, which requires to be much heavier in order to obtain the necessary stiffness. The length of the connecting rod increases at least twice the rate of increase of the stroke, whilst the power increases only as the stroke. Thus to increase the stroke of an engine two inches the connecting rod must be four inches longer, as must be the cylinders, valve gear, &c., whilst the crank-case must be increased in diameter by two inches and considerably more in weight, as the walls cannot remain the same in thickness with safety.

A long stroke engine has undoubtedly lighter pistons and slightly shorter crank-case, but the balance is in favour of the shorter stroke. Perhaps a greater drawback to long stroke than any of the above is the great increase in crank-shaft weight in order to obtain the necessary stiffness, the crank-shaft being generally the heaviest item in any but the radial type of engines.

The remarkable lightness of the crank-shaft in some aero engines is a matter of no small amount of surprise to many car engine designers, and for the moment one cannot conceive how crank-shafts of (literally speaking) paper thickness can be expected to do the work required of them. The secret of success in many cases is the absence of a flywheel, which latter probably introduces more stress in the average crank-shaft than anything else. An extremely heavy flywheel rigidly compels the crank-shaft to rotate with an exceedingly small variation in angular velocity, the stresses in the crank-shaft due to the acceleration and deceleration of the pistons being in this case considerably greater.

From this it would seem that an engine designed to run well without a flywheel of any sort, excepting the light propeller fitted, saves not only the weight of the flywheel, but indirectly a considerable amount of crank-shaft weight.

With regard to the ratio of connecting-rod length to stroke, this is a point of design in which the aero engine builder cannot allow himself to follow his own technical reasonings. To him the angularity of the connecting-rod has to be the greatest he can use with success, as a short rod gives him a much lighter engine, and it is no uncommon sight to see a connecting rod the length of which is only some 1·6 or 1·7 times the length of the stroke. In a 4-cylindered vertical engine he of course cannot so readily ignore the importance of a long connecting rod, but this type of engine is seldom used for aeronautical purposes to-day.

The largest diameter cylinder that can be used with success as an air-cooled engine appears to hover in the neighbourhood of 100 mm., although in some of the rotary motors even larger than this is used with success. Air-cooled stationary cylindered engines, with a bore in excess of 110 mm., seem to have a desire to run hot on occasions, and to continue firing spasmodically after the ignition has been cut off. Thus, when high powers are required, it is not unusual to see engines with cylinders amounting up to twenty in number.

Trouble does not appear to arise in tuning up eight or even twelve cylinders, but one would imagine that to detect an occasionally missing cylinder out of 20, would necessitate a more than ordinary knowledge of that particular engine. If air-cooling is in the future used for very high powers, it is more than likely that long stroke engines will be used in preference to engines with an abnormal number of cylinders.

The question of bearings and lubrication of aeronautical engines is one of the most important in the advance of aviation to-day. Automobile engines running most of their life under light load, with their high quality white metal and highly efficient oil circulating systems, have given engineers an altogether too favourable impression of the reliability of such bearings. Under continuous loads of a high order, connecting rod big end bearings in particular show excessive wear on the inside of the crank, and a momentary stoppage of the oil system entails a complete overhaul, and the fitting of new white metal. A reliable lubricating system is excellent in its way, but to have to risk the ruination of a valuable engine by a small piece of dirt or an inefficient gauze is quite sufficient to warrant our looking out for a system that offers more chance of success.

It is, indeed, surprising that car engine designers have not shown more enterprise in the matter of bearings, and have, one and all, concentrated on trying to improve a system which can never hope to reach perfection.

A network of tiny oil passages, designed to supply even the remotest bearings in the engine with the correct amount of oil is not, one would think, finality in bearing design.

Even the motor cycle is some two or three years ahead of the most luxurious car engines in this respect, and although car lubrication systems were tried, other things besides economy taught that the best way to achieve success is not to try to induce the bearing to perform its duty by fitting a better method of lubricating it, but by looking round for a bearing that does not require a lubricating system at all.

It is interesting to note that one of the most successful road racing cars of this year has the crank-shaft of the engine running on a number of ball bearings.

These last mentioned, however, are not ideal for an aero engine, as their weight for the load they will carry is certainly high, and they are not altogether free from possible breakdown or derangement.

A much improved bearing, and one which promises every success in the future, is the roller bearing. These bearings have, of course, been known in different forms for years, with apparently little success, chiefly because long rollers were used which had a habit of twisting out of parallel with the axis of the shaft, and materials of the quality we have at our disposal to-day could not be obtained. In these early roller bearings wear used to take place through the rollers binding and skidding on the shaft, and serious end thrust was obtained through the rollers becoming tapered.

The rollers of to-day which have a length equal to their diameter, seem to behave much better than any other form of bearing in use. The author's experience of roller bearings in the connecting rod big ends of engines running up to 6,500 r.p.m., convinces him, after trying every other type, that the roller bearing has a great future.

The keynote for aero engineers is undoubtedly simplicity in everything possible. An engine may be designed to perform a certain duty, and made to do its duty by the addition of many extraneous fittings and appliances, but if another engine can be designed to perform the same duty as well, without the extra appliances, the last mentioned will inevitably be more successful and more reliable.

Bolts and nuts are now looked upon as very useful and necessary details at one's disposal, whereas there can be no doubt that, although unfortunately often necessary, they are the *bete noir* of the designer, as well as the manufacturer.

The whole design of an engine may be altered by mechanics of different muscular strength assembling it, for what designer can tell the amount of initial stress that will be placed on a bolt or important part, and what amount of strength is left in the bolt or part to perform the duty it is intended to perform?

Two or three aero engines give evidence that the designer already realizes that the use of initially stressed parts is not the way to obtain the maximum amount of strength with the smallest amount of material, and the engine that uses the smallest number of bolts and nuts, and is designed so that all parts where possible are interlocking, and not stressed except by the work they have to do, stands a better chance of success.

As we cannot, to-day, have engines of absolute simplicity, the next best thing to do is to leave nothing to chance. Every possible or even conceivable risk must be removed, every part examined microscopically if necessary, and the mechanic impressed with the importance of properly securing every single bolt and nut on the engine. A thorough knowledge of the properties of every kind of material used in the manufacture of the aero engine is most essential, not particularly as regards the composition of the materials, as this is possibly better left to the specialist, but a knowledge of how each class of material behaves under stresses, its actual tensile strength (not that often stated by the manufacturers), its yield point, which is even more important, its percentage of elongation, and its resiliency.

Steel of 30 or 40 tons per sq. in. ultimate tensile should never find a place in an aero engine, when steel of from 90 to 120 tons tensile, with 85 to 115 tons yield, and 15 to 9 per cent. elongation respectively, can be obtained every day. The greatest care should be exercised in using case-hardened steel for stressed parts. After case-hardening the elongation is generally nothing at all, or at the most one half or one per cent., and as in aero engines these parts have to be so light they will not stand shocks or bending loads.

The system of filling up the sump with oil and using the same over and over again is not, from the author's experience, highly satisfactory. It seems to take as long as from five to six hours on full throttle for the average water-cooled engine to attain its maximum heat all over, after this point the difference in temperature between the engine and the surrounding air is such that no increased heating takes place, no matter how long the engine is run within reason. The quality of the oil meanwhile has become impoverished, and it is too much to ask the engine, once it has attained its maximum heat, to continue running on oil that is nearly at boiling point, and that has lost its lubricating qualities. On the other hand an engine extravagant in oil, unless some method of draining the oil away is used, becomes carbonized in the cylinder and valves get gummed up necessitating constant overhaul.

Valves and valve gear (with perhaps ignition) constitute the most unreliable parts of almost every aero engine, and there can be not the slightest doubt that an engine without valves will quickly supersede the present type as soon as such an engine can be found.

Sleeve valves do not offer a solution to the problem, because they necessitate increase of weight over present types, whilst decrease of weight is the most important factor.

The two-stroke cycle principle does not appear to be receiving the attention it deserves, and because it is already successful in that it has very few parts, will actually run, and is already a commercial proposition, one cannot help thinking it ought to be developed more, despite the enormous amount of natural prejudice against this type.

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AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

Meeting.—The fifth meeting of the forty-ninth session will be held on Wednesday, January 21st, at 8.30 p.m., when Sir Alfred Keogh, K.C.B., F.R.S., will preside. Mr. Leonard Bairstow, A.R.C.Sc., will read a paper, to be followed by a discussion on "The Stability of Aeroplanes," illustrated by experiments with paper gliders.

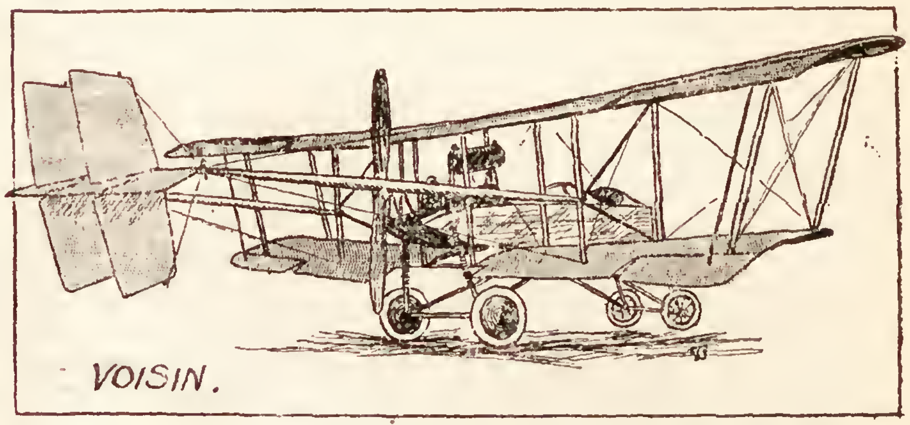
Members are reminded that, under the Rules, they may introduce visitors to General Meetings.

Tickets for visitors, not introduced, may be obtained from the Secretary, 11, Adam Street, Adelphi, W.C.

BERTRAM G. COOPER, Secretary.

A NEW MILITARY VOISIN BIPLANE.

One of the Voisin machines recently turned out by this historic aeroplane factory possesses several very interesting features, as the accompanying sketch will show. Like most of the Voisin machines of recent years, it is constructed for the greater part of steel. It is a biplane of the "headless" type, and differs from previous models in the method of carrying the tail. Instead of the usual two pairs of triangular outriggers from the main planes, two single outriggers or tail booms are employed. Each of these is attached to the centre of one of the rear plane struts on either side of the *nacelle*, and extends rearwards horizontally, or parallel to the line of flight. These tail booms, therefore, offer considerably less resistance than the triangular arrangement. Both tail booms are strongly braced to the main planes, whilst the struts carrying the former are also strengthened by a pair of diagonal cross-struts to the corresponding fore-struts. The rear extremities of the tail booms carry a single elevator tailplane, which in turn carries two pairs of vertical rudders that move bodily with the elevator. Each pair of rudders is divided into two and arranged above and below the elevator. Mounted in the centre of the lower main plane is the *nacelle*, which extends well in front of the main planes. The pilot and passenger are seated in separate cockpits in front of the *nacelle*—the pilot being behind—whilst in the rear is mounted the engine, a 200 h.p. Clerget, which drives the propeller by means of chain gear. The *nacelle* is supported by a very simple sprung chassis, similar to those on other Voisin machines, and there is also a pair of wheels mounted on the nose of the *nacelle*. *Ailerons* are employed for lateral balance, and the main planes are set at a slight dihedral angle. The span of the machine is 15 m., and the weight of the machine ready for the air is 1,300 kilos.

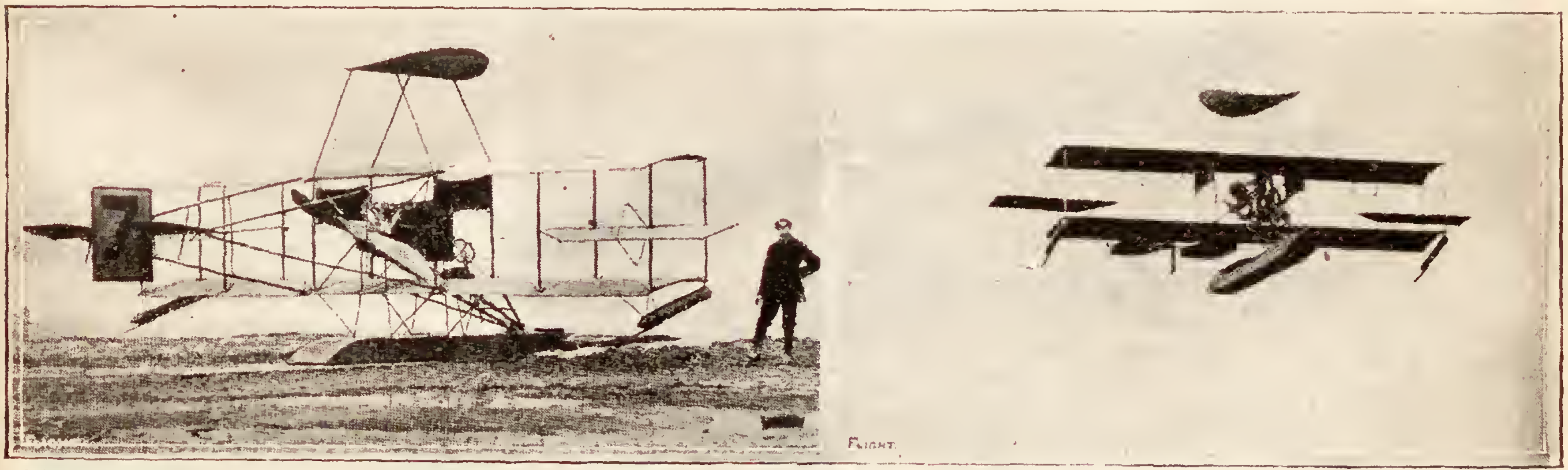


"Vee Jay."

* * *

A NEW AMERICAN STABILIZER.

From America comes some details of a new device for securing automatic stability that has just been tried and found to work satisfactorily. Briefly, it consists of a disc of fabric stretched over a light framework of wood, and mounted some distance above the main planes. The two transverse edges are turned upwards about 10 ins., thus presenting a slight side area to a cross-current of air. Mr. William S. Luckey, the Curtiss pilot, has just been testing the device for its inventor, Mr. H. C. Fiske, and found that it increased very materially the lateral stability of his Curtiss biplane. The action of the stabilizer is as follows: Suppose the aeroplane on which the device is mounted begins to side-slip to the left. The upturned left side of the stabilizer then offers a certain amount of side area to the current of air which is travelling across the path of the machine. As the point of application of this transverse air current is a considerable distance above the centre of gravity, the machine naturally tends to return to its normal position. It is not evident wherein this device differs in effect from the usual dihedral angle of the main planes, and we should be inclined to think that while it may possess the advantages of the dihedral angle it would also suffer from the same drawbacks.



THE CURTISS HYDRO-AEROPLANE FITTED WITH DISC STABILIZER.—On the right the machine in flight.

* * *

The First Pilots under New Rules.

It will be seen from the official notices of the Royal Aero Club on p. 39, that three pilots succeeded on New Year's Day in qualifying for their certificates under the new and more stringent rules. Their names in the order in which their certificates were granted were:—720 R. J. Lillywhite (Grahame-White School), 721 Sub-Lieut. F. G. Saunders, R.N.V.R. (Bristol School), and 722 H. B. Martindale (Vickers School).

Flying at Shoreham.

On Thursday, Friday, and Saturday of last week a considerable amount of flying was done by the pupils and by Instructor W. H. Elliott on the Avro machines belonging to the school. Lieut. Clemson has succeeded in doing really excellent straights in a good wind, and Mr. Purnell shows marked improvement. Mr. Hayland-Wilson, a new pupil, was out for the first time on Saturday, and was certainly very enterprising, insomuch that he accomplished a banked turn very low down. Mr. Cecil Pashley's machine has been rendered *hors de combat*, having had the front elevator smashed.

A New Grade of Emaillite.

A new grade of British-made Emaillite—to be known as No. 7—is being placed on the market by the British Emaillite Co., Ltd., of 30, Regent Street, W. It is a liquid dope, and a very special point is that it is non-inflammable both before and after being applied to the fabric; it will extinguish flame if poured upon it. Three coats are said to efficiently dope any fabric, tightening and strengthening it, and rendering it both water and rainproof, besides giving a very pronounced glossy finish.

CORRESPONDENCE.

Safety Aeroplanes.

[1819] Further to my letter on the subject of safety aeroplanes, which you kindly published in your issue of November 8th (1807), I note with interest Mr. Coanda's letter (1815) on this matter and the stress laid on the necessity for "unlooked for efforts by means of controls" (an essential feature of the phenomenon to which he refers), which really amounts to "control efforts" such as to render a machine capable of rapidly recovering the normal position under all circumstances.

It is, of course, apparent that a machine possessing planes of a uniform chord, with the whole lift distributed laterally, must be subject to "rolling" and considerable effort on the part of the pilot to maintain an "even keel" when encountering severe wind gusts. These effects, however, would be less marked with tapered planes, which compound the air velocity in order to distribute the lift laterally and longitudinally, provided some means were employed whereby the machine would be rendered less susceptible to dives, &c.

Having made a series of experiments in accordance with my views hereon, I am about to introduce a machine which will give stability by means of stabilising planes, interconnected and acting under load in such a manner as to automatically "line" the machine to the prevailing atmospherical conditions, such that no upsetting tendency prevails. These stabilising planes maintain a uniform plane lift, any pressure in excess of their normal lifting capacity being disposed of automatically, without any "damping out" process or series of oscillations about their combined axes of rotation.

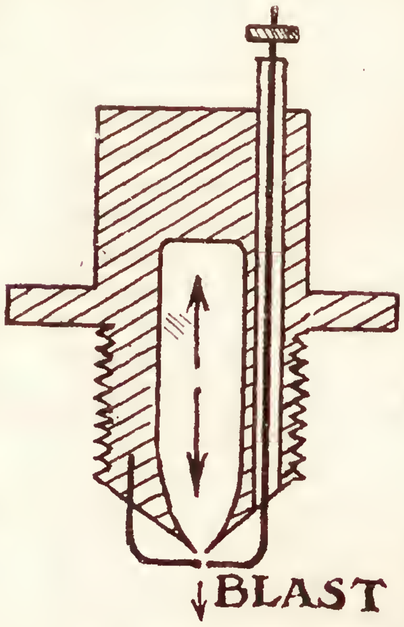
Battersea, S.W. JOHN W. ROBINS.

Some Suggestions.

[1820] Can any of your correspondents give a good reason for the persistence of aeroplane constructors in making machines with a very small dihedral? Models clearly show that a large dihedral makes an otherwise unstable machine into a stable one, and, indeed, into a machine which will right itself if it be started in an inverted position.

An aeroplane which will glide at all in an inverted position is a dangerous machine.

The writer has been often struck by side gusts, and an instant application of the control becomes necessary; but if the machine had been a laterally self-righting one, the whole incident would have been met with much equanimity on each occasion, for the immediate effect of the gust may be more marked, but the ultimate result of it negligible.



Models also show that it is not at all essential to have the centre of effort and the centre of gravity in the same line, or very near it.

With regard to engine failure due to misfiring through a choked sparking gap, a form of sparking-plug in which there is a hollow space with a narrow aperture dead in line with the gap effects a strong blast on the gap space on each explosion and expansion stroke and keeps it clear of deposit.

The use of two propellers, large and concentrically mounted, and driven at a comparatively slow speed, would make an aeroplane easier in every way, and the question of the differential gear needed does not seem to be beyond our engineers' skill.

Two independent engines, acting concentrically, is also possible, and has many advantages.

If there are inherent difficulties in the above suggestions, the writer would be very grateful to have them pointed out.

Pembridge Crescent. B^{2}.

"Flight" Copyright.

Mr. Cecil Pashley flying with a passenger at Shoreham Aerodrome.

Models

Edited by V. E. JOHNSON, M.A.

Some Hints for Beginners.

JUDGING by the very large stock of model aeroplanes which we happen to know a particular firm provided themselves with just prior to Christmas, they certainly must have expected an exceeding large demand for the same as Christmas or New Year presents; and although just at this time of the year the climatic conditions cannot be considered exactly propitious, it is undoubtedly a fact that every year at this season a very large number of "models" of all kinds come, for the first time it may be, into the hands of juveniles who are naturally all eagerness to "see the model work." Now, in the case of the older type of models such as locomotives, yachts, motor boats, &c., there is always either the "Pater" or Uncle "Tom," or Cousin "Dick," to say nothing of Brother "Bill," who "knows all about it," and the machine is soon got to work. It cannot be said, however, that at present the same is true of aeronautical models. Here the "Pater," Uncle "Tom," &c., sad as the fact is to relate, not infrequently know less about the matter than the youngster, with the result, that at the very first attempt it is by no means an uncommon thing for the model to be launched the wrong way about and come to grief. Now if you are an expert no model is perhaps more easily and quickly repaired than a model aeroplane; in the hands of a novice, we must confess the task is almost a hopeless one. Of course it can be repaired "somehow," but by repaired we mean mended in such a manner that it will, practically speaking, go on flying as well as before.

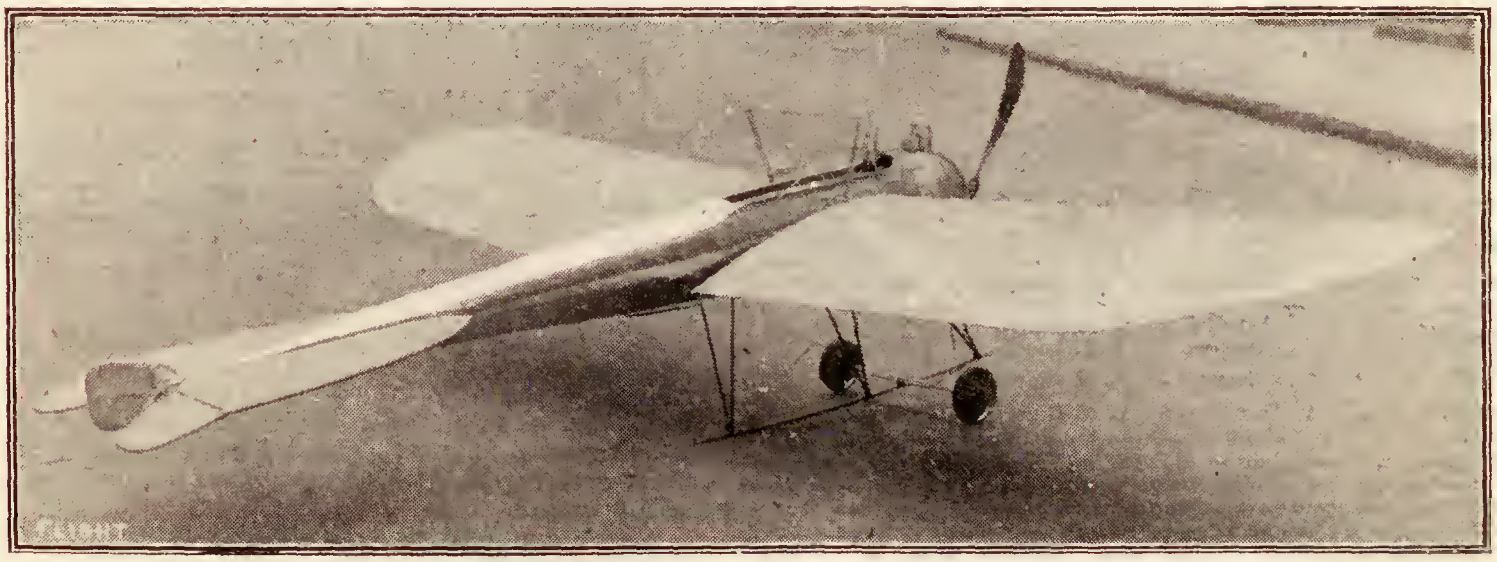
It is, therefore, of primary importance that a smash-up to start with should be avoided if possible.

Let us, however, first consider very briefly the case in which the reader has not yet purchased the model. If you know nothing whatever about model aeroplanes, nor your people either, it is best perhaps bought over the counter from a shopman who both can and will give you the necessary preliminary instructions as to its working. Avoid anything in the nature of a record-breaking model in the first instance, and choose one with a single propeller which flies with the elevator or small plane *foremost*. To obtain good results with *any* model, two things (amongst others) are essential; the rubber must be of the best, and it must be *fresh*. On no account buy what is obviously old stock, no matter how cheaply it may be offered to you. The rubber to be any real use must be capable (when new) of being stretched to at any rate *8 times its own length without fracture*. If it won't do this, don't buy it. The rubber must also be well lubricated. There are quite a number of good lubricants on the market; do not choose one which is too thick or looks at all dried up. Remember the rubber must be lubricated frequently. It should also always be removed from the machine after you have finished flying. It should on no account be passed round bare metal hooks; if this is the case buy a pennyworth of bicycle valve tubing, cut it up into suitable lengths and place on the hooks *before* using the machine. On no account buy a machine which is loose or flabby, or which, when shaken, "wibble-wobbles" all over the place; but a taut, well trimmed up machine, possessed at the same time of a certain give or flexibility which all aeronautical machines should possess. On no account try flying the machine in the house, or see (supposing the model one fitted with wheels) if it will "get off" the dining-room table. This advice may seem quite superfluous, and yet it is not so, for we personally know of quite a number of instances in which the above has been done, nearly always with disastrous results: not always to the model, be it noted—more often to something intrinsically of much greater value. The smashing of a fifty-guinea vase (which we know of as occurring in one case) could scarcely be considered as equated by the clearly demonstrated fact that the model would really fly. Generally speaking, of course, pictures are the worst sufferers—first of all, that is. It is also most unwise to fly the model in a garden (large or small) in which there are numerous obstructions, such as trees, &c. Hundreds and hundreds of models have been smashed up in this way.

Before actually trying to fly your model at all, there are quite a number of things for you to learn, all of which *can* be learnt either in the house or garden.

There is first of all the question of winding up, which reminds us that we have omitted the question of a "winder." As these can be purchased quite cheaply or easily adapted from an egg-beater or a drill, one should certainly be used. Now we have in this case supposed the propeller situated in the rear of the machine, evidently then the propeller, or, to speak more correctly, the rubber motor, must (by means of the winder—fitted to or round the boss or central part of the propeller) be wound up in such a direction that *when the propeller revolves*, the machine being held stationary, a column of air is driven backwards behind the propeller, to the rear of the machine. As to the number of "turns" which can or should be given to the rubber motor, it is somewhat difficult to say exactly, but the following statement is, we think, a fairly safe one. Provided the rubber be well lubricated, 500 turns can at any rate be given. This supposes the rod carrying the motor not much longer than the breadth or span of the machine. If this be so 750 to 1,000 turns can be given; but a model in which the *fuselage* does not exceed to any great extent the breadth of the machine is best. The above statement must be considered only a very approximate one, and as applying solely in a general way to commercial machines.

Having mastered the winding up, not forgetting to always keep the bearings well oiled, we pass on now to "gliding" or "launching" the machine in the open, with rubber motor and propeller *in position*, but the motor not wound up. The following applies equally well, whether the model be a hand-launched or r.o.g. (rise-off-the-ground) machine. Holding the model by both hands—the left hand grasping some fairly forward part of the *fuselage* or motor rod, and the right hand the central portion, bracket, bearing, &c. of the propeller, in such a manner as would prevent the propeller from rotating, supposing that the motor was wound up—point the nose or front of the machine *slightly* downwards and launch fairly fast into the air. Release the left hand just a moment *before* the right. If your model makes a nice even glide to earth, your elevation is probably correct; try several times to make sure. Is the machine plunges nose first to the ground, you must increase the angle at which your elevator (small front plane) is set; do this little by little until you obtain good even



Three-quarter rear view of the Desoutter model monoplane, scale drawings of which were given on November 8th last.

glides. If your model soars up into the air and finally either comes down backwards on to its hind quarters, *i.e.*, sits down, as it were, or after careering up into the air nose dives to the ground, this shows over elevation, and the angle must be made less. Having correctly adjusted this, you are now in a position to wind up your model and try the same in actual free flight. If the model is a hand-launched one, then you will launch it in exactly the same manner as when gliding it; if there be a breeze it is generally preferable to launch it against it; be sure you don't point it nose upwards when doing so—launch it quietly. If you launch it with the breeze, launch it much harder and point the nose somewhat upwards. Never launch the model *across* the wind. If the model be an r.o.g. one, select a smooth level piece of ground, wind up your motor, place the model with its wheels on the ground, being careful in this case that the model *faces* the breeze, and just release the propeller, don't give the model any push. Let it do it all on its own. If the model in either case when flying "switch-backs" in the air, soaring up and down, it is a sign of slight over-elevation. If it comes to the ground with the rubber motor not fully unwound—say half run out—it is a sign of one of two things, or it may be both. It is either under-elevated or under-powered, and it may be both. If it swoops up into the air and then nose dives it is over-elevated only. An over-powered and over-elevated model not unfrequently "loops the loop."

In the case of a present the model may not, of course, be of the above type; it may be a tractor model, *i.e.*, one which flies large plane forward, propeller (in this case usually termed a tractor) in front. To the initiated the difference is very plain, but those who are not so often experience the greatest difficulty in distinguishing the two types. The following is undoubtedly a very unscientific manner of discriminating between the two, yet we believe it will always do so. Set the model on its wheels on a table or bench and note carefully if the smaller plane is at a lower level than the front, as in a Blériot, for example; it at once follows that the model flies propeller first. If the small plane is at least on a level with the main plane, or even higher than it, the model is of the elevator in front, propeller behind, so-called canard type. Other differences are: In the latter type the elevator is generally quite small—is not unfrequently set above the motor rod. In the tractor type the propeller has almost invariably a "skid" or chassis extension, extending underneath and forward of the propeller to protect the latter when landing. Even in a hand-launched model this should be present. A little careful consideration will also show the reader that the propeller which has the convex side of its blade always *in front—i.e.*, in the direction of motion—affords a ready method of determining the above. Therefore the propeller must always be wound in such a manner that it is (apparently) the concave side which drives the air back. Some propellers have a convex and an almost plane side—if this be the case the flat side should be hollowed out by means of careful sandpapering—as the efficiency of the propeller will be considerably increased. There is also another type of machine which flies main plane first; it is a tail-type machine fitted with two propellers in the rear. It does not represent any type of full-sized machine so far in existence, and it cannot be said to be a novice's machine. So far as actual flying results go, it has some very fine records to its credit. The question of elevation in this machine, as also in that of many tractors, is solved by moving the main plane along the motor rod or *fuselage*: forward for more elevation, backwards for less. Some tractors are adjusted by increasing or decreasing the angle of the tail or the small auxiliary planes attached.

The best and most easily adjusted machine for the beginner *to commence with* is the small planes in front or canard type.

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver...	85 secs.
Twin screw, do.	Distance	R. Lucas ...	590 yards.
	Duration	G. Hayden	137 secs.
Single screw, rise off ground	Distance	W. E. Evans	290 yards.
	Duration	W. E. Evans	64 secs.
Twin screw, do.	Distance	L. H. Slatter	365 yards.
	Duration	J. E. Louch	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance	C. C. Dutton	266 yards.
	Duration	J. E. Louch	91 secs
Do., off-ground	Distance	C. C. Dutton	190 yards.
	Duration	J. E. Louch	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter	60 secs.

Affiliation.—All affiliated clubs should send in their affiliation subscription of 10*s.* 6*d.*, together with list of officers and members, also all clubs wishing to become eligible to compete in the inter-team competition to be held in connection with the Aero Exhibition, and also for the Farrow shield during the year, should send in their applications without delay. Affiliated clubs also will have special reduced charge for club exhibits at the exhibition. The following have already reserved club stands: The Leytonstone Aero Club, The North East London Ae. Club, Paddington Club, Stony Stratford Kite and Model Aer plane Club, and The Reigate, Redhill, and District Ae. Club.

Vice-Patron.—His Majesty King Manoel has honoured the Association b becoming a Vice-Patron; also Their Majesties Queen Amelia and Quee Augusta Victoria have been elected members of the Association.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

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AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for th future. Secretaries' reports, to be included, must reach the Edito on the last Monday in each month.

Leytonstone and District Aero Club (64, Leyspring Road).

Jan. 11th, model flying, Wanstead Flats, 10 a.m., as usual. If wet, mee at club room.

Paddington and Districts (77, Swinderby Road, Wembley).

Jan. 10th, flying, Sudbury. Annual general meeting at secretary's hous 6 p.m. The attendance of all members is particularly requested.

Wimbledon and District (165, Holland Road, W.).

Jan. 10th and 11th, flying as usual.

UNAFFILIATED CLUBS.

Finsbury and District (85, Upper Tollington Park, N.).

Jan. 10th, flying, 3 p.m., Finsbury Park.

S. Eastern Model Ae.C. (1, Railway Approach, Brockley).

Jan. 10th, Woolwich Common, 3.30 p.m. until dusk. Jan. 11th, Blac heath, 7.30 to 10 a.m.; Lee Aerodrome, 10.30 a.m. to 12.45 p.m. Members a requested to accelerate the construction of models intended for the club's fir indoor exhibition, to be held at the Central Hall, High Street, Peckha on the last Thursday in this month, 7 to 10 p.m. Every member is expecte to exhibit.

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NEW COMPANY REGISTERED.

Agents' Section, Ltd.—Unlimited number of members, eac liable for £1 in the event of winding-up. To promote and protec the interests of firms, persons, or corporations engaged in the retai branches of the motor trade, including the business of repairers o and dealers in motors, motor cars, motor boats, launches, balloon airships, aeroplanes, hydroplanes, and other flying machines. Th management is vested in a committee.

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PUBLICATIONS RECEIVED.

Almanack, 1914. Phillipss, 70, Chancery Lane, W.C.

Aero-Manuel, 1914. By Ch. Faroux and G. Bonnet. Paris H. Dunod and E. Pinat, 47–49, Quai des Grands-Augustins Price 12 frs.

Catalogue.

White and Poppe Engines and Carburettors. White and Popp Ltd., Lockhurst Lane, Coventry.

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Aeronautical Patents Published.

Applied for in 1912.

Published January 1st, 1914.

25,348. G. M. Absalom. Safety balanced air machines.
25,529. J. G. A. Kitchen and I. H. Storey. Flying machines.
28,440. H. D. de M. Carey. Stability of flying machines.
28,596. H. E. Wimperis and G. K. B. Elphinstone. Indicating speed o aircraft.
29,072. A. Keith, J. Weiss, and Weiss Aeroplane Synd. Aeropla wings.

Applied for in 1913.

Published January 1st, 1914.

5,223. J. R. Portrr. Construction of aeronautical machines.
11,223. J. Blumenfeld. Aircraft housing.
12,205. M. A. Parisano. Flying machines.
12,824. W. E. Verclaire. Aeroplanes.
13,255. W. Mazouch and F. J. Blimsrieder. Parachutes.
13,538. Soc. L. Breguet. Braking device for aeroplanes.

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CONTENTS.

Editorial Comment: PAGE
Aerial Defence and its Urgency 53
Men of Moment in the World of Flight: No. 2 Squadron Military Wing R.F.C. 55
60 h.p. Wright Aero-boat (with scale drawings) 56
Automatic Stabilizers. By Capt. Bellenger 58
Paris Salon 59
Bristol Repair Wagon at Paris Salon 63
Eddies. By "Will o' the Wisp" 65
From the British Flying Grounds 67
Flying at Hendon 68
Armchair Reflections. By The Dreamer... 69
Wind Gusts and Aerial Disturbances. By Dr. W. N. Shaw... 70
Invisible Aeroplanes 71
British Notes of the Week 72
Foreign Aviation News 73
Models. Edited by V. E. Johnson, M.A. 75
Correspondence... 77

EDITORIAL COMMENT.

Aerial Defence and its Urgency.

In matters connected with aerial defence we have always contended—no longer ago than last week we again insisted on this point—that only by the creation of a strong volume of public opinion can the hands of responsible Ministers be strengthened to the point at which they can wring from an unwilling Treasury sufficient to set our house in order. In the work of creating that volume of opinion we necessarily depend to a very great extent upon the Press of the country, and, to say simple truth, the Press is manifesting a far clearer understanding of the needs of the moment than is shown by those more directly responsible. In fact, almost with one accord and with one voice the great daily newspapers are endeavouring to drive home the urgency of the situation and to educate the man in the street to the need that exists for bringing pressure to bear in the proper quarters.

Democratic government is a good thing, but it has certain disadvantages of its own as compared with systems in which more autocratic methods obtain. Where government is of the kind described as being "by the people, for the people"—and incidentally at the expense of the people—there must always present itself the difficulty of the "ins and outs." The party which is in power must at all times keep a close watch on the polling booths, otherwise there is always the probability to be reckoned with that the reins of office—and the spoils thereof—will fall into the hands of those on the other side. Therefore, the first thing to be thought of in connection with new movements and new measures is the crucial question of whether or not they are likely to be "popular," or, in other words, whether they can be depended upon to retain votes for the party in power, or whether, on the other hand they are likely to transfer the suffrages of the electors to the opposition. Alternatively, the question is whether matters of negative value from the vote-catching point of view shall be allowed to slide in favour of something which will influence the electors, even though the Government of the day realises well enough that the matter is one of such urgency as to be almost vital. Aerial defence is, at the moment, one of these questions of negative value. There has not yet been created the necessary volume of opinion to impress it on the minds of the Government as a whole, that if they neglect the question the consequences to them may be as serious as those of the historic "Cordite Vote." Were that opinion existent, there would be no need for us to write on the subject—we should be as strong in the air as we are at sea.

In last Monday's issue of our contemporary, the *Morning Post*, there appeared an excellent leading article on the subject of the forthcoming Navy and Army Estimates, which is well worthy the attention of every seriously minded man who gives more than a passing thought to our preparedness for war, and the fatal consequences which may easily follow upon its neglect. The *Morning Post* says:—

> "It is to be hoped that when the Estimates for the Navy and the Army are introduced this year, the First Lord and the Secretary of State will give the House of Commons clear accounts of their policy in regard to aerial navigation. For some time past it has been held probable that in the next war the Power that has the more skilful aeronauts will have a great advantage both by sea and land. It is not yet clear whether or not the airmen will be able by acts of destruction to exert much influence on the course of battles, but it is believed that aerial scouting when successful will give to the Commander-in-Chief whose scouts can accomplish it a long start of his adversary and that the handicap thus placed on his opponent will be heavy. The difference will be that between knowing the

> enemy's moves and guessing them. That being the case, prudence prescribes that the two Departments that have to do with the operations of war should diligently study the progress of aeronautics and all its applications to the operations of war by sea and land. The knowledge thus obtained should be incessantly applied to the provision of such kinds of airships and aeroplanes as have been proved to be capable of service, as well as of officers and crews for their management. Moreover, the strategists of both Services, as well as the Admirals commanding squadrons and the Generals commanding divisions, should have under their orders a sufficient number of aircraft to insure their becoming familiar with the uses to which they can be put, and with the kind of instructions with which their aerial scouts ought to be furnished in the successive stages of a campaign. So far as we are aware, these various needs are well understood at both offices, and do not require to be suggested. What we have in view is an annual report for each Service, showing what progress has been made, and what futher measures are contemplated. Such reports have a double use; their preparation causes the Departments concerned to take stock of their work and of their plans, and their publication, if and when they show real progress, reassures the public, which is rendered uneasy by vague or ambiguous language in regard to the condition of the two Services, and still more uneasy by reports of which the form or substance fails to carry conviction."

We are entirely with our contemporary, not only in the matter of providing adequately for aircraft and their *personnel*, but in the issue of the annual report suggested in the quotation we have made. One of our troubles is that there is far too much of mystery made in matters which it would do no conceivable harm to make public, but, on the contrary, would work towards a good end were the nation only taken into the confidence of the Government, as indeed it has a right to be. We are not referring now to matters which are of a nature which would prove of use to a possible enemy, but those of broad policy, and which involve certain details which ultimately become known to everyone through outside channels, and which, if communicated by responsible departments, would have a reassuring effect on the public mind. Take, for example, the unedifying spectacle that was witnessed not so long ago of a War Minister trying to juggle with facts across the floor of the House in the face of knowledge possessed by those to whom he was giving the lie by implication. Had such a report as that suggested by the *Morning Post* been issued prior to the submission of the Estimates to Parliament, there would have been no need for cross-examination on detail, since the broad lines of the Government policy would have been in possession of the nation, and all that would have been needful would have been a definite assurance that those lines were being followed.

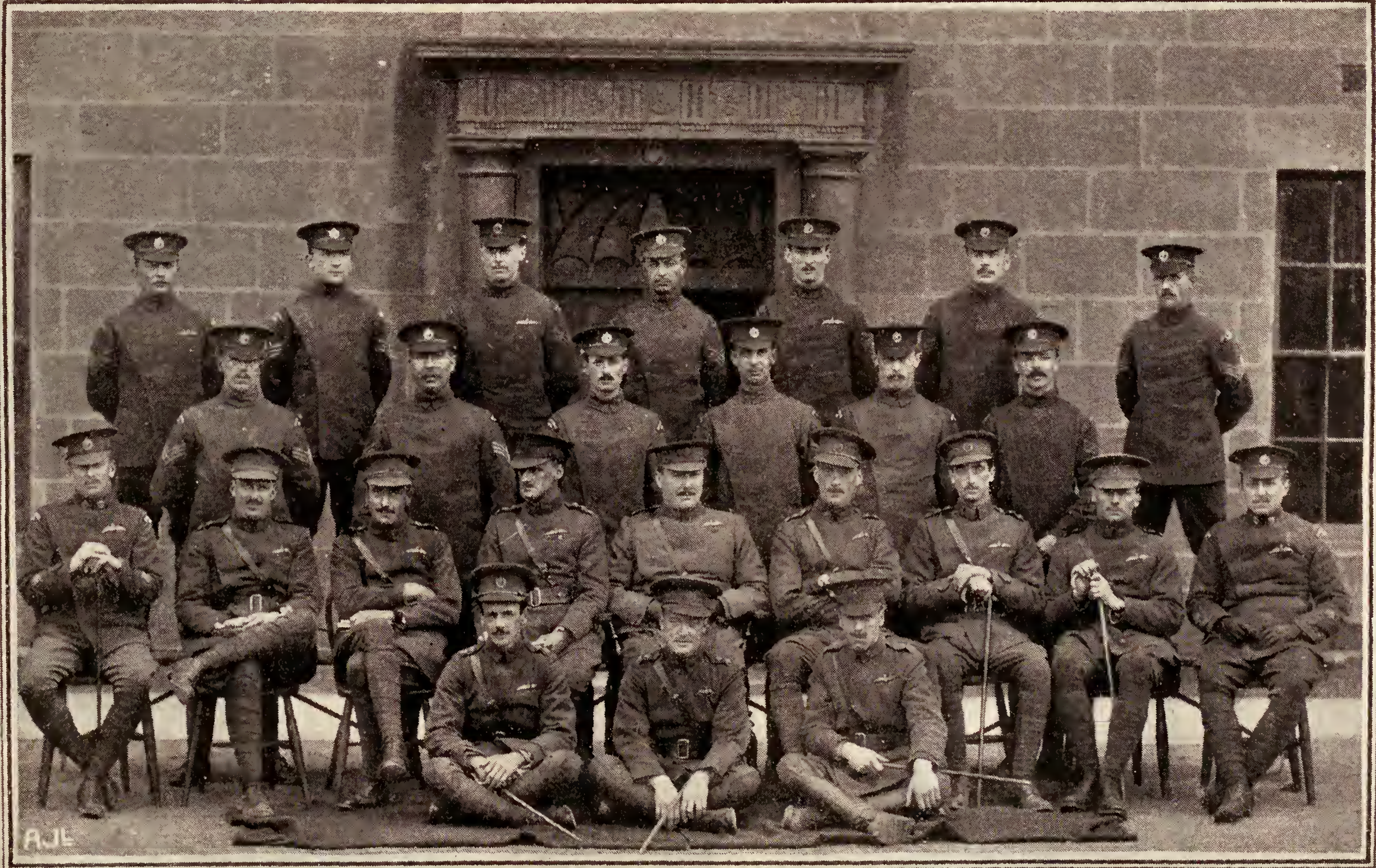
* * * *

Orville Wright on the Future.

SPEAKING at the banquet by the Aero Club of America in New York on December 17th, the tenth anniversary of the first flight by the Wrights on a power-driven machine, Orville Wright said that in the near future aeroplanes would be used to carry mails in many of the States such as Arizona, New Mexico, Utah, &c., where they could do better work than the railroads. He thought that the development of the heavier-than-air machine during the next decade would be beyond the most sanguine expectations. He went on to say that he thought the flying boat had a great future for sport, as it produced the thrills of the motor boat on the water, offered all the facilities of the motor car, and was speedier than either.

PASSING A PYLON AT HENDON AERODROME.—From an original drawing by Mr. Roderic Hill.

MEN OF MOMENT IN THE WORLD OF FLIGHT.



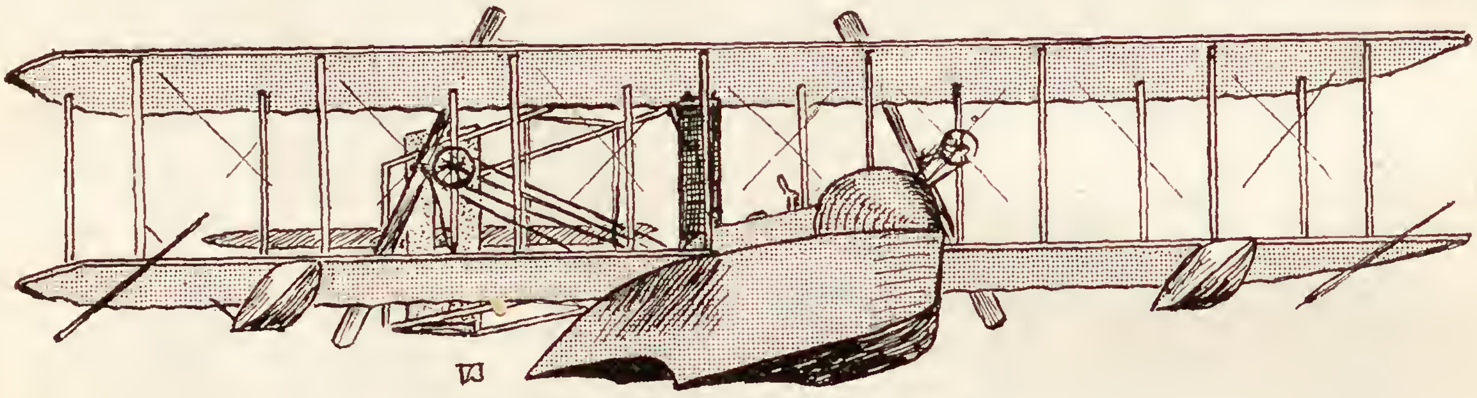
Top row: Sergts. Kemper, Kesszler, Mead, Borne, Mullins, Neathy, Hatchett.
Second row: Sergts. Aspinal, Smith, Baxter, Jillings, Combold, Felsted.
Third row: Sergt.-Maj. Fletcher, Lieut. MacLean, Capt. Tucker, Capt. Becke, Maj. Burke, C.O., Capt. Longcroft, Capt. MacDonell, Lieut. Harvey, Sergt.-Maj. Measures.
Sitting on ground: Lieuts. Dawes, Martyn, and Capt. Waldron.

OFFICERS AND N.C.O.'S OF SECOND SQUADRON, ROYAL FLYING CORPS, STATIONED AT MONTROSE.

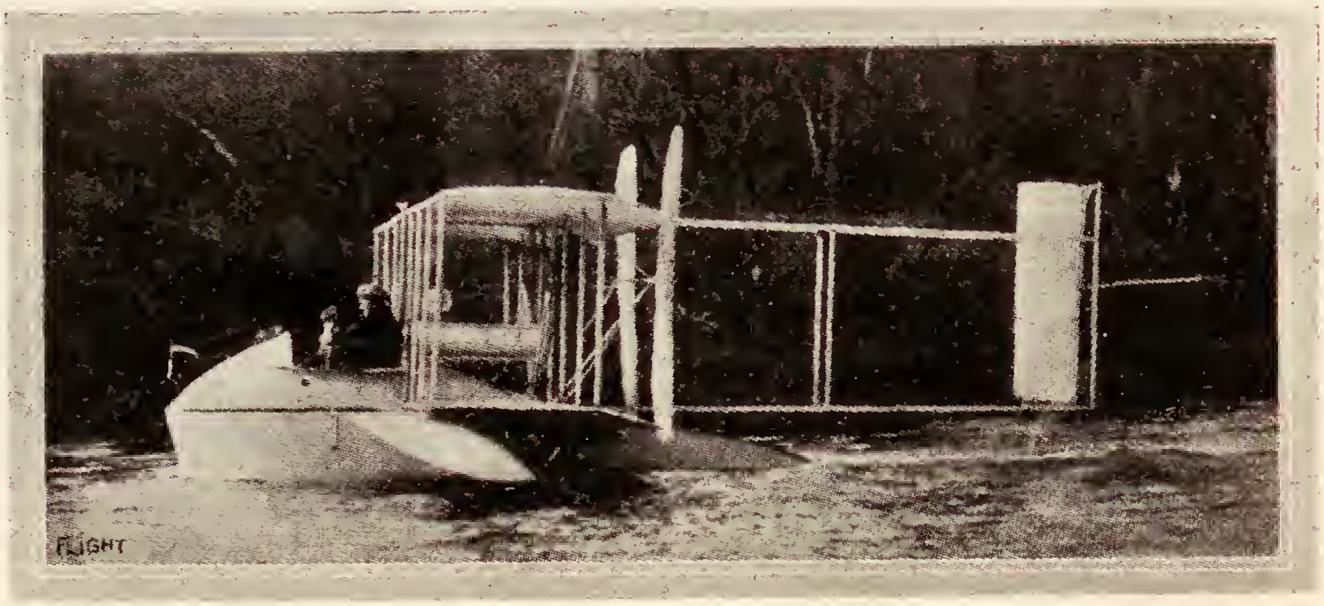
THE 60 H.P. WRIGHT AERO-BOAT.

THE popularity of the "flying-boat" type of hydro-aeroplane in America is emphasized by the fact that the Wright Co. has now listed a machine of this type, known as model G. An interesting point in connection with this machine is that it is the result of the collaboration of two pioneers: Orville Wright, of course, being responsible for the aeroplane, while Grover C. Loening—one of the earliest experimenters with the flying boat—has contributed his share of the design in respect to the latter. Although this new Wright model is of the flying-boat type, it really possesses one or two of the characteristics of the single-pontoon type of machine—like, for instance, the Wright hydro-biplane described in FLIGHT for September 6th last. It is, in fact, a combination of both systems, possessing, it is claimed, the advantages of each without the disadvantages of either. This will readily be appreciated by a glance at the accompanying scale drawings, for it will be seen that the boat differs from the usual type in that, instead of stern-tapering to the tail planes, it is comparatively short, like a pontoon, yet at the same time the seaworthiness of the boat system is retained and the tendency of the pontoon to dive under water is reduced to a minimum. Again, the pilot and passenger are not in such close proximity to the water as in other boats, for they sit on the deck and are thus in a somewhat safer position in case of the boat being swamped by a wave. The boat consists of an alloy metal hull, built up on a strong wooden framework. It is 18 ft. long, with a maximum depth of nearly 3 ft. and a beam amidships of 3 ft. 7 ins. The bow is pointed and the stern tapers to a horizontal knife-edge. It is fitted with a single hydroplane step and the curvature of both fore and aft surfaces has been very carefully worked out. The boat is divided up into six watertight compartments and weighs, complete with engine-bed, seats and "cabin," only 305 lbs. The outer surface of the metal hull is specially treated to resist the action of sea water, &c. Two auxiliary floats, also of metal, are mounted on the leading edge of, and below the lower planes, one on either side of the boat, midway between the latter and the wing-tips. Mounted on the deck of the boat amidships are the main planes and the engine, and just forward of the leading edge of the lower plane are the two seats for pilot and passenger, side by side, whilst right in front is a cowl forming a cockpit. The main planes, as with the rest of the aeroplane component, follow the usual design of the Wright land machines, being built up of hollow spars and spruce ribs, the front spars forming the leading edges. Extending back from the rear spars is the orthodox Wright tail outrigger carrying a flexing elevator, somewhat larger than usual, mounted in front of which are the twin rudders. It will be seen that the engine is not mounted alongside the seats as in former models, but behind them, exactly in the centre of the lower plane. The power plant consists of one of the latest 60 h.p. 6-cyl. Wright motors

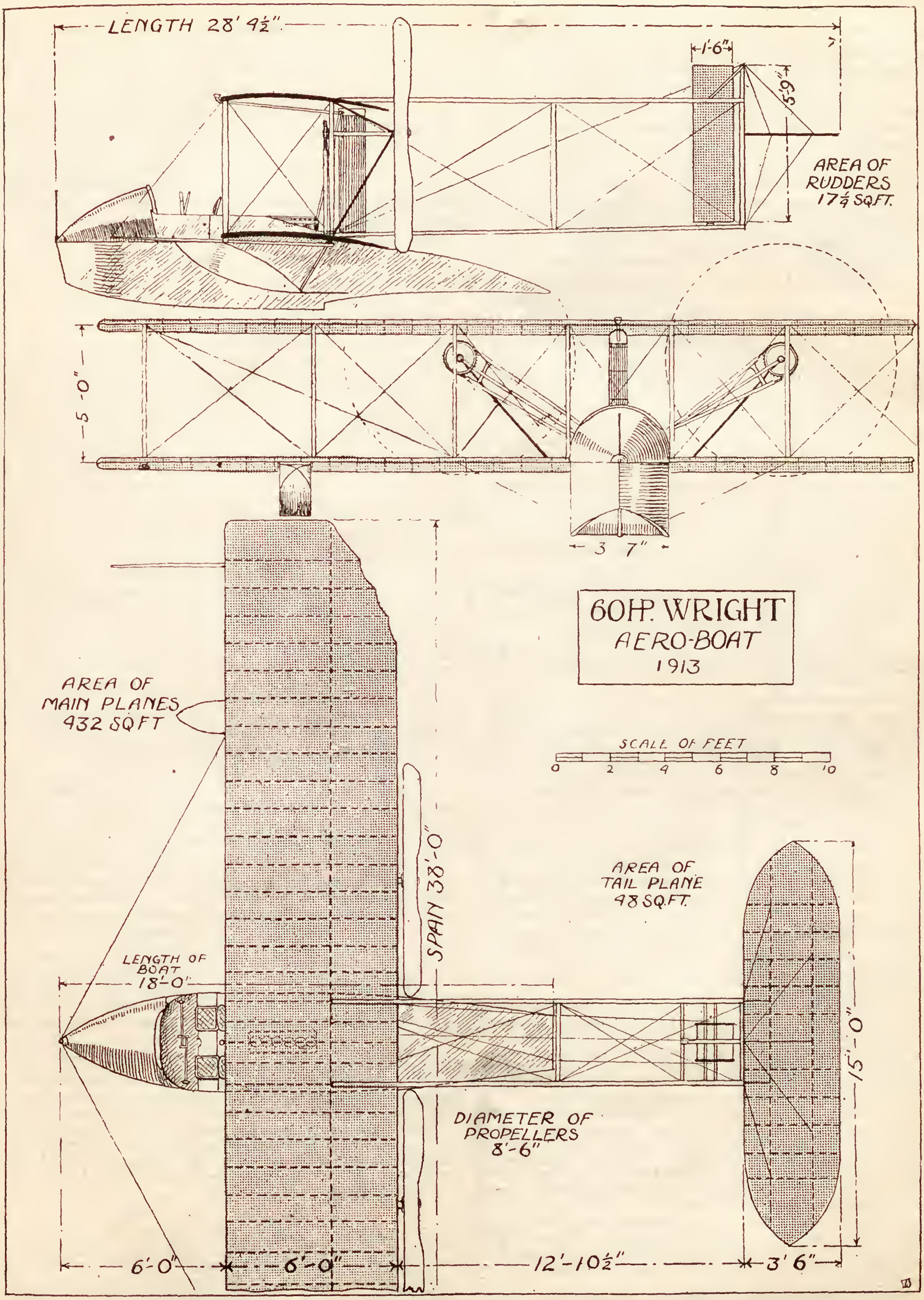
A view of the Wright aero-boat in flight.



Sketch of the Wright aero-boat.



The new Wright aero-boat, as seen from the side.



THE NEW WRIGHT AERO-BOAT.—Plan, side and front elevation to scale.

(water-cooled), $4\frac{5}{8}$ ins. by $4\frac{1}{2}$ ins. bore and stroke, which drives a pair of propellers by chains in the conventional style. The propellers are placed a little higher in order to clear the water, and a corresponding alteration has been made to the elevator so that it comes level with the line of thrust. A foot throttle as well as a hand lever on the instrument board is provided for controlling the engine. The engine may be started by means of a hand crank situated just behind the seats, or a self-starter can be fitted if desired, whilst provision has been made for the fitting of a silencer. The machine is controlled in the air from either seat by the usual Wright system of levers, whilst the steering of the machine when hydroplaning is facilitated by two paddles mounted on the lower wing tips and operated from the cockpit. No front "blinkers" are employed, and instead of using a piece of string to indicate the machine's attitude, a small flag is carried by a mast in the bow, which, besides serving its useful purpose, adds to the appearance of the aero-boat. The total weight of the machine empty is 1,200 lbs., and the useful load is about 600 lbs. During the past few months Orville Wright has been carrying out some exhaustive tests with one of these aero-boats with entirely satisfactory results, a speed varying from 38 to 60 m.p.h. being obtained with two up. It rises from the water after a run of not more than 200 ft., and it is very stable in high winds.

AUTOMATIC STABILIZERS.

Mr. Henry M. Jullerot, Chief Pilot of the Bristol Flying School, Lark Hill, in drawing our attention to an article from the pen of Capt. Bellenger in the *Bulletin mensuel de l'A.G.Ae.*, says that he agrees with the views therein expressed, and thinks that the majority of pilots will do the same. The following is a translation of the article:—

"It is undeniable that pilots are opposed to the use of automatic stabilizers on aeroplanes, and as they do not usually give any reasons for their opposition, the inventors have good cause for accusing them of hindering progress. And yet the pilots are not far wrong. If they do act thus from prudence nobody will blame them, for although experiments with a badly designed stabilizer may enlighten the inventor as to the defects of his device, they will possibly be carried out at the expense of the aviator's safety.

"But there is another cause other than justified cautiousness for the attitude of the pilots. All the stabilizers which I have seen up to the present have been founded on two hypotheses. Firstly that the conditions for stability of an aeroplane, its position in the air, its speed, &c., are invariable during flight. Secondly that the manœuvres to be carried out to bring the machine back to its stable equilibrium depend solely and directly on the disturbance which occurred during the flight.

"But that is not even all. The conditions for stability of an aeroplane vary every instant with the atmospheric conditions. Having its symmetrical plane vertical, its flight path horizontal, and a constant speed, constitute the stable state of an aeroplane for certain atmospheric conditions only, *i.e.*, absence of wind or the existence of an absolute constant wind in the region where the aeroplane flies. But these atmospheric conditions are absolutely exceptional, and to each variation of these conditions corresponds a variation of the stable equilibrium. Sometimes it is best to bank to the right, sometimes, on the other hand, it is advisable to bank to the left. Sometimes the pilot must fly *cabré* and sometimes he must fly *piqué*, or again it may be advisable to increase the speed or to diminish it, and he constantly has to combine all these manœuvres. In other words, there does not exist a fixed stable equilibrium, but there is one corresponding to each particular atmospheric condition. The making of a pilot consists precisely in developing in him that sense of the air which will, at any instant, make him instinctively choose the best attitude. Up to the present it does not seem that this attitude can be determined by absolute and mathematical rules.

"A lengthy experience has taught me that the proper manœuvre to execute in order to right a machine does not depend directly on the disturbance itself, but more on the cause of the disturbance, so that for two precisely identical attitudes taken by the same machine through different causes, the manœuvre required to right the machine differs also. The word 'remous,' which has often been abused for the purpose of masking our ignorance of the matter itself, serves to denote every variation in the movement of the atmosphere, but these variations may be caused either by obstacles on the ground, by local calorific phenomena, by the electric state of certain regions of the air, or by other causes which the future may reveal, and the required manœuvre varies in each case. How can the inert matter which constitutes the automatic stabilizer discern the difference in causes of the identical phenomena? And it is very often a question of life or death. Only a thinking and intelligent being—one acts more often from intuition than from reflection—can discern the difference and consequently modify the action. A thinking, feeling, acting organ—what is it but man?

"Besides it should be noted that an automatic stabilizer, since it is unable to perceive the cause of the disturbance, and is also unable to foresee or anticipate it, does not begin to work until after the disturbance in the path of the aeroplane has existed for some time. It should begin working beforehand in order to diminish the anticipated effect of the cause, and furnish the maximum of correction before the disturbance has reached its maximum. When a boat approaches a wave, does the pilot wait till his craft is careened by the wave before applying his maximum control? No, he measures with his eye the advancing wave, gives his boat the most favourable position, and does almost all his controlling before reaching the top of the wave, that is to say at the moment when the denivellation—the variation in water level—attains its maximum. The same should be done in the air. But, because the air wave is not visible to the eye, our theorists do not see it, and, having never felt it, they deny the pilot, who does feel it, the right to know better than they themselves what is the matter. They consequently impose upon him the use of instruments which, provided they do not work wrongly, certainly have little effect. The result hereof has moreover been proved experimentally: Recently at Juvisy a machine fitted with an automatic stabilizer was flying simultaneously with other machines not so equipped, and all the eye-witnesses can testify that, although the machine fitted with the stabilizer did not require any control by the pilot, it was tossed about much more than were the other machines. How would it have fared in a gale?

"If it is advisable to give the aeroplane such a form that it flies normally in a position which is comfortable for the pilot—with the head upwards most of the time—it is indispensable to leave all the control organs at the disposal of the pilot exclusively.

"Finally, the start and especially the landing involve very delicate manœuvres when the conditions for the equilibrium of the machine, as it changes its means of support, alter radically and rapidly. These manœuvres demand a certain judgment: it is a matter of importance, it will be agreed, whether the flight path becomes parallel to the ground at 10 centimetres or at 10 metres, or that the path of flight meets the ground before becoming parallel to it; and it will also be agreed that the most favourable moment for flattening out is of very short duration in aeroplanes travelling at a speed of 20, 30 or 50 metres per second. Also, and precisely on account of the lack of sentience, the automatic stabilizers must be disconnected when in the vicinity of the ground.

"Also when the machine is far from the ground, and when its attitude is of more consequence for the comfort than for the safety of the pilot—perhaps even for Pegoud, although he finds it very comfortable to fly head down—the most tangible effect of the automatic stabilizer is to increase the fatigue of the pilot and the machine by enlarging the disturbances. When close to the ground—that is to say, when the attitude of the machine is of vital importance—the stabilizer must be disconnected.

"Why then be bothered with such impedimenta? The management of an aeroplane is not a purely mechanical problem, the fixed principles of which allow of attributing an invariable and automatic solution; it is an ever-changing struggle with a very capricious and changeable element—the air; and to follow such an opponent in his feints and tricks requires more than raw material, it requires an organ with alert intelligence, supple and quick, with instantaneous decision—it requires a pilot."

"The Stability of Aeroplanes"

Is the subject of the next lecture before the Aeronautical Society. It will be given by Mr. Leonard Bairstow, A.R.C.S., at the Royal United Service Institution, on Wednesday next, at 8.30 p.m. Sir Alfred Keogh, K.C.B., F.R.S., will preside, and the lecture will be illustrated by experiments with model gliders.

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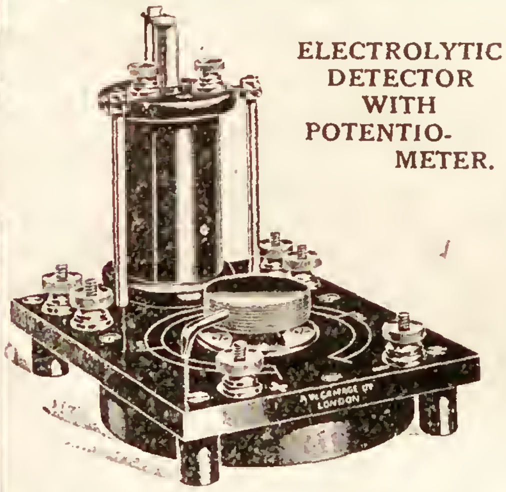

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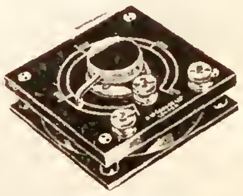

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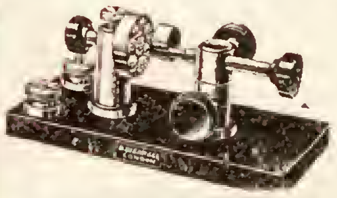

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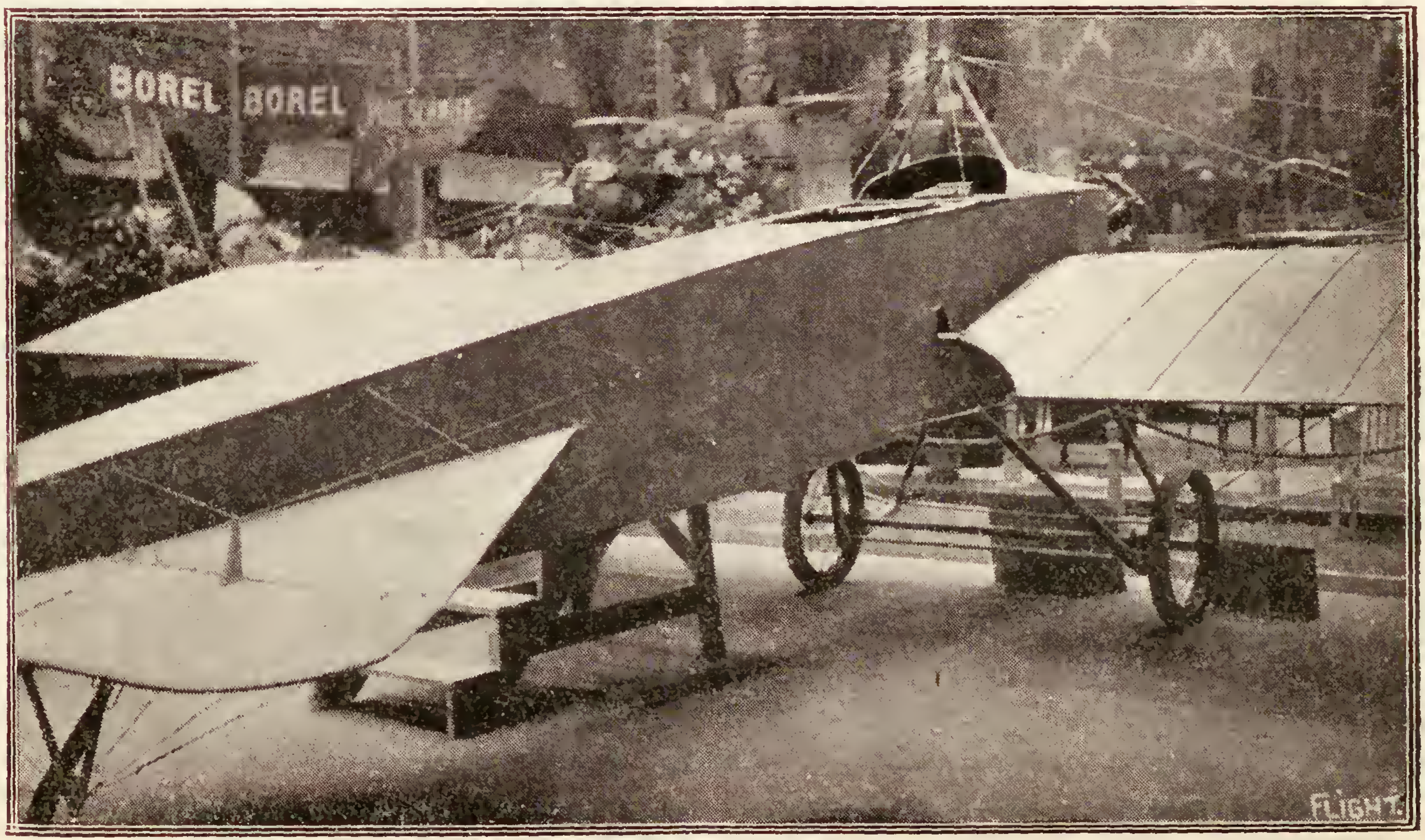
SIXTH ARTICLE.

RATMANOFF AND DE BEER.

On the Ratmanoff stand were to be seen two monoplanes, one of which was a Ratmanoff school type monoplane. It is fitted with a 45 h.p. Anzani engine, and the machine itself is built on quite orthodox lines. There is nothing remarkable about the machine, and it is simply a straightforward well-built machine for all-round work, and is sold at the reasonable price of £600. The other machine



De Beer monoplane.

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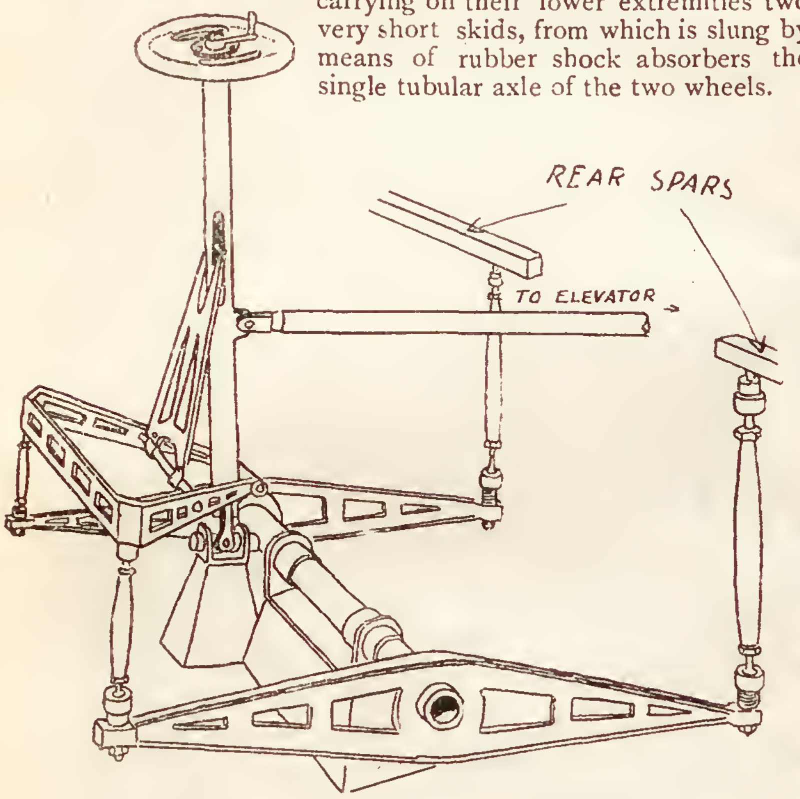
exhibited on this stand has been built by Mons. Ratmanoff to the designs of M. De Beer, and is chiefly interesting on account of the provision made for altering the angle of incidence while the machine is in flight. It is driven by an 80 h.p. Anzani engine, mounted on overhung bearings in the front portion of the *fuselage*. This is of rectangular section, and built up in the usual way of four *longerons* of ash, connected by struts and cross-members of spruce. The chassis is of a very simple type, and consists of two pairs of ash struts carrying on their lower extremities two very short skids, from which is slung by means of rubber shock absorbers the single tubular axle of the two wheels.



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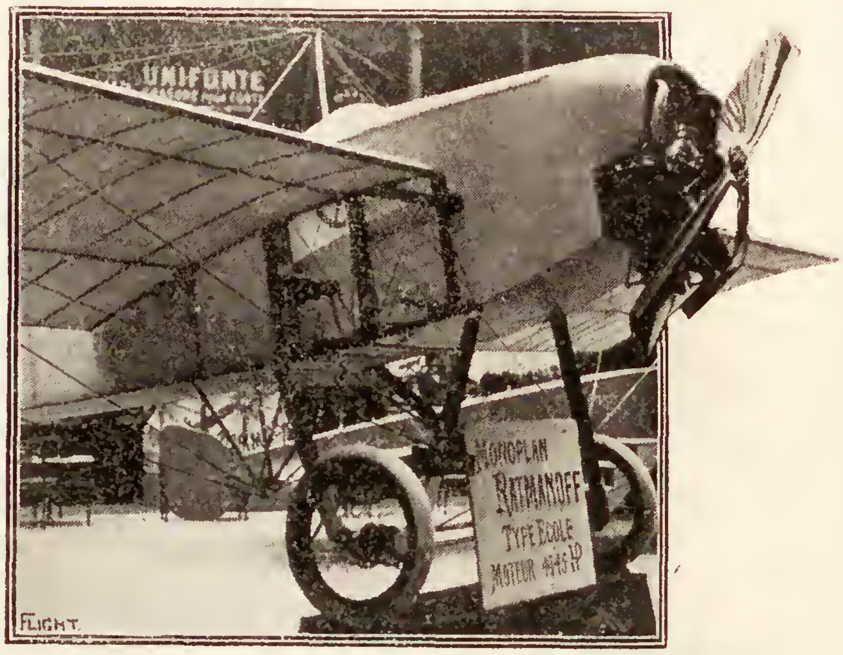
Diagrammatic sketch of the de Beer controls.

Inside the *fuselage* is the pilot's seat, from where he controls the machine by means of the control lever shown in one of the accompanying sketches. The main planes pivot round the front spar, which consists of a steel tube running right through from tip to tip, and is mounted on the *fuselage*. The two rear spars project slightly inside the *fuselage* covering, where they are secured to the system of control levers by which the angle of incidence is altered. By pulling the control lever back, the angle of incidence is increased, thus giving greater lift and causing the machine to climb, while a forward movement of the column decreases the angle of incidence, thereby causing it to descend. A side to side movement increases the angle of incidence of one wing and decreases the angle of incidence of the other, so that this operation takes the place of the warp. The elevator is connected up to the control lever, and works in conjunction with the main planes.

One point in the construction of this arrangement is open to criticism: the two rear spars are simply cut off just inside the *fuselage* covering, and no provision has been made for taking the compression due to the drift, which consequently has to be taken entirely by the bracing cables of the front spar. Otherwise the system appears to be quite good, although the desired object might be obtained in a somewhat simpler way.



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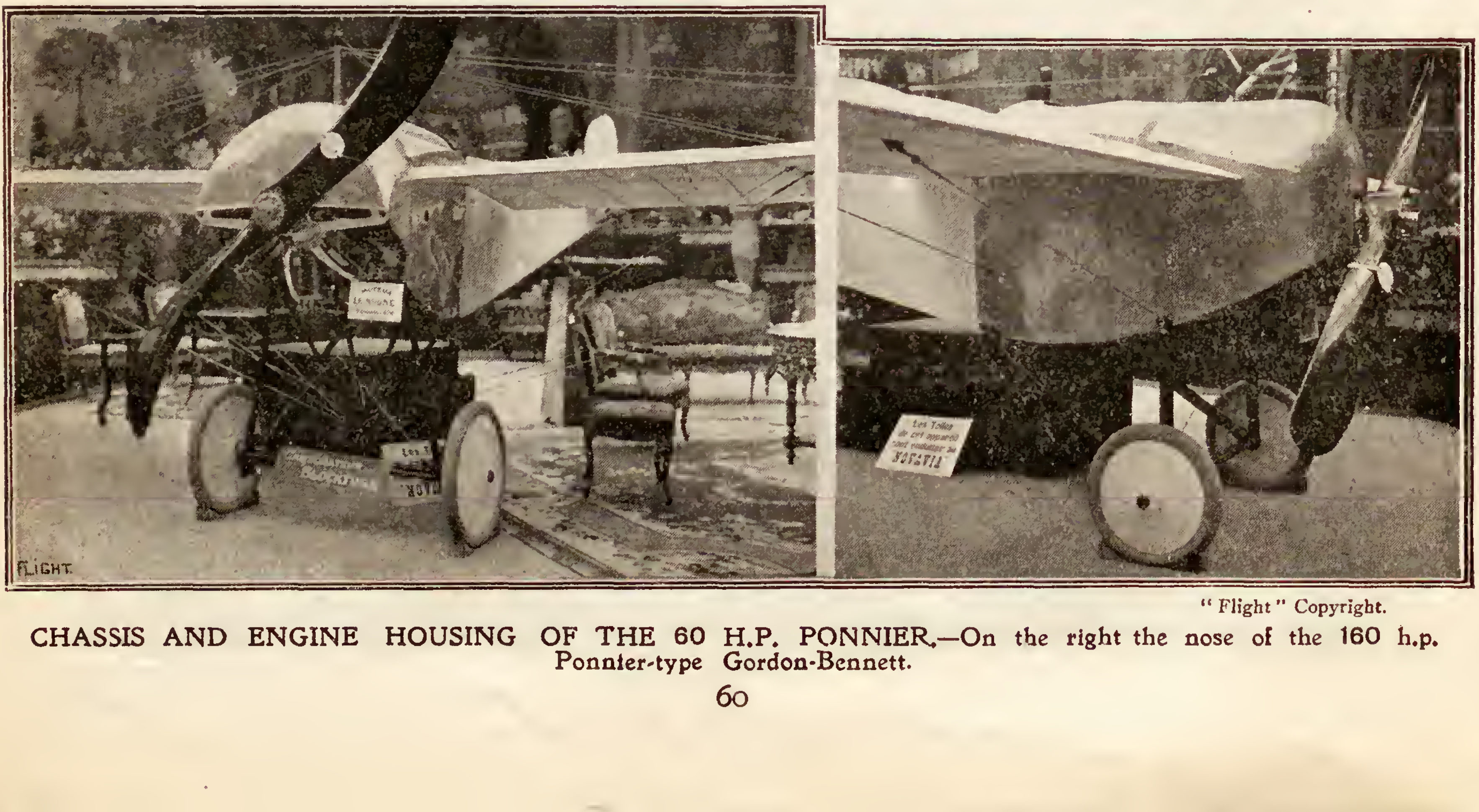
The Ratmanoff monoplane.

PONNIER.

The two Ponnier monoplanes exhibited were evidently built for speed, one of them being similar to the monoplane flown by Emile Vedrines in the Gordon-Bennett race. This machine was fitted with a 160 h.p. Gnome engine, carried between double bearings, of which the front one was easily detachable. The chassis had been reduced to its simplest possible form, consisting of two pairs of V struts of streamlined steel tubes, carrying a single axle on which are mounted the wheels. No provision whatever had been made for springing these, so that the machine must be very tricky to land on anything but the smoothest of surfaces.



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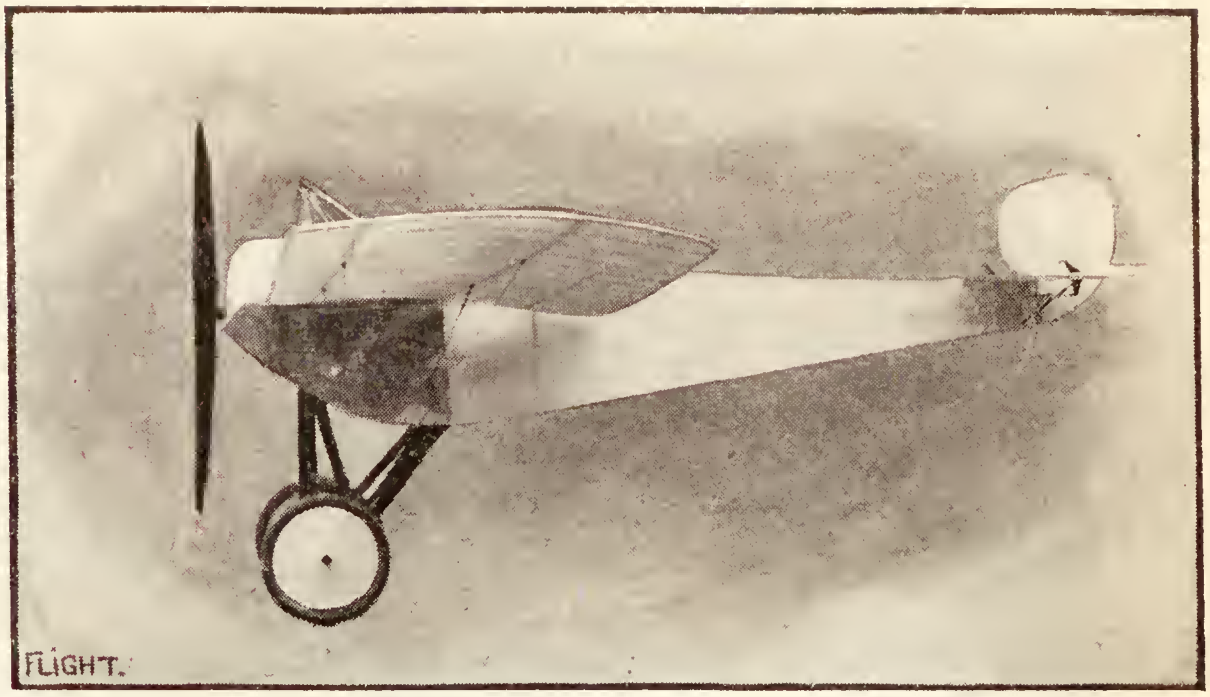
CHASSIS AND ENGINE HOUSING OF THE 60 H.P. PONNIER.—On the right the nose of the 160 h.p. Ponnier-type Gordon-Bennett.



The 60 h.p. Ponnier monoplane. "Flight" Copyright.

The other machine, which was similar in general lines, was fitted with wings of much bigger span, and the chassis was of a more useful type, the wheels being sprung in the usual way by rubber shock absorbers.

Constructionally the two machines consisted of a very deep *fuselage* built up of four *longerons* of ash, connected by struts and cross-members of spruce.

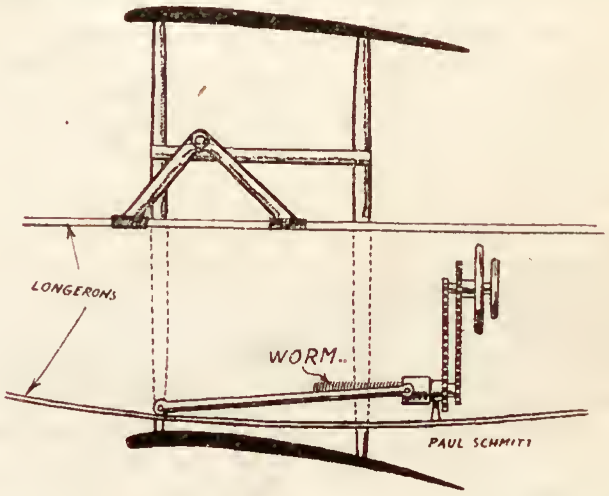
The method of joining these to the *longerons* was such that the *longerons* are not weakened by piercing. The tail planes are built up of steel tubes.

The upper stay-wires of the wings were attached to the top of a triangular pyramid in such a manner that they could be quickly dismantled, and the lower lift-wires were secured to a quadrangular pyramid, which was independent of the landing chassis. Control was effected by a single hand-lever for warp and elevator, and a foot-bar for the rudder. One gathers that in the future the Ponnier monoplanes will probably be built of steel throughout, so that this firm must now be added to the ever-increasing list of aeroplane manufacturers who favour steel as a material for aeroplane construction in preference to wood.

PAUL SCHMITT.

On the same stand as the Morane-Saulnier monoplanes, but forming a separate exhibit, was the Paul Schmitt biplane, the most interesting feature of which was the provision made for altering the angle of incidence. This machine, which was built of steel throughout, was fitted with a 14-cyl. 160 h.p. Gnome engine, mounted on double bearings in the front of the *fuselage*. The *fuselage*, which was built up of steel tubes, was of rectangular section in the front portion, gradually tapering to a triangular section at the rear. In front of the main planes was a very roomy cockpit containing the passengers' seats, which were placed side by side. Access to this cockpit was gained through a door in the side of the *fuselage*, and the spacious cockpit reminded one more of a motor car than of an aeroplane. The pilot's seat was situated out behind the main planes, and in front of him were the two wheels by means of which the angle of incidence could be altered while the machine is in flight, as well as the ordinary control levers, which consist of a single central lever for *ailerons* and elevator, and a pivoted foot-bar for the rudder. It is, perhaps, a debatable point whether it is of any great advantage to be able to vary the angle of incidence during flight, and practical tests of this machine will therefore be of great interest. From the accompanying diagrammatic sketch the principle of the system employed for varying the angle of incidence will be easily understood, and the method of carrying it out appears to be a mechanically sound piece of work.

The range of variation in the angle of incidence is from 0 to 12 degrees, and the wings may be moved through that arc in the space of a few seconds. By increasing the angle of incidence and at the same time throttling down the engine, the minimum speed is obtained, while decreasing the angle of incidence and opening out the throttle increases the speed of the machine. The chassis, which was built up of steel tubes throughout, was of the wheel and skid type, the four wheels being carried on a single axle sprung from the skids in the usual way by means of rubber shock absorbers. The tail planes consist of a large balanced elevator and a divided rudder, no fixed tail plane being fitted. A pivoted tail skid protects the tail planes against contact with the ground.



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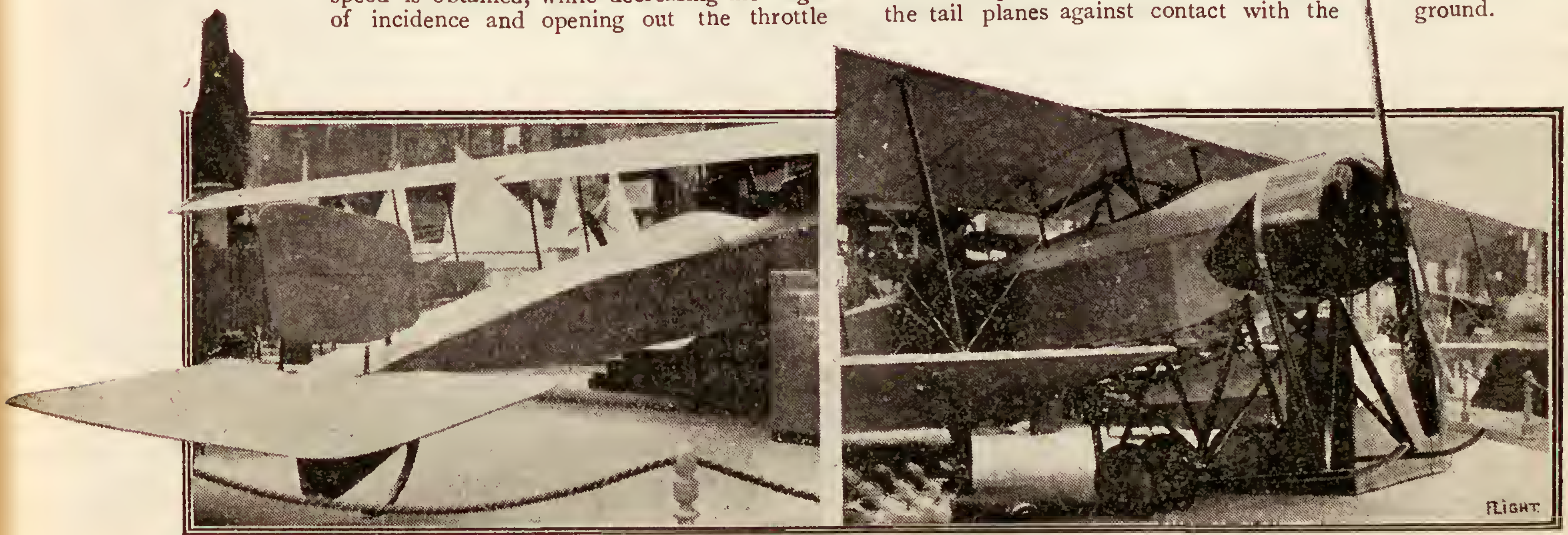
Diagrammatic sketch showing method of altering the angle of incidence in the Paul Schmitt biplane.



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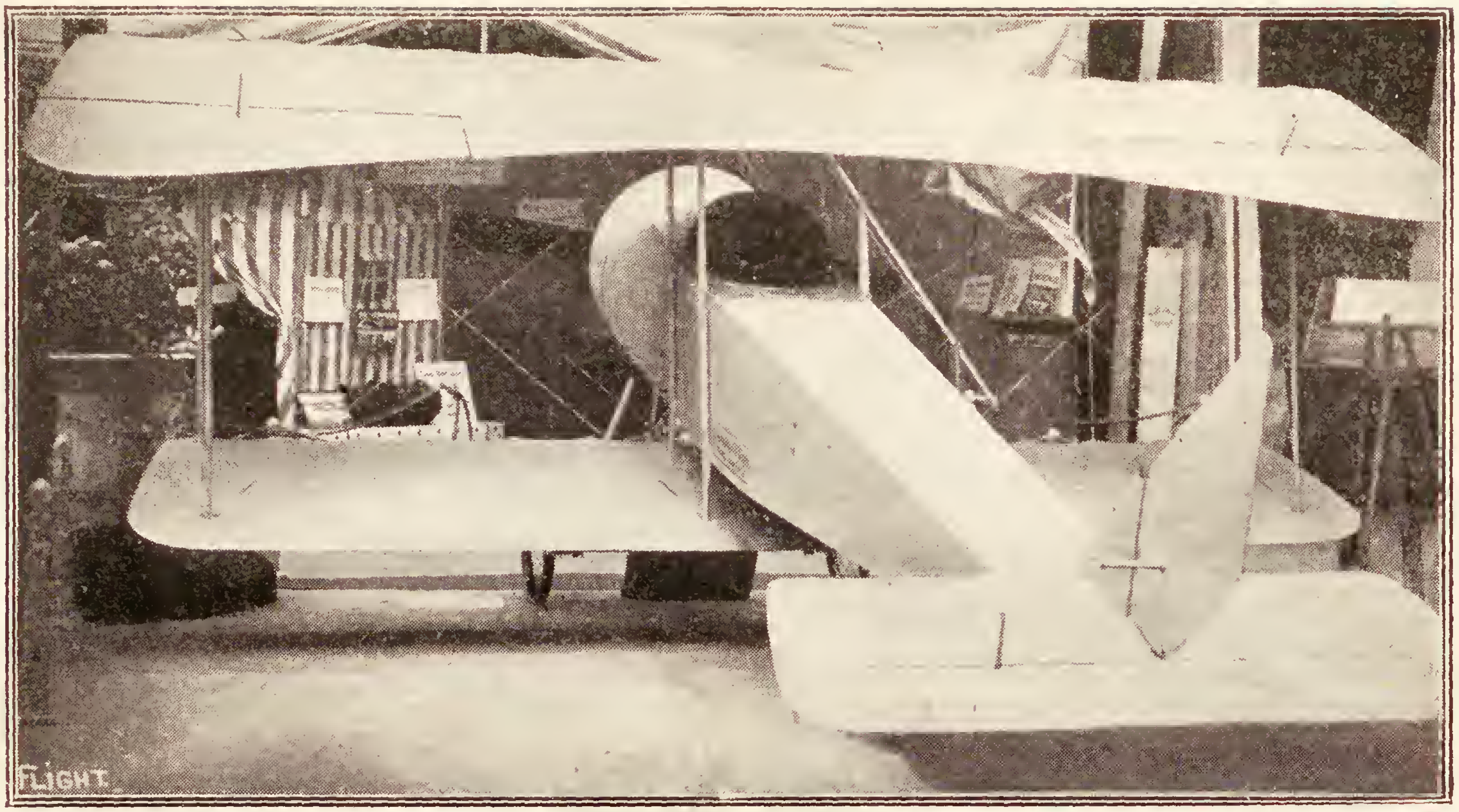
THE PAUL SCHMITT BIPLANE.—On the left are seen the tail planes.

GOUPY.

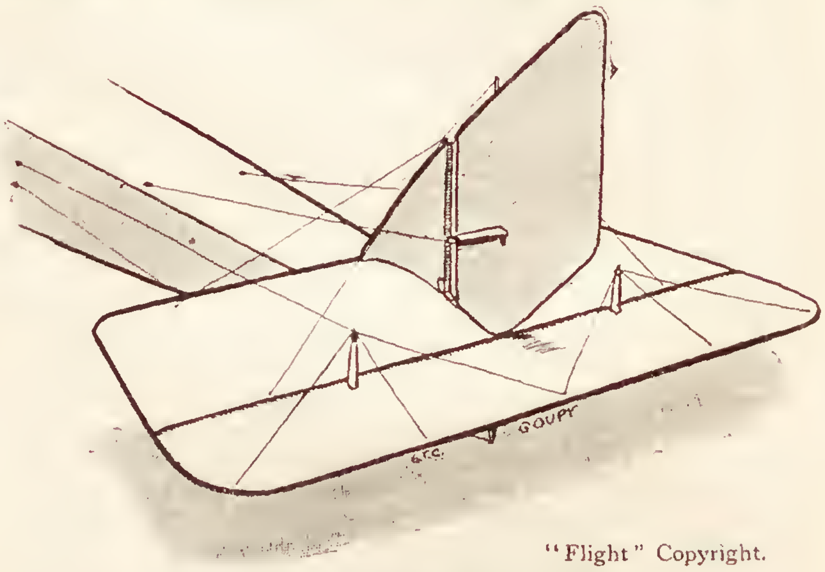


The Goupy single-seater. "Flight" Copyright.

It was a little disappointing, especially in view of the fact that at one time these machines seemed to be full of promise and did some fine performances, to find that the Goupy firm was among the very few firms who apparently had made no progress since the previous Paris Show, when, it will be recalled, a three-seated hydro-aeroplane was exhibited.

Of the two Goupy machines on view, one was a three-seater biplane with the seats arranged one behind the other. It had the usual staggered Goupy planes, but *ailerons* have been fitted instead of the pivoted wing-tips formerly employed on these machines. The engine, a 9-cyl. 100 h.p. Gnome, was mounted on overhung bearings in the nose of the *fuselage*. The chassis, which was of the wheel and skid type, did not look any too strong for its work, and could, one would think, easily be improved.

The other machine shown was a small biplane of almost ridiculously small span. In its general appearance it was very similar to the three-seater, but it was, of course, very much smaller. It was driven by an 80 h.p. Gnome engine, mounted on similar bearings to those of the big machine, the cowl covering it being shaped to form the nose of the *fuselage*.



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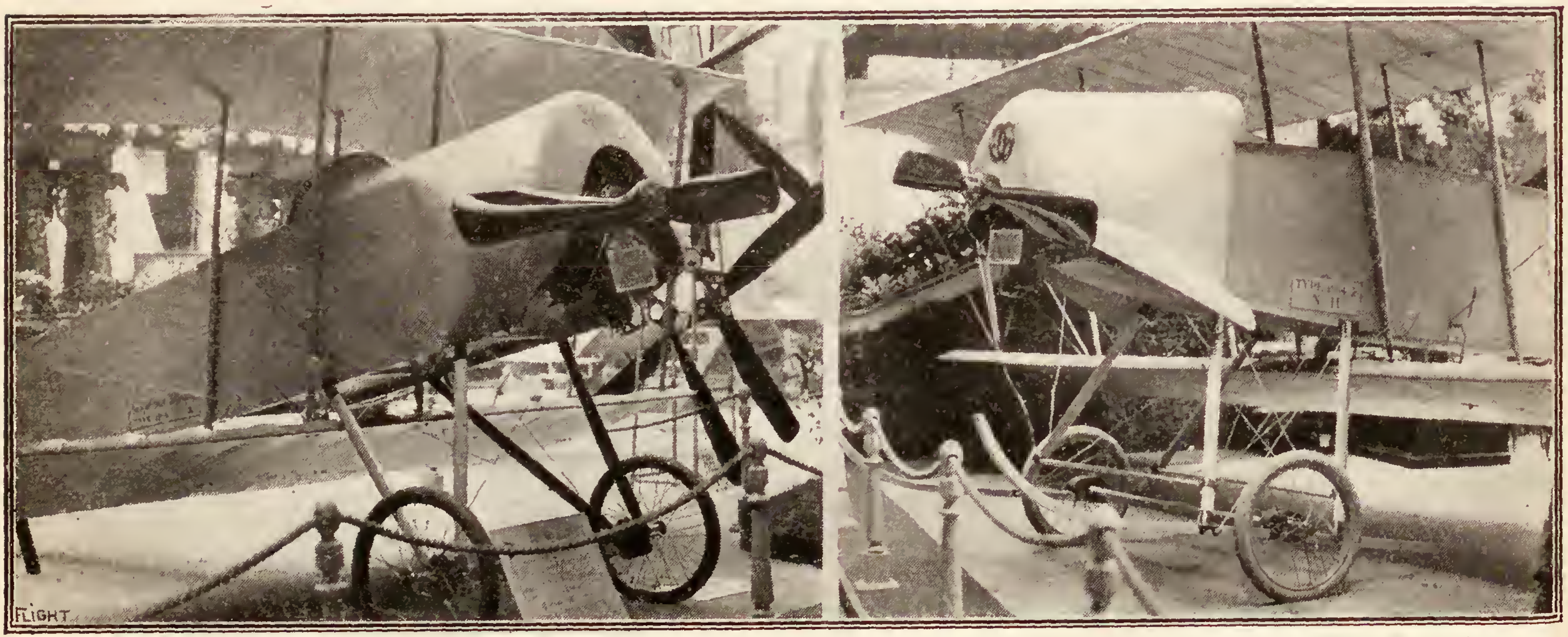
Tail planes of the Goupy biplane.



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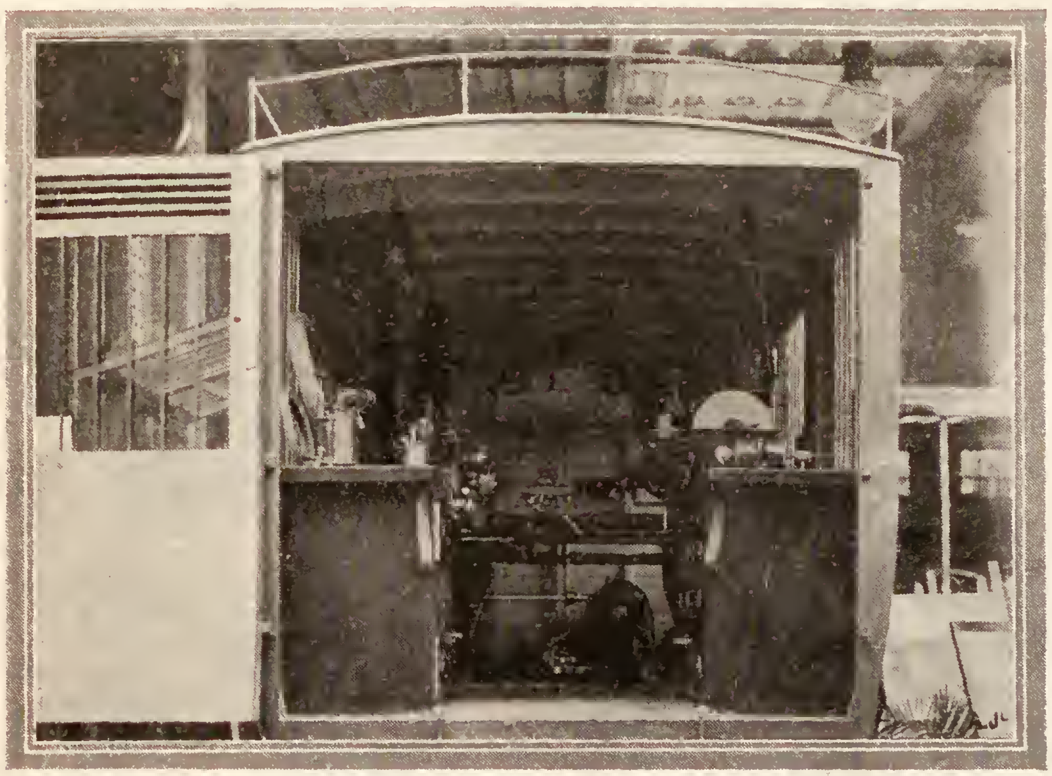
CHASSIS AND ENGINE MOUNTING OF THE GOUPY SINGLE-SEATER.—On the right the tandem-seater Goupy biplane.

THE BRISTOL REPAIR WAGON AT THE PARIS SALON.

WITH the increased use of the aeroplane for military purposes, the repair wagon, with its necessary outfit of machinery, and its staff of mechanics, becomes an absolute necessity, and quite one of the best we have seen so far is that of the British and Colonial Aeroplane Co., Ltd., exhibited at the Paris Salon. Its motor is one of 30–35 h.p., and it was built entirely by the Company themselves at their works in Bristol, and ran the land portion of the journey to Paris under its own power, giving not the slightest trouble on the way. Driven direct from the engine is a generator which provides the power to drive all the machinery and provide the inside and outside lighting, though when not running the lighting system, which is a Lucas, may be run off accumulators fitted in a most convenient and get-at-able place in the interior of the van.



The Bristol field service repair wagon for aircraft, seen at the Paris Salon.

Quite a feature of this workshop is that the whole of the machinery can be kept running whilst the wagon is travelling on the road at a speed of six to eight m.p.h., which speed, it has been found, is about the limit that can be attained when work is in progress, taking into consideration that men working at the machines must not be jolted about too much.

Every machine is fitted with its own motor, and is governed by an independent cut-out, so that it is impossible to switch on the current at the main switchboard with any of the machines under load.

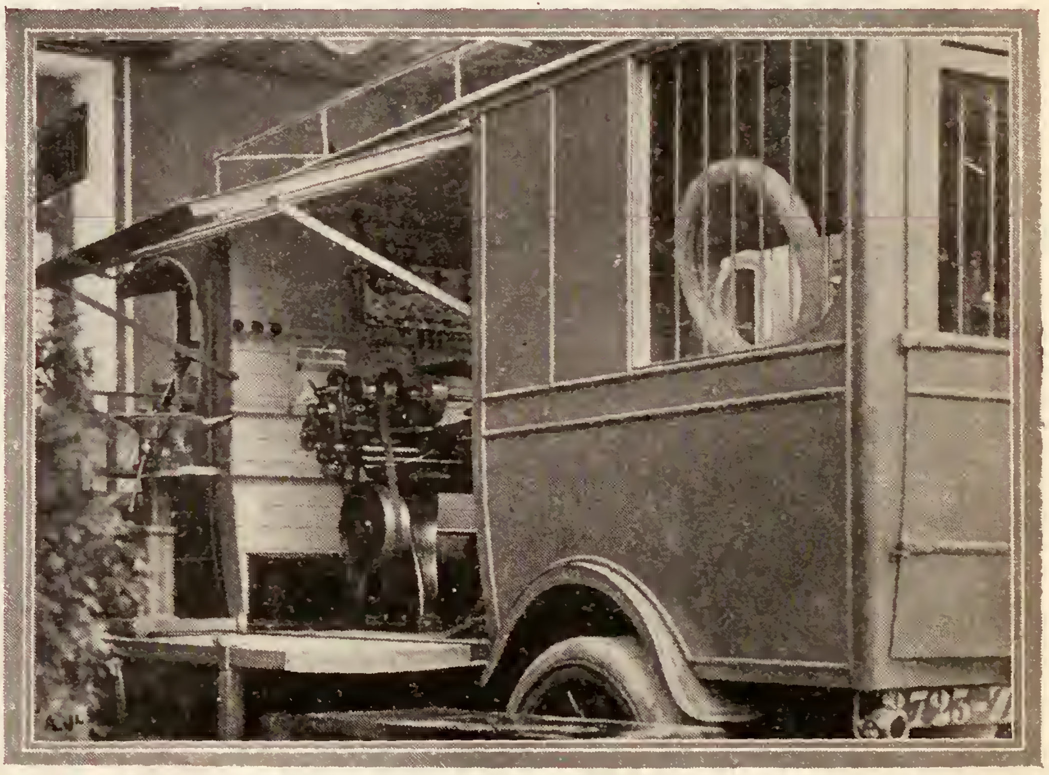
The machines comprise a lathe, bandsaw, drilling machine, electric hand-drilling machine, which is portable and can be taken outside the van at the end of a good length of flexible cord, hand-shaping machine, grind stone, fitters' and carpenters' benches, with vices and tools, fitters' furnace and anvil, together with all tool chests and drawers, fitted out with partitions for spare parts. Under the chassis, at the back of the van, is a very fine winding gear, which can be used whether the van is travelling or not. It is of great power, and is capable of pulling the entire van out of a ditch or soft earth should the wheels sink in, and if an anchorage can be found to fix the end of the cable to. Both sides of the van are half-glass, and are divided at the forward half, so that the bottom may be let down to form a platform, whilst the upper half goes up to form a roof, thus greatly increasing the available working space when the van is stationary. The petrol capacity is 40 gallons. Total weight with all machines and tools on board is about 6½ tons; speed 12 to 15 m.p.h. The motor is fitted with an automatic governor, which cuts out at 900 revs. The price of the vehicle complete is £1,500, which, considering the amount of machinery included, is remarkably inexpensive.

Subsequent to the Show, the vehicle returned under its own power, so far as the land portion of the journey was concerned, to Bristol and the following "log" of the trip gives some details as to the behaviour of the wagon on the road:—

"We left the Grande Palais at 5.15 p.m. on Saturday (December 27th), and proceeded *via* the Champs Elysees to the main road to Saint-Germain-en-Laye. No difficulty whatever was experienced in driving the wagon through the streets, which at that time were crowded with motors vehicles of every description. The road for some eight miles after leaving the Porte Maillot, was in a very bad state of repair, it being practically full of holes six and even eight inches deep and about a foot square, but thanks to the excellent suspension of the wagon, no undue vibration or shock was felt.

"The town of Saint-Germain-en-Laye (famous for the architecture of its castle and church) was soon reached, and here the wagon was garaged for the night, it being our intention to start away at daybreak the following morning and complete the journey to Le Tréport the same day. This, however, proved to be impossible, as at 6.30 a.m. on Sunday, the muddy roads of the previous evening were carpeted with snow to a depth of three inches, the snow still falling. A start was, however, made at 6.45 a.m., but it was soon apparent that to proceed would have been decidedly dangerous, as it was impossible to distinguish the road from the ditch, and the attempt for that day was therefore abandoned. The weather did not improve during Sunday, and when the snow ceased falling at midday, it commenced to freeze, and at 8 a.m. on Monday, the snow was quite hard and showed no signs of clearing away.

"We again left Saint-Germain, and proceeded through the magnificent St. Germain Forest, where the trees, thickly covered with snow, were a very impressive sight. We soon arrived at the town of Pontoise, where we found that for a few miles the roads had been cleared by snow ploughs, but this impeded rather than facilitated our progress on account of the ploughs only clearing a narrow passage of about three feet, with the result that the wheels of the wagon were running through the banks of snow nearly a foot deep caused by the plough.



A side view of the Bristol Co.'s field service repair wagon for aircraft at the Paris Salon.

"Passing through the village of Méru, we were soon on the way to Beauvais, a historical town of considerable size and importance, and the journey then proceeded without incident through Marseilles-le-Petit to Grandvilliers. The road between Méru and Grandvilliers was exceptionally hilly, as was in fact the whole journey, but this particular section contained a hill fully two miles long in the form of a double 'S,' on which the frozen snow did not provide the best surface for the wheels to grip. In several places we ran into snow drifts nearly two feet deep, but the wagon steadily made its way through these.

"The night was spent at Grandvilliers, and on Tuesday morning we started from there at 8 a.m., arriving at Aumale at 9.15 a.m. where we picked up the River Bresle, which was followed through Gamaches and Eu, until Le Tréport was reached.

"The wagon was put on board the boat for London on Wednesday, arriving in England on Saturday morning, and the road journey from London to Bristol was accomplished without incident. The average speed of the motor wagon on the French roads was 12 miles per hour, which was a very creditable performance, considering the state of the roads and the heavy running occasioned by the several snowstorms. The 35 h.p. motor worked splendidly throughout the run, and, to sum up, this travelling motor workshop is excellent testimonial to the quality of the construction at the Brislington shops of the Bristol Co."

Reading from left to right, top row: Lieut. E. D. M. Robertson, R.N., Lieut. C. E. R. Bridson, Sub-Lieut. G. R. Bromet, R.N.
Middle row: 2nd Lieut. G. H. Broadhurst, R.F.A., Sub-Lieut. F. G. Saunders, R.N.V.R. (who on January 1st was first to take his ticket at Brooklands under new tests), Mr. Ian C. Macdonell.
Bottom row: Mr. J. L. Finney and Mr. Don, R.N.
Some pilots who have recently passed the qualifying tests for pilots at the Bristol Flying School, at Brooklands under the tuition of Mr. F. Warren Merriam. Altogether Mr. Merriam has now put through nearly 100 pupils, most of them being army and navy candidates, and without a single accident which could be really called serious. In regard to his own mishaps, about the only one Mr. Merriam has had during his work at Brooklands was when he took his turn at the Sewage Farm, owing to his engine petering out.

EDDIES.

The persistent bad luck attending Count Zeppelin and his airships, has in no way discouraged the German authorities, and more ships are to be built. The engineers and workmen in the Friedrichshafen factory on lake Constance, are busy constructing five more Zeppelins of various sizes, all of which must be ready by April next. Two of these are intended for the army and two for the navy, the fifth will remain at Friedrichshafen for experimental purposes and passenger carrying. Whether airships will or will not be of such great service as anticipated in any coming warfare remains to be proved, but one cannot help admiring the pluck and persistency shown by the German nation in the face of terrible misfortune.

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The Navy have a way of getting hold of good pilots, somehow, and I was reminded of this when I saw that Rainey—or Lieut. Rainey, as I suppose I must call him now—put up his record climb last week; 1,200 feet in 58 seconds with "all aboard"; but then, everybody who saw Rainey at Eastbourne knows Rainey. I have read somewhere that the best way to disable airships will be to get a pilot on a monoplane to fly right into one. It went on to say that of course this meant destruction to the pilot, but that we should have no trouble to find men to do it. Just so! If Rainey is anywhere about just then—well, I know Rainey.

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It's a pity aviation cannot boast a few more sportsmen like Frank McClean in its ranks. Possessed of a fair share of the stuff that makes the world go round, and with a huge interest in all that pertains to aviation, either in his own interests or the interests of others, he has probably done more for the advancement of flying than any other single individual. In the very early days he obtained possession of a large tract of land in Sheppey, round about Eastchurch, which he made over to the Royal Aero Club at a mere peppercorn rent as a practice ground. It would not be wrong either, I think, to call him the father of the Navy flyers, for he it was who at his own expense bought and placed machines at the disposal of the Admiralty to enable the first quartette of naval pupils to be trained at Eastchurch, when the Navy had not a single machine for them to learn on.

A very reticent man, so far as his own good deeds are concerned, he has done more for aviation than most people are aware of, and there is not much doubt that his recent flight up the Nile is as much in the interests of other people as for his own pleasure; nor must we forget his sister, who is frequently his passenger and companion when flying. The enthusiastic private owner is the man for aviation—would to goodness we had more like him.

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The capabilities of the pretty little Caudron biplane are just now being shown to advantage in New Zealand, by the flying of J. W. H. Scotland, who it will be remembered came to England to learn flying at the Hall school at Hendon. He took his ticket in good style, and even in his pupil days showed every promise of becoming a first-class pilot; which promise he now appears to be fulfilling. Being in the lucky position of being able to purchase his own machine, he very wisely chose the make on which he learned, and ordered through Ewen, a Caudron, which was built for him by Hewlett and Blondeau, and was everything that he could wish. A good pilot on a good machine, in a country where flying exhibitions are none too plentiful, he should have little difficulty in getting plenty of engagements, which I am sure he will carry out to the satisfaction of all concerned, not excluding himself.

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There are some things we can do better in England than on the Continent, even in aviation: we don't allow aviators to fly over London, and I am glad of it! I don't at all like the idea that an aeroplane might drop on my head through the roof as I sit writing these notes. Gibert has just had a little mishap whilst flying over Paris, and landed on the roof of a factory. The paper states that no harm was done, except to the roof, and the machine, but wait a bit! I remember once reading about a lady who brought an action—and won it too, for being *nearly* run over by a taxicab. The cab did not really touch her, but it was being driven to the common danger, and the lady fell, and claimed damages for shock to the system, or intellectual and moral damage, or something of that sort. It's all very well for the pilot to appear at the door smoking a cigarette, and no doubt the roof and the machine can be repaired without much expense, but it is distinctly disquieting to the nerves, even of a factory girl, to have a ton or so of aeroplane suddenly appear through the roof to the accompaniment of a shower of falling tiles. Suppose he missed the roof and fell on a motor 'bus?

Shock to the system

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Although I write these notes every week, I know nothing about aeroplanes, as you may already have guessed, in which case this little apology will be unnecessary. I see that yet another inventor is on the track of the uncapsizable aeroplane; in fact he goes further, according to the *Daily Express*, and claims that he has already invented one that cannot capsize. You know, I really ought by rights to be a millionaire now, because almost everything that has been invented, and has brought fortune to its inventor, I had thought of before, and had seen nothing in it; you have probably noticed this yourself. You remember, of course, when you used to wrestle with your collar stud, you knew perfectly well that if the head would only take off, you could get it through much easier—but who bothers with these things? Well, to get back to aeroplanes. This gentleman says he has found that if the stress is put on the undercarriage, and the weight on the wings during flight, the aeroplane will be uncapsizable. There! and I had thought that this was being done all the time—Ah! me; when SHALL I wake up?

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Several papers have been commenting extensively on the expressions of dissatisfaction made by Mr. B. C. Hucks at Moortown, Leeds.

When Pegoud first looped the loop in this country, I took up the position that it was of the utmost importance to aviation from a scientific point of view, but that as a circus performance there was not much in it, and I have seen no reason to alter my opinion since. At the same time there is sufficient of the thrill in it, to make it inevitable that some pilots would take it up as a show performance, though I think one and all have defended it from the scientific side. This being so, it is a pity Hucks should have so far forgotten himself as to give vent to his feelings as he did. I can quite understand his annoyance in the matter, but it is sometimes better to think a lot and say nothing. Looping the loop must, I think, be taken as representing the march of progress in aviation, which cannot be stayed, at the same time it will go far to make the ordinary spectator become *blasé* rather too quickly with regard to exhibition flying. Hamel seems intent on knocking the bottom out of the whole thing as a special stunt, seeing that he now does it as part of his regular flying, almost every time he goes up. The point is, one can't have one's apple and eat it, and looping the loop will have to, in fact has already, become part and parcel of ordinary flying. It is useless to grumble about people staying outside to see it because it has to be done at such an altitude, that looking the matter squarely in the face, and taking human nature as human nature, there will always be a section of the public who will not pay to see what they can see for nothing. There is probably only one aerodrome in the world where one must pay, or see not, and that is Brooklands, hence the huge crowds to see Pegoud.

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Upside down Skating——?

What has become of the bard of Hendon? I haven't seen any of his verses since he made Hamel fly over the moon to the tune of the fiddle. Perhaps the cold weather is keeping him in his sanctum, where he is getting something ready to startle us with in the coming season; anyway, he will have to look to his laurels, because another aviation poet laureate has taken the field. I read the following in *Lloyd's* this week, and incidentally the poet got five shillings for writing it, whereas our Hendon friend publishes his free, for the benefit of mankind generally :—

"Bertie bought a pair of skates, an aviator he;
Exclaimed, 'I conquered A.I.R. so why not I.C.E.?'
He glided off so smoothly, quite thought he'd got the knack,
But cried 'Good Gustav Hamel!' as he volplaned on his back.
Then he tried a sort of spiral, and gave one awful 'Whoop!'
As the chap in front of him collapsed, and Bertie looped the loop.
They brought him round with brandy and took him to the shore,
And as they gently bore him home he murmured 'Nevermore!'."

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The little slip made in last week's FLIGHT, when the wrong inscription (as given by a photographic agency who supplied the photograph, and whose reputation is such that pictures are hardly glanced at for correcting purposes) was placed under the picture of Mr. Gustav Hamel and Miss Trehawke Davies, was noticed when the first copy came from the press, and was instantly corrected. Even so, some few copies were already printed, such is the productive power of modern machinery. We thank those readers who have written pointing out the error, and seeing that we must have had one letter for every two copies wrongly printed, it shows the interest our readers take in their favourite journal, and how keen they are that nothing wrong should be placed on record. The machine was, of course, a Blériot, and the block was only inserted in that number to give readers a picture of Mr. Hamel and Miss Davies together.

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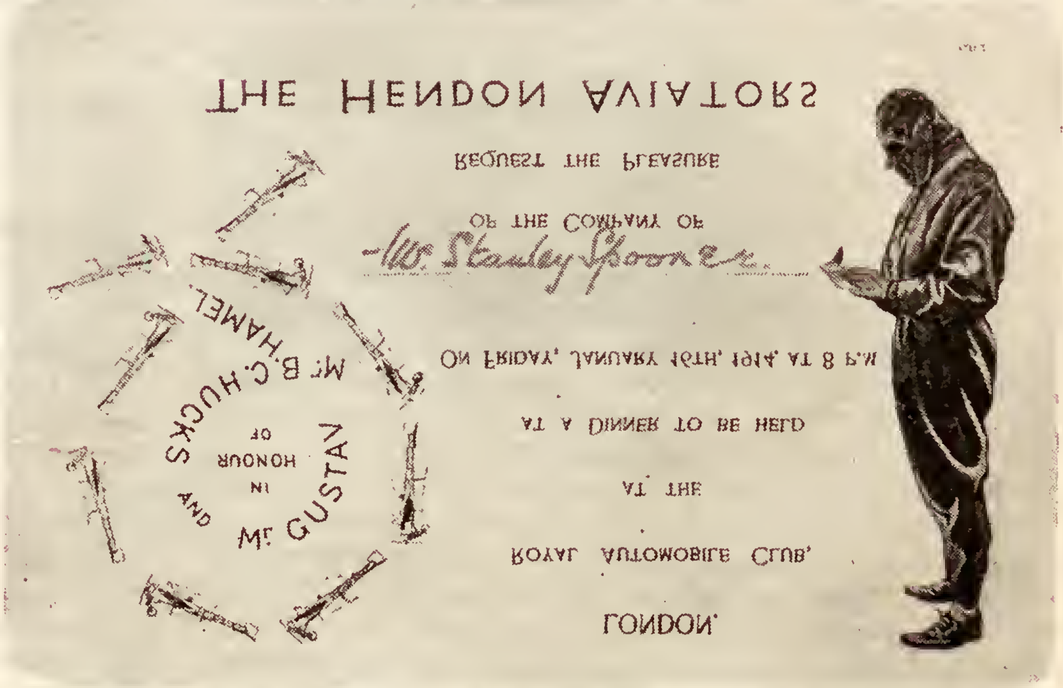
Writing as I do before the event, my first thought is that I should like to be present at the upside-down dinner given to Mr. Hucks and Mr. Hamel at the Royal Automobile Club on Friday. I think it would be very interesting. Everything—almost—is going to be done backwards. "Gentlemen, you may smoke" will be the first item, and soup the last. Mr. Hamel and Mr. Hucks will respond to the toasts of their health before they have been proposed. In fact, everything is going to be topsy-turvy. If the thing is going to be carried out to the letter, there will certainly be some fun. I can imagine, for instance, that they will arrive in their respective cars driving on the reverse. That they will climb the grand staircase backwards, and enter the room on their heads. If there is any real upside-down work to be done, it is possible that it had better be done early in the evening, because when one plays practical jokes with one's inside, things might not be so comfortable later. Of course, it is impossible to carry the thing out properly, after the style we are used to seeing when a film is run backwards, otherwise, it would be most entertaining.

In that case the thing would start with the morning headache, and travel backward through a restless night. The evening-dress suit would pick itself up from various parts of the room and clothe the figure, and the whole thing would be great. I see the tables are going to have legs screwed on above the cloth, and mirrors will be placed so that all will appear to be reversed. No! on second thoughts I am glad I am not going to be present. Sometimes at these dinners, where all goes with a merry swing, it is quite bad enough to get things to look right way up when they are, goodness knows what the effect will be under these conditions. "WILL O' THE WISP."



THE HENDON AVIATORS
REQUEST THE PLEASURE
OF THE COMPANY OF
Mr Stanley Spooner
ON FRIDAY, JANUARY 16TH, 1914, AT 8 P.M.
AT A DINNER TO BE HELD
AT THE
ROYAL AUTOMOBILE CLUB,
LONDON.

Mr B.C. HUCKS AND Mr GUSTAV HAMEL
IN HONOUR OF

The invitation card to the "Upside-Down Dinner" at which no ladies were present.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Monday and Tuesday last week no Naval flying.

Wednesday, Commander Samson making some fine flights on S. 3 80 h.p Gnome in the afternoon. Capt. Courtney instructing on the school machine S. 2 50 h.p. Gnome. Lieut. Osmond, from the Grain Station, flying well on S. 65 80 h.p. Gnome.

Thursday, Lieut. Osmond again up on S. 65, Petty Officer Andrew making a long flight on M. Farman 23, Capt. Courtney instructing on No. 2. While the pilots were up a gale sprang up; though making very bumpy descents, they managed to land without any breakages.

Mr. R. E. B. Hunt, who passed for his *brevet* at the Eastbourne Aviation grounds on December 22nd.

Just before dusk, Friday, Lieut. Davis, R.N., took up S. 65, though the wind was blowing at about 30 m.p.h. After making a couple of very bumpy circuits he landed in a well-chosen spot.

Commander Samson had out No. 3 in the rain and wind, Saturday. Lieut. Davis, on Sopwith 33 80 h.p. Gnome, also in the rain, but flying well at a good height for two or three circuits. In the afternoon there was a lot of flying. Com. Samson on No. 3. Capt. Courtney on Dep. 7 making two fine long and high flights. Lieut. Davis also making high flights on Sopwith 33. Lieut. Osmond on S. 65 had one long trip in the clouds, finishing with a beautiful spiral glide. The M. Farman was up, piloted by P.O. Andrew, making some good flights. Also Leading Seaman Bateman put up a good exhibition on the M. Farman.

Civilian Flying.—On Monday Mr. Gordon Bell was up testing a new Short 100 h.p. Gnome tractor, taking up Mr. C. R. Fairey and Mr. M. Wright. Tuesday he was up again, testing propellers and taking Mr. Fairey up as passenger. Wednesday he was again flying the same machine, taking Mr. Fairey and Mr. M. Wright up together, and the machine behaved grandly with this extra load. Thursday, though an absolute gale was blowing, Mr. Bell again was up, doing some pretty stunt flying, Mr. Fairey again being passenger. In the afternoon Mr. Bell started for the Isle of Grain in hail, rain and wind. While the machine was on the ground there was too much wind for it to answer to the controls, and at a thousand feet it was absolutely unsafe, for even birds were being blown all over the place. Very slow progress was made, as the wind was head all the way, but Mr. Bell persevered and made a safe landing.

Brooklands Aerodrome.

On Monday and Tuesday last week it was too windy for flying.

On Wednesday both the Vickers and Bristol Schools were busy with their respective pupils. Messrs. Barnwell and Elsdon were out on the Blériot monoplane. Herr Roempler made a number of flights on the D.F.W. biplane, both solo and with passengers. The Martinsyde monoplane was flying well. Mr. Alcock was out several times on Mr. Coatalen's Maurice Farman biplane with the 100 h.p. Sunbeam. Capt. Baird and Lieut. Adams came over from Farnborough on a Maurice Farman biplane, returning to Farnborough after a short stay.

The weather was too bad on Thursday for flying.

Mr. Pixton was flying well on Friday on the No. 8 80 h.p. Gnome-Sopwith biplane. Mr. Barnwell made some interesting firing tests with the gun-carrying Vickers biplane with a passenger, the latter controlling the gun.

On Saturday Mr. Merriam was out on the new Bristol School biplane with Mr. Jacques as a passenger. The Martinsyde monoplane was flying well. Mr. Alcock was further testing Mr. Coatalen's Maurice Farman biplane. Herr Roempler was out on the D.F.W. biplane. Mr. Raynham was testing Mr. Davis's 50 h.p. Avro biplane, at the same time giving tuition to Mr. Davis, who afterwards made some good straights solo.

The wind was very strong on Sunday, and only two machines were out—the Martinsyde monoplane, on which the winner of the ballot, Mr. L. C. Tasho, chauffeur to the Daimler Co.'s hire department, Store Street, Tottenham Court Road, London, and the winner of the previous week's ballot, had their flights, and the Sopwith biplane, Mr. Pixton.

Bristol School.—Monday, last week, no flying in morning owing to wind and rain. Merriam made a flight during the afternoon but found weather too bad for tuition. On Tuesday, weather too bad for flying all day.

Halford testing, with Lieut. Pigott as passenger, Wednesday. Afterwards with Lieut. Cull on straights. Merriam gave two flights each to Lieuts. Watkins, Pigott and Cull for circuits and landings, the pupils having full control. Merriam again with same pupils, after which Lieut. Pigott made his first circuit extremely well, landing perfectly. Lieut. Watkins then made his first circuits in fine style. Lieut. Pigott made five circuits, with very good landings, Lieut. Watkins also doing circuits and landing practice. Lieut. Cull then made his first circuit alone, while Lieuts. Watkins and Pigott were doing figures of eight, the latter pupils landing remarkably well. Lieut. Cull on circuits at 300 ft. and Lieuts. Watkins and Pigott making *vol plané* landings from a good height. Lieut. Cull again on circuits, which finished the morning's work. In the afternoon Merriam tested two new machines, then with Lieuts. Palmer and Binney (new pupil) on straights. Lieut. Watkins then went for the first half of his *brevet*, which he succeeded in taking, flying exceedingly well and landing close to observers. Lieut. Pigott doing figures of eight. Halford finished the day's work with a flight at dusk with Air-Mechanic Locker.

Thursday, Halford testing but found wind too strong, after which another test was made. Merriam took Air-Mechanic Locker on several straights, but the wind springing up suddenly prevented further tuition.

All day Friday weather too bad for flying.

Mr. Norman Howarth, who gained his certificate at the Grahame-White School, Hendon, on December 11th.

On Saturday, after the rain ceased, at 9 a.m., Merriam took Lieut. Binney for a high flight, but found the wind rather bad. He took Lieut. Pigott for a straight flight to give him experience in flying in a wind. Halford gave two flights to Lieut. Binney, but the wind was too bad to continue. Tests were made during the afternoon, Merriam taking Mr. Racine Jacques as passenger, but the weather was not good enough for tuition.

Vickers School.—Monday, last week, Barnwell on gun-carrying biplane, with passengers.

Messrs. Elsdon, Barnwell and Knight on biplanes, Wednesday, instruction to Messrs. Crosbie, Creagh, Dawson and Monckton. Mr. Creagh solo. Mr. Webb solo on No. 5 mono.

Thursday, Instructors Knight and Elsdon on biplane with Messrs. Crosbie and Monckton, and Friday, Barnwell testing gun-carrying biplane, with passenger.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—The weather was very bad nearly all last week for pupils, but on Wednesday Messrs. Norris, Carr, Cripps, and Lillywhite made solo circuits, and Mr. Parker circuits with Instructor Manton. Messrs. Piercy, Cowly, Parker, Bjorkland, Moor, Strange, North straights with Instructors M. D. Manton or L. A. Strange in passenger seat. Afterwards Mr. Bjorkland solo straights.

W. H. Ewen School.—During the past week weather conditions have been unfavourable, and in consequence there has not been much out-door practice by the pupils at the W. H. Ewen school. On Wednesday, however, M. E. Baumann, after a test flight on the *brevet* machine, had out Messrs. Macgregor and Cooper, both flying good half-circuits, Mr. Murray was doing good circuits, and practising landing from 50 ft. with engine off. In the afternoon the same pupils were out again for some time, all doing well.

Under the instruction of Mr. F. W. Goodden, Lieut. Kinnear was doing good straights, and Mr. Busk was rolling.

For the rest of the week, tuition was confined to practical work in the hangars, though M. Baumann on the 60 h.p. Caudron two-seater and Mr. Goodden on the 45 h.p. biplanes put up some good exhibitions in high winds.

Hall School.—A gale stopped flying Monday and Tuesday last week. On Wednesday, Mr. Hall flying ¾ hour at high altitudes on No. 1 Caudron, executing a spiral descent with propeller stopped from 1,000 ft. Very strong wind Thursday, and a gale Friday. J. L. Hall ten minutes in afternoon, very bumpy. Saturday, Denys Ware out in early morning with pupils Brookes and Burn, but on testing air found conditions too windy for school practice. J. L. Hall exhibitions in afternoon, but engine not pulling well owing to oil not running freely. New double-surfaced Caudron nearing completion.

Salisbury Plain.

Bristol School.—The weather during Monday last week was very bad, and no flying took place during the morning. At 3.20 p.m. Busteed arrived from Bristol on the 80 h.p. Bristol tractor biplane, taking 26 mins. for the journey, *i.e.*, a speed of nearly 90 m.p.h. Busteed then gave flights on this machine to Mr. Voigt and Mr. Stutt.

Busteed and Voigt each made flights Tuesday to test conditions, but owing to the strong wind no tuition was possible.

Busteed behind Mr. Stutt for two flights Wednesday; this pupil then making his first solo, in the course of which he did two large circuits flying very well. Busteed then took Mr. Stutt for a trip on the 80 h.p. tractor. Mr. Gilligan made two good solos on biplane. Jullerot testing on biplane and tandem monoplane. Mr. Gilligan and Mr. Stutt each did three solos. Jullerot then out on 80 h.p. tractor. Voigt gave further landing practice to Mr. Stutt, this instructor then finishing up with a high flight on the biplane.

Thursday, the weather during the morning was unfit for tuition, and in the afternoon Sippe made a short flight in 80 h.p. tractor, but found weather still unsuitable.

The wind and rain on Friday morning prevented tuition, but in the afternoon Sippe went out on the tractor with Voigt as passenger, but was compelled to return, running into clouds at 500 ft. The wind was then blowing at about 35 m.p.h.

Saturday, too windy for tuition in morning. In the afternoon Jullerot gave tuition to Captain Fell and Lieut. Finch, but the weather was unfavourable.

Shoreham Aerodrome.

THE weather last week did not allow of much work being done, though the best was made of what calm weather there was. All of the pupils have been out, and Lieut. Clemson and Mr. Purnell are now doing very good straights on the 45 h.p. Green-Avro.

Mr. R. P. Cannon has made splendid progress, and has done a number of good circuits at a good height. He is now nearly ready for his "ticket." Mr. William H. Elliott, who was the instructor for the week, has done a lot of very good flying on the 45 h.p. Avro, doing a number of remarkably good banked turns. Messrs. V. W. Eyre, A. Maskall, and R. P. Maskall (new pupils) are now on the rolling stage.

FLYING AT HENDON.

THE January Meeting at Hendon last Saturday was held under very unpleasant weather conditions, for besides being very cold, a drizzling rain fell off and on during the afternoon, and it was also very misty, which did not improve matters so far as the cross-country handicap—the principal event down on the programme—was concerned. The proceedings were opened with a splendid exhibition flight by Marcus D. Manton on the twin-rudder G.-W. 'bus. Manton's exhibition consisted of his usual neat spirals, zig-zags, &c. Other Hendon pilots came out on their machines immediately after and put up numerous exhibition and passenger flights. These pilots were F. Goodden on the 45 h.p. Caudron, Pierre Verrier and R. H. Carr on Maurice Farmans, R. Lillywhite—the New Year pilot—on the 50 h.p. G.-W. 'bus, Philippe Marty on the 50 h.p. Morane-Saulnier, J. L. Hall on his new 35 h.p. Caudron, G. L. Temple on his 50 h.p. Blériot, and last, but not least, Gustav Hamel on his 80 h.p. Morane-Saulnier. The "get-off" of the two Maurice Farmans was rather peculiar, for both started simultaneously from opposite ends of the paddock and flew towards each other, turning away when at close quarters. Verrier's machine was a new one, and showed a remarkable turn of speed compared with others of its type. Hamel executed some more of his extraordinary "side loops," during some of which he flew upside down for some appreciable time. The Morane-Saulnier has such an effective warp that Hamel does not appear to have much difficulty in turning the machine sideways over on its back, and in doing so we noticed that he brings the nose of the machine up slightly just before he banks over. In addition to these evolutions, Hamel performed several other stunts, including some spirals, climbing the meanwhile. Temple's performance was also in the modern style, his bankings being such that it was hard to tell whether he was upside down or not. He ascended to a height of 4,000 ft. or so, and was lost to view in the clouds. He finished up with a vertical semi-upside-down dive of about 1,000 ft., flattening out very gently.

The cross-country handicap was flown over the 16-mile Bittacy Hill course (4 laps), and produced six starters, as fallows:—L. Strange on the 50 h.p. G.-W. 'bus (10 mins. 28 secs.), Marcus D. Manton on a similar but later machine (7 mins. 38 secs.), F. Goodden on the 45 h.p. Caudron (5 mins. 44 secs.), R. H. Carr on the 75 h.p. G.-W.-Maurice Farman (5 mins. 8 secs.), Pierre Verrier on the Aircraft-Maurice Farman (3 mins. 34 secs.), and Philippe Marty on the Morane-Saulnier (scratch). Verrier easily obtained first place, and came home 35 seconds in front of second man, Marty, who put up a fine effort from scratch. Strange came in third, 10 seconds behind Marty, and Goodden followed 18 seconds after, having passed Manton on the last lap. Carr, on his new mount, strayed a bit on the course owing to the mist, and came in last. After the race some more exhibition and passenger flights were made, whilst Hamel gave a further demonstration on his 80 h.p. Morane-Saulnier.

Cross-Country Handicap (16 miles) for Hendon Cup.

	Handicap.	Handicap Time.
	m. s.	m. s.
1. Pierre Verrier (75 h.p. Maurice Farman biplane) ...	3 34	25 43
2. Philippe Marty (50 h.p. Morane-Saulnier monoplane) ...	scratch	26 18
3. L. Strange (50 h.p. G.-W. biplane) ...	10 28	26 28
4. F. Goodden (45 h.p. Caudron biplane) ...	5 44	26 46
5. Marcus D. Manton (50 h.p. G.-W. biplane)	7 38	26 58
6. R. H. Carr (75 h.p. Maurice Farman biplane) ...	5 8	27 22

Aeroplanes for Ambulance Work.

ANOTHER use for aeroplanes in war time was dealt with by Lieut.-Col. J. F. Donegan, R.A.M.C., in a lecture at the Royal United Service Institution on Wednesday evening. He said that not long ago an expert of experience told him that he considered that before long aircraft would be used for the transport of detachments of troops on the field. When that was possible he had little doubt that they would be available for the removal of wounded who were able to sit up, having due regard for the rapidity with which aeroplanes could act, as compared with vehicles confined to roads, and also the fact that they could proceed regardless of roads or bridges; neither should they hamper or delay troops moving in a different direction. They might also be useful in scouting for wounded at night, if fitted with searchlights.

ARMCHAIR REFLECTIONS.

By THE DREAMER.

Women of England, Here's your Chance!

I have been asked whether I am in favour of women taking up aviation in exactly the same way that men do: I am not at all sure of my own mind in the matter; let's go into it. There is, of course, the oft repeated stereotyped phrase, that the place for a women is at home. To my mind this statement is generally dogmatically made by people who have made up their minds without thought, and without being in a position by the digestion of facts, to bring their argument to a logical conclusion; and used principally to close the argument before it is opened, as being the shortest way out of a position they have taken up but cannot sustain. I want to leave out the faintest breath likely to drift us towards women's suffrage, which to my mind has done more to kill the spirit of chivalry in the attitude of men towards women than anything I know. Man is, for his own benefit generally, pretending to take woman at her own valuation. Well, now, if man is going to shield himself by pretending that the reason he does it is because women have attempted to prove that they are men's equal, and are therefore ready to meet him on a level footing, he must also give in that they are perfectly entitled to become pilots if they want to, and show them a fair field and no favours. It would, of course, be a sad day for this or any other country, including the women themselves, if the majority of women took to the masculine life of independence, working and maintaining themselves throughout life without the aid of men. This would not only affect an already over-cheap labour market, but it would affect the birth-rate, and a country with a falling birth-rate that cannot be checked, is doomed as a nation, and in falling, will drag down all with it, including the prime cause, women themselves.

On the other hand, I do not see any reason whatever why women should always be looked upon as food-cooking-maternal-machines. Women are born into this world with the same right to live and enjoy life that men have, providing always that it does not interfere with race continuity, which must ever stand first and foremost, for the sake and benefit of all. On this footing I do not think there is much to be scared about. The maternal instinct is very strong in the women of this country, whatever it may be in other countries, and leaving out the very few, it seems to me that women will nearly always get married when opportunity, circumstance, and heart combine, no matter to what position they may have arisen in the commercial world. We see this almost every day, when women give up lucrative positions to enter the hymeneal state.

Personally, I do not think that women, taken as a whole, have sufficient strength of mind and nerve combined to act quickly and with decision in moments of grave difficulty. Women, most of them, are more afraid of accidents and death than men are, and are not so able to disregard these in moments where to fail to act instantly means disaster, and they cannot so readily think only of the business on hand to the utter disregard of all else. I know there have been brave women in the past, as there have also been cowardly men, but this proves nothing.

Again, speaking personally, I do not see any reason why any woman who would like to take up flying, and thinks she has the requisite nerve, should not do so. In any case, there is not likely to be so many that it will affect anybody, and if flying ever comes to be a sport in the same or even in a similar way to motoring, I think women are as much entitled to enjoy it as men. I suppose really women should do exactly as they like, just as men do—I don't see any reason why they shouldn't, and if I were a woman I am quite sure I should!

Well, now, having disposed of that, here is something I should like the women of England to read, and think carefully over—something where they CAN step in and show the men what they can do. There seems to be a general impression amongst those in a position to judge, that the Atlantic flight stands a good chance of taking place during this year, and that the *Daily Mail* prize of £10,000 will be paid over before we celebrate another Christmas. Whether it will be won, if won at all, by an English machine, an American one, or one from the Continent, it is hard to say, but in all these countries steps are being taken to prepare machines for the journey. In America and on the Continent, I believe the steps are assuming a concrete form, but in England it is merely whispered that so-and-so or so-and-so are going to have a cut. I know of no firm who have publicly announced their deliberate intention of doing so, and thinking of the way intending competitors dropped out one by one over the Circuit of Britain as the day for the start drew near, I can quite see the possibility of us getting left.

I take it that all English men and English women would like to see England the winner, from a love of nation and apart from any monetary gain, and a little encouragement of the hard and jingling sort would help matters considerably. There will not be very much in the prize beyond glory for whoever wins it, and it is hardly fair to expect a private firm to put up all the money, and run all the risk of failure, for what after all will be, if won, a cause for national rejoicing. I myself cannot see much in it for anybody except the builder of the engine, who will have proved the reliability of his wares; because, after all, it is more a matter of an engine with a machine large enough to carry enough fuel to feed it than anything; always excepting the pilot, of course, who will have to be not only good as an aviator, but a man of iron, to stand the strain of 72 hours' continuous flying, even with dual control.

Why not a National Machine to Win Glory for the Nation?

The Women's Aerial League have already done so much for aviation in this country, and are still doing so much, that they must have their hands so full that I dare not ask them to take up the suggestion, but I am quite sure that the women of this country could, if they would, get up a national subscription amongst women which would provide the necessary capital to build a machine capable of the journey; to provide the money necessary for the testing and subsequent alterations, or even partially rebuilding, and to finance the whole thing through to a probably successful finish. I believe that the aeroplane has now reached the position where it is simply a question of money and a little experimenting to build a machine capable of winning the prize, and if the women of this country were to subscribe the money, build their own machine and win, what a glorious day it would be for them, and we mere male things would, I am sure, enter most heartily into the celebrations—we can always do our fair share of that.

WIND GUSTS AND THE STRUCTURE OF AERIAL DISTURBANCES.*

By W. N. SHAW, LL.D., Sc.D., F.R.S., F.Ae.S.

AFTER defining gusts as being "fluctuations of wind force at short intervals," which have "every stage of gradation from the ordinary gustiness of an otherwise steady wind, with about seventeen fluctuations a minute, to the equally irregular recurring squalls, themselves made up of groups of gusts at intervals of half an hour, more or less"; Dr. Shaw observed that he was disposed to regard these phenomena as the turbulent motion of the atmosphere, as distinguished from the streamline motion of the undisturbed atmospheric current, although he supposed that all air currents must have in them a certain amount of circulation in consequence of their movement being carried out on the rotating earth.

He said that he proposed to discuss the cause or causes of the turbulent motion which is found in the atmosphere, and proceeded :—

We know for certain from experiment, as well as from observation, that eddy motion is produced when a steady current of air moves along even a smooth, solid, or liquid surface, and still more so when it passes an obstacle, so that the surface of the sea, or of flat land, or still more conspicuous obstacles in the shape of waves, cliffs, buildings, trees or woods, will cause eddy motion. Much time and trouble has been spent at the National Physical Laboratory at Teddington in securing a current in an air channel reasonably free from eddy motion, and it is this kind of eddy motion which is manifest in the gustiness of an ordinary wind. We may be pretty sure of that from the differences which we notice between the gustiness of different exposures as recorded by our anemometers; and in illustration of this point let me call attention to the traces of the anemometers at Aberdeen, Pendennis Castle, Shoeburyness, and lastly Gibraltar. The gustiness is evidently dependent upon the direction from which the wind comes. The wind which advances over a gradual slope direct from the open sea is much less gusty than that which comes over land. Moreover, the gustiness as estimated by the range of velocity during any interval to the mean velocity for that interval has been shown by examples to diminish with increasing height, but the law of decrease is evidently not a simple one.

The most extensive fluctuations in the wind are those which are shown on the anemometer at the top of the rock of Gibraltar when the wind blows on the east cliff, which is very abrupt, but in that case we have to deal with a special form of localised disturbance which we call the cliff eddy.

Permanent Eddies over Cliffs.—When the wind blows on the face of the cliff with sufficient velocity we get a permanent eddy which can be observed in a strong wind on any cliff, and which, in the case of Gibraltar, is bounded by a sheet of air going upwards at a steep angle, sometimes for hundreds of feet. The peculiar characteristics of the anemometer trace in that case probably represent not so much fluctuations in the velocity of the wind itself as the fluctuations in the upward direction, to which the anemometer responds by the sudden transition from pressure to suction at the opening which is designed for pressure. As the variation of the upward direction depends upon the velocity with which the air approaches the cliff, we get the interesting feature of an optimum value for the wind velocity shown in the chart, which is not the maximum of the wind velocity.

This eddy motion of air flowing past obstacles is thus of a complicated character, and it is a question whether we can describe it in general terms at all.

Vortex Rings.—The case of eddy motion with which most people are familiar and which is most easily described is the vortex ring, which can easily be obtained by a current of air passing with suitable rapidity through a circular opening. In that case the eddy motion is quite persistent, and the vortex ring travels with a velocity depending on its speed of rotation. If the vortex ring is circular it moves without change of shape; if it is not circular, but still a complete ring, it is still persistent, but oscillates about the mean position of circularity.

Incomplete Vortices.—The vortex ring must be complete in order that its core of low pressure may be completely protected. If the core is not protected the whole system rapidly disintegrates. We know from the persistence of semi-circular vortices in water that the core of a water vortex can be sufficiently protected by the creation of a gravitational pressure-difference at the cut end, and a smooth rigid surface would do as well; but in the atmosphere there are no facilities for those kinds of protection, and therein we have consequently to deal with vortices necessarily incomplete and in all stages of disintegration. The complete circular or semi-circular persistent vortex is therefore of little help to us and we must seek some other mode of description.

Relation of Vortices to Gusts.—Experiments at the National Physical Laboratory have shown that a steady air current passing an obstacle throws off a succession of nearly complete vortices which are sufficiently persistent for their shape to be recognised, though subsequently they disintegrate rapidly. Out of the steady motion and the obstacle we get a sort of pulsating motion, which on the larger scale would be represented on an anemogram by a series of gusts. One step in the description of the turbulent motion, due to an obstacle, would therefore be to say how frequently these vortices are given off. I speak with diffidence, for I do not know what the law is, but I suppose that with an increasing current the eddies are formed and sent off more and more rapidly until we get a quasi-permanent but pulsating cliff eddy from which masses of air in turbulent motion pass away to leeward.

Turbulence in Absence of Large Obstacles.—The eddies due to a comparatively flat surface of land or water are still more difficult to describe. Mr. Mallock has pointed out that the eddy motions in steamer smoke are due to wind and water and not to wind and steamer, and I have often watched steamer smoke with a view of resolving its convolutions into something which could be described, but so far without success.

Turbulent Motion without Material Obstacles.—There is, however, another question to which I shall now ask your attention, and that is whether material obstacles are necessary for the production of turbulent motion that may affect an airship or an aeroplane. To that I think the answer is obviously "no," and it leads to the consideration of the origin of turbulent motion in the free atmosphere itself. In the tropical revolving storms we have examples of real vortices with vertical axes maintained sometimes for several days together. They are a hundred miles or so in diameter, they travel at a slow rate, about 10 miles an hour, and they originate over the sea in circumstances which have little or nothing to do with surface friction. The difficulty about them is to understand how the low pressure at the core is maintained when all the processes which we see going on tend to reduce it. If that difficulty were disposed of the rest is easy; the conservation of angular momentum would account for the violence of the winds if the successive rings of the vortex are diminishing the diameter.

Besides these we have the tornadoes of the North American plains, which are perhaps a quarter of a mile wide and seem also to be rotary; they last for a few hours. There are besides the occasional dust "devils" or little whirlwinds and waterspouts, which are similar but less destructive.

About these three types of turbulent motion, let me remark that for some reason or other, which I cannot give you, they have the characteristic of persistence for days, hours, or minutes, as the case may be.

Turbulence set up by Temperature Differences.—Now there is a cause of local circulation in the atmosphere, in the sense of turbulent motion, in the convection of relatively warm and cold air. We seem to be able to trace cause and effect in this matter in the case of the line squall in which apparently there is a long line or cascade of descending air which pushes up the warmer air in front of it. In general character the phenomena are not, strictly speaking, vortex motion, because the air that descends, being cold, will not rise again and complete its circle, but there might very well be a core of turbulent motion between the two currents. There is also generally some horizontal circulation, because the two main currents are seldom parallel, so that it is quite possible, and even likely, that the violent relative motion may give rise to line eddies which ultimately drop one end on the earth. Mr. Clarke's sketches of the line squall of October 15th seem to illustrate this process. They show the cloud formation, the turbulence with horizontal axis degenerating into little waterspouts of eddy motion with vertical axes, but the "where?" and "when?" of the formation of such vertical eddies out of the vertical relative motion are beyond our powers. Certain it is that the destruction of the Zeppelin off Heligoland, on September 8th last, may be attributed to turbulent motion originating in the convective condition of the atmosphere itself.

Disturbances due to Cloud Formation.—And here let me point out, in conclusion, that convection of any kind in the atmosphere must necessarily disturb the distribution of air currents and give rise to eddies and variations of wind such as those which we call squalls.

We are accustomed to regard the formation of cloud as carried on in the general air current without much disturbance of other atmospheric processes. I have been recently computing in some detail the changes of pressure-difference in different layers, and I have arrived at the formula,

$$0{\cdot}0342\,\frac{p}{\theta}\left(\frac{\Delta\theta}{\theta}-\frac{\Delta p}{p}\right)$$

(where Δp is the difference of pressure between two places on the same level, and $\Delta\theta$ the corresponding difference of temperature) as expressing the increase in the pressure-difference between two places for a metre increase of height. With this formula applied to each successive metre we can find the pressure-difference at any level from the existing conditions of temperature. Now suppose a convective circulation to take place with the deliberation that the atmosphere always shows, we get at once the essential elements of eddy motion.

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* Abstracts from a paper read before the Aeronautical Society on January 7th at the Royal United Service Institution.

Suppose that for a kilometre of thickness the air becomes five degrees warmer in the one vertical and five degrees colder in the other; the mean difference in Δp may be left out for the moment, we get for the change introduced

$$34{\cdot}2 \times 3 \times \frac{10}{300}$$
$$= 3{\cdot}42\ mb.$$

The pressure difference at the bottom may be not more than 10 *mb*, and, consequently, the result of the convection, which appears to the onlooker merely as a striking cloud, is also a signal to the bottom to change the velocity of the wind there by 30 per cent. and the wind pressure by about 60 per cent. So we must regard every warm patch and every cold patch in the upper air not merely as floating along and doing nothing, but as making up the pressure distribution upon which the surface wind depends, and every disturbance of temperature by convection means a corresponding disturbance of the regularity or steadiness of the wind.

When, therefore, one speaks of the structure of a disturbance for the purpose of aeronautical science, let it not be supposed that the actual wind-structure of the moment is the end of all things; the temperatures of the different parts of the structure are, at least, an important element in the matter of squalls and wind, and as a step towards the comprehension of the structure we must not overlook the temperature differences of different parts. Temperature differences cause convection and convection causes turbulence. Hence, convective weather, whatever be its immediate cause, perhaps the sequence of events on a line squall, or the intense local heating of a sunny day, is likely to be turbulent weather for the airman.

In the course of the discussion on Dr. Shaw's paper on "Wind Gusts and the Structure of Aerial Disturbances" at the meeting of the Aeronautical Society on January 7th last, it was suggested by several speakers that the time had arrived when combined action should be taken by the Society and by their guests on that occasion, the Royal Meteorological Society, to accumulate and dissect information on the nature of the disturbances to which the air is subject. The chairman, Major-General Ruck, agreed that such a course was eminently desirable, and said that there was, without doubt, much data available, but owing to the absence of a properly constituted body to deal with these matters, it was not used to the best advantage. He, therefore, thought that they might form a joint committee of the two societies immediately, on which those interested in this work would be adequately represented.

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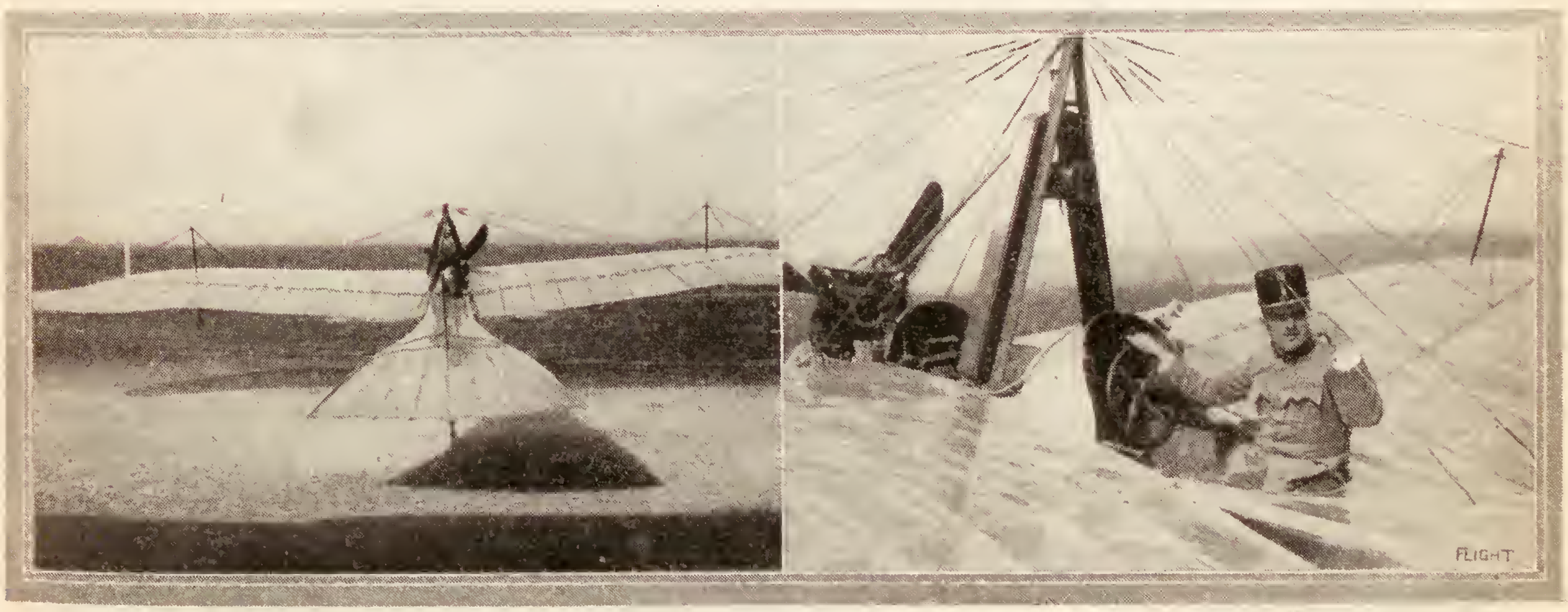
INVISIBLE AEROPLANES.

ONE important point which the designer of a military aeroplane has to keep in mind is that his machine, when in the air, must be as hard to discern as possible. There have been several attempts to build an aeroplane with the wings of transparent material, and in May and June of 1912, Lieut. Nittner was flying at Wiener Neustadt, near Vienna, an Etrich monoplane, specially built on such lines for Capt. Petroczy, formerly commandant of the flying corps in the Austrian Army. This machine had the planes covered with a special variety of Emaillite cellulose sheets, and the system has since been developed and patented in all countries by MM. Leduc Heitz, of the Paris House of Emaillite. A photograph is reproduced of the Etrich machine, to which reference has been made, and which those present on the ground were unable to locate in the air when flying at an altitude of between 900 and 1,200 ft. It is stated that at a height of 700 ft. only the framework is dimly visible, and this and the outline of the motor and pilot and passengers present so small an area to rifle or gun fire, that at the rate of speed at which aeroplanes are flown to-day, accurate aiming at such surfaces becomes nearly impossible. There are also secondary advantages in the use of such transparent sheeting in the construction of aeroplanes. For one thing, it enables the pilot to keep an eye upon the interior framework of the planes, and to detect at once any straining or fracture of the ribs, &c. Another advantage is that the highly polished smooth surface reduces the friction, as was proved in the case of Capt. Petroczy's machine, although, as that was the first machine to be so treated, the material used was not so suitable as the latest product. The surface could not be properly tightened, and owing to the sheeting being more or less plastic it presented a wavy surface, while some difficulty was experienced in securely fastening it to the ribs.

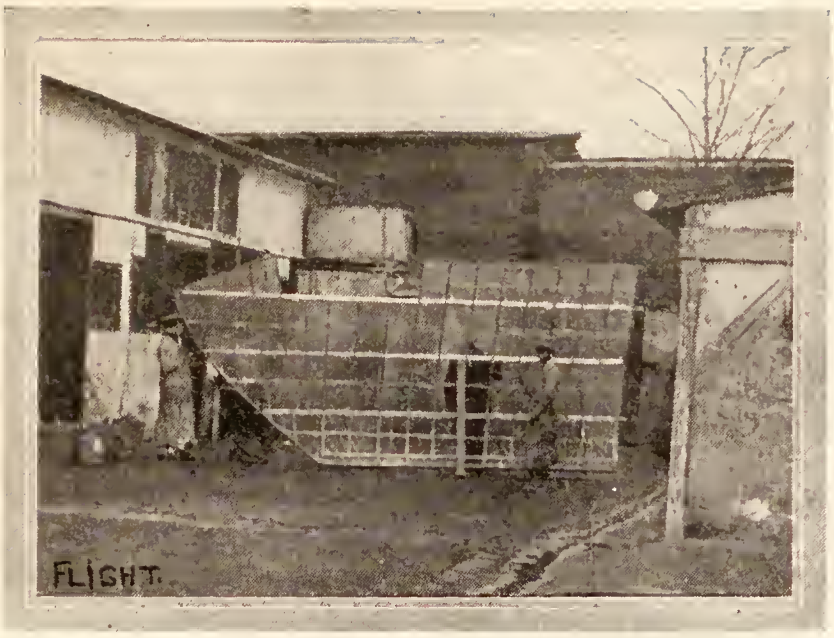
As long ago as 1904, Prof. Reisner, of Aachen, suggested that polished celluloid should be utilised for aeroplane sheeting in order to diminish air friction.

Last year, M. W. A. Lebedeff, working in conjunction with the Russian Government, tried to cover a Henry Farman biplane with transparent cellulose sheeting of a somewhat modified composition. This material was not so heavy as that used in Austria, and it was also somewhat stronger (its tensile strength being about 7 kilogs. per square millimetre of section), but the wavy surface of the wings, due to the flexibility of the material, could not be overcome.

After working at the problem for some time the Emaillite firm have developed a better material which was seen at the Paris Show on the planes of the Moreau monoplane. Instead of using ordinary cellulose sheeting, this machine has what might be termed a reinforced sheeting consisting of two layers of Emaillite with a sheet of silk tulle between them, the tulle being specially treated to render



Two views of the Etrich monoplane covered with Emaillite treating and flown by Lieut. Nittner at Wiener Neustadt. It will be noticed, especially from the photograph on the right that the inner construction of the planes can be seen through the top surface.



A wing of the Moreau aeroplane which was at the Paris Salon. It will be seen that the man standing behind the planes is as visible as the one in front.

it transparent. That the material is to all intents and purposes transparent is illustrated by the photographs of one of the wings of the Moreau monoplane behind which a man can be clearly seen. The use of the tulle liner not only strengthens the material but it also prevents it sagging or warping between the ribs so that by its use it is quite possible to obtain a smooth and regular surface on the planes. The tensile strength of the material is about nine to ten kilogs. per square millimetre section and a ·35 mm. sheeting is sufficient to ensure a tensile strength of about 2,800 to 3,000 kilogs. of the wing covering, a stress which is never attained with the best fabrics in use. The weight of this new Emaillite material does not exceed 375 grammes per square metre, which is but 40 per cent. more than the weight of good doped linen fabric as generally used, so that the increase of weight in the case of ordinary machines would be between 12 and 15 kilogs. It is claimed for this new Emaillite transparent reinforced sheeting that it has all the advantages of that which is not reinforced without its faults. It can be fastened either by nailing, sewing, or by using an adhesive solution. It will not tear or break when anything such as a tool falls upon it, while should it be pierced by a bullet the fabric liner would prevent the damage extending. The British patents for this invention are held by the British Emaillite Co., Ltd., of 30, Regent Street, W. Extensive tests are shortly to be carried out with machines covered in this way, in order to ascertain the height at which they become virtually invisible.

BRITISH NOTES OF THE WEEK.

THE ROYAL FLYING CORPS.

THE following appointments were notified in the *London Gazette* of the 9th inst. :—

R.F.C.—Military Wing.—*Special Reserve of Officers.*—The undermentioned Second Lieutenants (on probation) are confirmed in their rank :—Gordon N. Humphreys and David E. Stodart.

The following were announced by the Admiralty on the 9th inst. :—

Lieut. H. E. M. Watkins, R.N.R., to "Pembroke," additional, for course of instruction at Central Flying School, January 27th.

Sub-Lieut. F. G. Saunders, R.N.V.R., to "Pembroke," additional, for course of instruction at Central Flying School, as Probationary Sub-Lieut. (R.N.R.), January 27th.

The following was announced by the Admiralty on the 12th inst. :—

Assistant Paymaster T. Goldsmith, to the "Pembroke," additional, for Naval Airship Section, Farnborough, to date January 15th.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending January 10th :—

Flying Depôt. S. Farnborough.—Experimental and repair work was carried on as usual.

No. 2 Squadron. Montrose.—The squadron was employed in removing stores and sheds to the new flying ground at Bloomfield. The snow and weather generally render this operation a slow one.

No. 3 Squadron. Netheravon.—The squadron pilots were out frequently during the week and a few long flights were made.

No. 4 Squadron. Netheravon.—The officer and N.C.O. pilots carried out reconnaissance flights on several days of the week.

No. 5 Squadron. S. Farnborough.—Instructional flights were made by the officer pilots of the squadron, and overhaul and repair work continued.

A Fine Flight by Pixton.

BY way of delivering the eighth War Office Sopwith tractor, C. H. Pixton, on Monday morning, flew from Brooklands to Farnborough, the trip taking exactly 8½ mins. By the route followed the distance is not less than 16 miles, so that the speed worked out to over 110 m.p.h. The wind gauge at Brooklands showed between 20 and 30 m.p.h., and higher up the wind was quite 40 m.p.h., besides which it was snowing hard all the time.

Leeds Aviation Meeting.

SOME fine flying by Hucks on his Blériot and H. Blackburn on the 80 h.p. Blackburn was seen by large and enthusiastic crowds at the Aviation Field, Moortown, on Wednesday, Thursday and Saturday of last week.

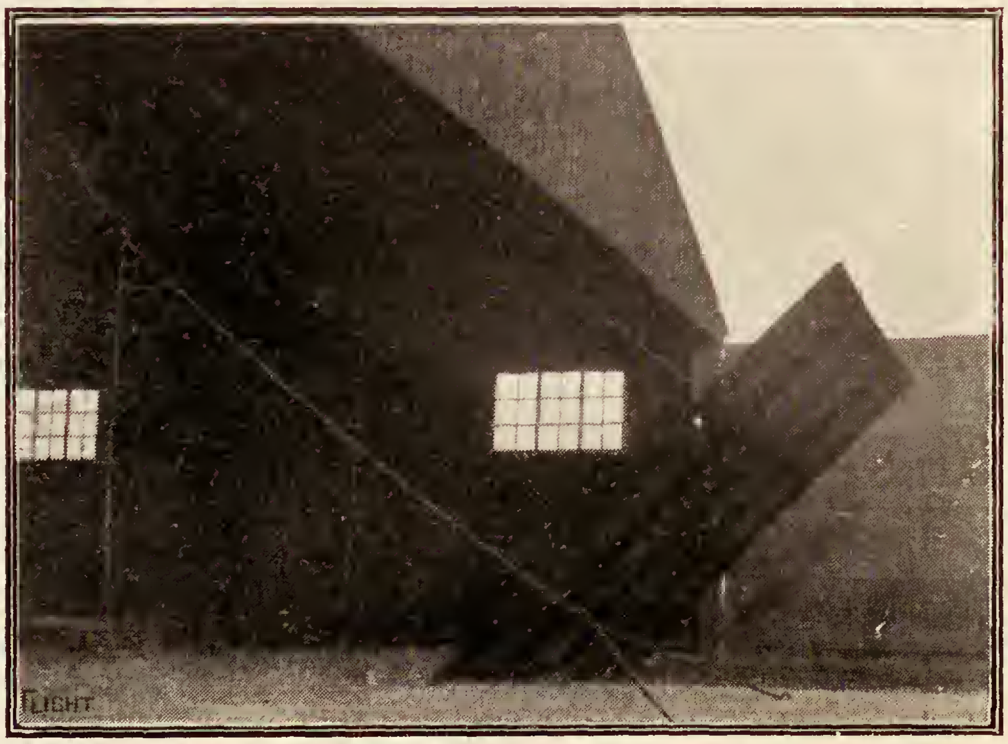
On Wednesday, Hucks made a couple of flights, looping in all 10 times, but Blackburn, who was flying to Leeds from York, had to return to York after reaching Tadcaster, owing to fog and mist. On Thursday, Hucks looped several times at a very low altitude. Blackburn (who had arrived from York in the morning) made a long flight with Dr. Christie as passenger. During the gale on Friday, Blackburn made a passenger flight with Mr. C. Bingham, of the Blackburn Aeroplane Co., at times rising above the clouds. On the Saturday, despite wind and rain, H. Blackburn gave a fine exhibition of banking and diving, with Dr. Christie as passenger. Hucks also flew, but the frightful weather conditions rendered upside-down flying impossible. Blackburn also made a trip, with Dr. Christie as passenger, to Harrogate and back.

"Sunday Best" for the R.F.C.

HITHERTO the men of the Military Wing of the Royal Flying Corps have been dressed in khaki, but now they are to have a Sunday suit of blue cloth, similar in style to that of the Royal Field Artillery. The buttons will bear the monogram R.F.C., while those men who have qualified as pilots or mechanics will bear badges, representing propeller blades, on the left breast. One of the first to don the new uniform was Sergeant Griffin at his wedding last Saturday.

The Flying Station at Nuneaton.

REPRODUCED herewith is a photograph of the hangar Mr. E. F. Melly has built at Nuneaton for the benefit of aviation in general, and to which reference was made in FLIGHT some time ago. The hangar, the specification for which was drawn up by Mr. H. G. Melly, of the Liverpool Aviation School, is 50 ft. square, 12 ft. clear headway, and has two hinged doors with two drop doors which are



The hangar which Mr. E. F. Melly has constructed at Nuneaton for the benefit of aviators generally.

raised by blocks and tackle, and can easily be worked by two men. These doors when lowered make a splendid floor to work on if any repairs have to be done to a machine. The landing ground in which it stands is 12 acres, and open in three directions, and is only ten minutes' walk to the middle of the town. Nuneaton is exactly half way between Manchester or Liverpool and London, and may be said to be the centre of England.

Sunbeam Activity.

ON Wednesday and Saturday of last week, at Brooklands, J. Alcock took up several passengers on the M. Farman with 100 h.p. Sunbeam engine, and on Thursday morning he made a good cross-country flight with a passenger.

A Lady Mayoress Flier.

ON Tuesday afternoon the Lady Mayoress of Leeds (Mrs. Charles Ratcliffe) enjoyed a view of Leeds from aloft, being taken up to a height of 2,000 ft. by Mr. H. Blackburn on Dr. Christie's 80 h.p. Blackburn monoplane.

Mr. Ewen to Lecture in Edinburgh.

TWO cinematograph lectures on the subject of "Learning to Fly" are to be given by Mr. W. H. Ewen in the Princes' Cinema, Edinburgh, at 3 and 8 p.m., on Tuesday, January 20th. Members of the Edinburgh Aeronautical Society, on showing their membership cards, will be admitted free.

A Lecture by Capt. Waterlow.

ON Friday, January 30th, at 3.30 p.m., Capt. C. M. Waterlow, R.F.C., will give a lantern lecture before the Ladies Automobile Club, at Claridge's Hotel, on "Airships, Past and Present."

"Shell" Spirit was Used.

FOR his looping the loop flight, with Miss Trehawke Davies as passenger, Mr. Gustav. Hamel relied on Shell motor spirit.

* * *

FOREIGN AVIATION NEWS.

Duma President Flies.

DURING a visit to the South of France last week, M. Malikoff, the President of the Russian Duma, was taken for a flight by Maicon on his 100 h.p. Anzani-Caudron waterplane. Starting from Beaulieu, Maicon flew along the Côte d'Azur to Monte Carlo, alighting in the harbour before returning to his starting point.

The Red Ribbon for Moreau.

IT was announced last week that M. Moreau, the inventor of the Moreau automatic stability machine, had been honoured with the Cross of the Legion of Honour.

Fast Flying on Morane "Parasol."

ACCOMPANIED by Vidart, and flying the Morane parasol, L. Gilbert started from Villacoublay on the 8th inst. An hour and five minutes later he landed at Mourmelon, having covered a distance of 200 kiloms.

Another Prize Offered by Paris Council.

THE Parisian Municipal Council has offered a sum of £400 to the French National Aerial League, and it has been decided to utilize the money for a prize for a speed competition between two capitals.

A Signal Device for Aeroplanes.

IT is announced from Paris that the Breguet firm has designed a signalling device, which appears to be on similar lines to the James Means system described in FLIGHT for March 16th, 1912. A valve operated by the pilot or passenger releases soot from a reservoir in such a way that long or short streaks of black are formed in the wake of the machine, thus permitting messages to be transmitted under the Morse code. It is stated that with field-glasses it was found possible to read a message at a distance of five miles.

Long Flight by E. Vedrines.

HAVING recovered from his injuries sustained when his machine took fire while making an attempt on the speed records, Emile Vedrines on Saturday last made a flight of an hour and a half at Rheims. He intends shortly to undertake a long flight, probably to Morocco.

A Ponnier for French Army.

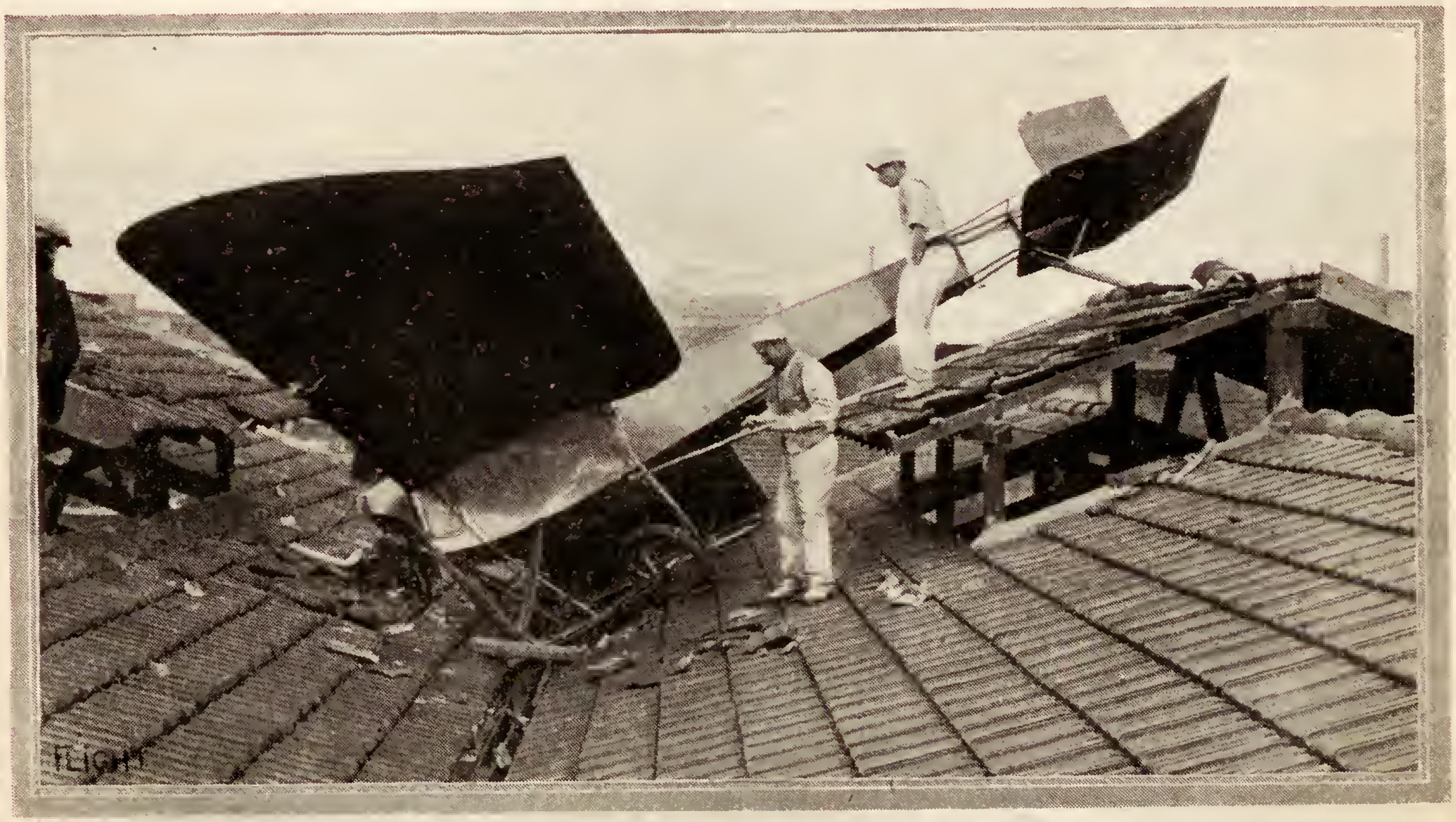
AT Rheims on the 7th inst., Bielovucic, before a military commission, tested a Ponnier scouting aeroplane for the French Army. The monoplane, which is fitted with a Rhone motor, climbed 1,500 metres in 5 mins.

Gibert Lands on a Roof.

AFTER a long rest Gibert has returned to aviation, but his return was inauspicious. On the 8th, he went up at Issy on a Vendome monoplane, and on getting to a height of 500 metres flew round the Eiffel Tower. Soon after he commenced a *vol plané*, and seemingly miscalculated the rate of descent. When about thirty metres from the ground he switched on, but the motor refused to start, and the machine crashed on to the roof of a tile-works. Surprisingly little damage was done to roof and machine, whilst the pilot was unhurt.

M. Farman's Week-end Trip.

ACCOMPANIED by Derome, and on one of the latest type machines, Maurice Farman on Saturday flew from Buc to near Arpajon, and then went round Montlhery before returning to Buc.



Gibert's monoplane after his landing on the roof of some sheds near Paris. Note how, under the circumstances, comparatively little damage of any sort was done, either to the building or the machine.

Testing a New H. Farman.

On the 8th inst. at Buc, Henry Farman was testing a new biplane with the *fuselage* placed midway between the two main planes. After a long cross-country trip the machine was banked steeply, and made some steep dives. On his descent Henry Farman expressed himself as very satisfied with the way the machine behaved in the air.

To Revive Issy as an Aerodrome.

In the early days of aviation in France, Issy was quite an important place, but the various restrictions which have been imposed from time to time have had the effect of driving away most of those who used to make it their headquarters. A committee has now been formed, representing the various interests concerned, with a view to getting the restrictions removed and restore Issy to its former place as one of the chief flying centres.

Marking Routes in France.

Arrangements have been completed by the Ligue Nationale Aerienne for the latitude and longitude of 31 principal places in France to be painted on the tops of the local gasometers so as to guide pilots. The numbers are ranged one above the other, the latitude being on top. The size of the numbers vary according to the size of the gasometer, the largest, 9·87 metres high, being used at Rheims.

With the Loopers.

Several additions were made last week to the ranks of the exponents of looping the loop and upside-down flying. Three of them were trained at the Blériot school at Buc, one being Mr. R. O. Crawshay, who has flown a Blériot on several occasions at Hendon. After only practising for two days, he succeeded on Wednesday of last week in looping the loop eight times. The next day at Buc, Count de Lareinty-Tholozan made six loops, while on Friday Baron Pasquier carried out some loops. On the 7th Gilbert did some loops on a Morane at Villacoublay, as also did Chemet on a Borel and Galtier on a Caudron at the Chateaufort ground near by. These two last mentioned also repeated their performance on Sunday. On Sunday last, looping flights were made by Garros at Barcelona, Honouille at Algiers, and Chanteloup at Troyes. On the 8th Chevilliard gave an exhibition at Havre, after which his machine was packed up for transmission to Nice.

Military Night Flying in Belgium.

A series of experiments in night flying have recently been made at the Kiewit aerodrome by Lieut. Demanet. The officer has had his Farman fitted with a 50 c.p. headlamp at the front of the *nacelle*, while 12 c.p. lamps are arranged along the top plane. The current for these lamps is generated by a little dynamo, driven by the aeroplane motor, and charging a battery of accumulators.

December at Johannisthal.

During the month of December, 134 pilots made 2,410 flights, of an aggregate duration of 313½ hours, at Johannisthal. The longest flight was of 19 hours 11 mins. by Breitbeil, on an Ago biplane, while Reiterer made 278 flights on his Etrich Taube.

Orville Wright in Italy.

On the 8th inst. Orville Wright arrived at Genoa from America, and left for Rome in order to meet the Italian Naval Ministry.

A Race from Genoa to Tripoli.

Arrangements are being made in Italy for a race for hydroaeroplanes from Genoa to Tripoli, a distance of about 2,000 kiloms. It is expected that the prize fund will be at least £4,000.

Marc Pourpe at Khartoum.

On Monday afternoon, Pourpe completed his flight to Khartoum, taking 4¼ hours for a non-stop flight of 320 miles from Abu Hamed. In our last issue we recorded his arrival at Wady Halfa on January 8th, and on the following morning he progressed to Abu Hamed, taking less than 3 hrs. for the distance of 231 miles. On both these last stages, he was troubled by a side-wind which carried a lot of sand. Pourpe was welcomed at Khartoum by the Sirdar, Sir Reginald Wingate.

Vedrines Flies Round the Pyramids.

During a flight on his Blériot round the Pyramids on Monday, Jules Vedrines took as a passenger Rostovitz Bey, president of the Nuncovitch Co., who is 85 years of age.

Flying in Persia.

On his Blériot-Gnome, Kouzminsky, on the 12th inst., flew from Kasra-Kadjar to Teheran, where he flew before the Shah and other members of the Imperial family.

A Chinese Fatality.

It is reported from Mukden that a Chinese military biplane on returning to Kalgan after a reconnaissance along the Mongolian frontier, during which it was fired on by the Mongols, was capsized in a gust of wind. The pilot was killed and the passenger injured.

A Three-Seater for Brazil.

For use at the Brazilian Naval Flying School at Rio de Janeiro, a three-seater waterplane has been ordered from the Bossi firm in Italy. The machine will be a biplane fitted with catamaran floats. It will have engines of 300 h.p., and weigh in flying trim 1,000 kilogs. A mean speed of 80 k.p.h. over an out and home course is asked for, while the delivery tests will include two flights of two hours each with full load. The machine will be fitted with a wireless telegraphy outfit and a bomb-dropping device.

Fatal Accident to Chilian Aviator.

When flying at a height of 1,000 ft. at Santiago de Chili, on Monday, the machine of Lieut. Mery, a Chilian military aviator, capsized. The pilot was killed on the spot.

"Z 7" on Trial.

The new Zeppelin, "Z 7," for the German Army, which is to be stationed at Dresden, commenced her trials at Friedrichshafen last week. The vessel, which is similar in general design to the ill-fated Naval Zeppelin, was in charge of Count Zeppelin during the trips, while the performance was noted by a commission of officers.

"Z 6" Goes to Leipzig.

On Saturday last the military dirigible "Z 6" left Gotha at 10 a.m., and at 1 p.m. arrived safely at Leipzig.

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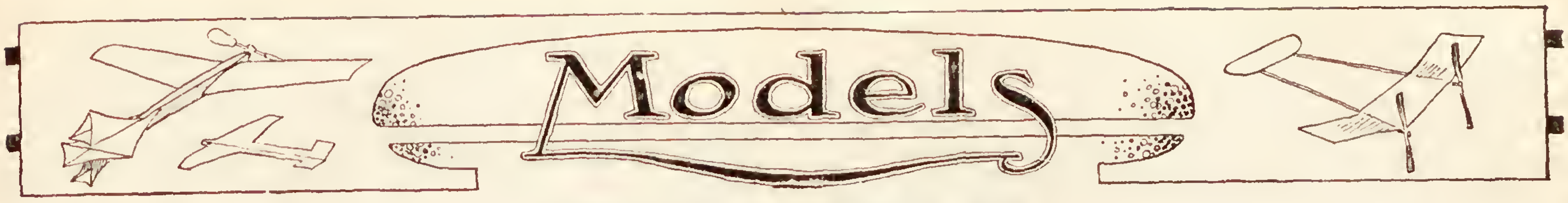
A Borel waterplane taxying, as seen from behind.



Models

Edited by V. E. JOHNSON, M.A.

The K. and M.A.A. Meeting at Caxton Hall.

THIS meeting, which was held at the above on January 9th, for the purpose of distributing the prizes won by aeromodellists at the recent *Model Engineer* Exhibition, and to hear a lecture by Mr. F. Handley Page on "The Dependence of Aviation on Experimental Model Work," was a most successful one in every way. We give below the opening remarks of Sir John Shelley, who presided. Mr. Handley Page's most instructive and able lecture will be fully reported in due course, as well as the interesting discussion which followed.

Sir John Shelley said it gave him great pleasure to preside over the meeting. He thought he was right in saying that most machines, or at any rate a great number of them, owed their success to lessons learnt from models, although perhaps this did not apply so much to model aeroplanes as to some other engineering types. This was perhaps due to the small size of the machines, which would, no doubt, be successfully overcome in the future. The principal power for model aeroplanes at present was twisted rubber; now, although even such models could, no doubt, be very useful in designing full-sized machines, the problem of the best and most suitable motive power was the most important point to find out. If they wanted to get themselves taken seriously by the aeronautical world, they must look beyond the present, if they did not want to be looked upon merely as makers of interesting toys.

For that reason he proposed giving prizes for models which could be useful in making full-sized machines. There was to be an aeronautical exhibition at Olympia in March, and he hoped that all members of the Association and the affiliated clubs would do their best by making models which could be used as models for full-sized machines. This would do more good for the Association than anything else. Anything done six months later would have nothing like such good results (even from an advertisement point of view only) as could be accomplished by doing them *now*.

With regard to the Kite and Model Aeroplane Association and the affiliated clubs all over the country, he had been asked what good it would do anybody to join the Association. Well! He had dealt with that question to the best of his ability. He did not think people fully realised the benefit of joining themselves together with one special object. Generally speaking an individual got nowhere, and what applied to individuals applied equally well to societies. They might have a large number of model aero clubs spread all over England, but they ought to have one central body to hold them together. If not they would be no better than so many individuals, without any means of exchanging ideas, and without any rivalry or incentive to do their best. He could not help thinking that the Kite and Model Aeroplane Association ought to do their best to keep in as close touch as possible with the country associations. They should offer prizes only open to such clubs and themselves. He would suggest that all competitions should be only open to members of the Association and the affiliated clubs, and not to those who merely entered a machine for a few, or perhaps only a single competition. He thought, therefore, the best thing they could do was for them to talk about this model association to their friends, and get them either to form clubs or join the central one. By so doing they would increase the membership and do a tremendous amount of good for themselves at the same time.

He would now call upon Mr. Handley Page to lecture upon "The Dependence of Aviation upon Experimental Model Work."

(*To be continued.*)

Paddington and District Aero Club.

We have received from the secretary, Mr. W. E. Evans, a copy of their financial balance sheet for the year, and also a list of the successes won by club members in open competition during the same time. The balance sheet is in a decidedly satisfactory state—the financial year starting with a small deficiency but finishing with a balance in hand of more than four times the deficiency, and this in spite of the fact that over £8 was spent in prizes alone. The prizes won in open competition include the Gamage Cup and Gold Medal, the London Aerodrome Trophy and Silver Plaque, and the K. and M.A.A. Silver Cup and Gold Medal (Distance and Stability Competition), &c., numbering some seventeen in all. In inter-club contests the club won three out of five. The club also holds six official British records out of a total of fourteen.

We offer the club our hearty congratulations on their successful year's work both financially and practically. We think the following "tip" a very good one, which all model clubs would do well to follow—one club at any rate does it with, we believe, considerable profit:—Send to the local newspaper a short and pithy account of your doings week by week, under a suitable title, not necessarily the exact name or title of the club, although needless to say, this should always be "worked in."

Some Remarks on the Management of Model Aero Clubs.

By W. E. EVANS.

Having been the secretary of a model aero club for some two years, I have come to the conclusion, firstly, that it is difficult to obtain truly enthusiastic members who will stick to model aeroplaning for more than a month or two, but those who persevere long enough to get over the often disheartening period of disappointment of the first few months cannot give it up. Therefore I advise the older members of clubs to assist the new members and novices as much as they possibly can with their model flying. The surest way to lose members is by jeering at a bad smash.

Secondly, as regards finance, I think a subscription of one shilling per month should be the minimum. A smaller subscription than this does not allow enough money to be devoted to prizes, and winning a prize, even though it be of small value, has often been the turning point leading to greater successes. Therefore prizes must be offered on a comparatively generous scale.

Thirdly, it is impossible for a small model club to rent a flying ground, and as model flying is not permitted on any public ground (except Wimbledon Common), it behoves the managers of such clubs to scour their districts and find a benevolent landowner who will accede to your request to fly your models on part of his ground.

Having obtained permission, do not take the liberty of flying on his ground on Sundays, and it is safer not to ask such a favour. You might get a decided refusal altogether. Do not fail to invite your benefactor and his friends down to his own ground one fine Saturday afternoon during the summer, and give them as good a display of model flying as you possibly can. A gentleman who is good enough to allow you to use his ground on Saturday afternoons free of charge will not be backward in offering a prize for competition amongst the members.

A club workshop is almost a necessity, but you will have to pay at least 3*s*. per week rent for the accommodation. I maintain a small club cannot afford this, and that they will be better off without it. If any workshop or clubroom is rented then the club's income from subscriptions should be at least double the amount of rent. Where subscriptions are small and economy the watchword, committee meetings may be arranged to take place at stated intervals at one or more member's homes.

The secretary should endeavour to keep in touch with all the members, especially the newer ones.

When any open competition is earmarked by the committee as a subject for attack, club competitions for similar models under similar conditions should be arranged for at least two or three weeks prior to that event, and prizes offered for the same. The club's chance of scoring on the eventful day will be greatly increased if this be done.

In conclusion, a word of advice to aeromodellists. Do not build a model hurriedly; even if it should turn out any good at all, it will be sure to be unreliable. Also do not copy one or more of the crack fliers' machines; let it be seen that your model is your own work and brains. If you must copy something do so, but don't steal a whole machine; try to effect some original improvement whether doubtful or otherwise; you will at least learn something by your experimenting.

What is Model Work?

A correspondent sends us a post-card, in which he says "that in his opinion matter has recently appeared in this section which is not of a 'model' character." Our correspondent refers, we presume, to the paragraphs dealing with man-carrying gliders. This raises the interesting question of what is and what is not model work.

In considering this question, relative to which in all probability no two people would hold exactly the same opinion, the question of the influence and value of such work on aeronautical progress in general is one which should not be lost sight of. This means that the scope of the work should be as extensive as possible. The question of *size* is not one that of necessity comes into consideration at all. Speaking generally, "models" are not unfrequently made *larger* than the originals. This is not so, of course, in aeronautical work—not, that is, of machines as a whole, although it is quite conceivable that it might be true of some particular *part* of the same, purposely built on an enlarged scale for testing or other purposes.

Whatever model work in a true comprehensive sense may or may not consist of, it most certainly does not consist *solely* in the making and flying of model aeroplanes; but in *all* useful and scientific work which can be carried out by the aid of such, no matter what the actual *size* of the particular apparatus in question may be.

Model aeronautical work is so intimately wrapped up and interwoven with aeronautical inventions that it is quite impossible (even were it desirable) to separate the two. Practical inventors usually make or have made a working *model* of their invention. This is often done for two reasons—firstly, to fully satisfy themselves that the idea is absolutely workable in practice, secondly, for demonstration purposes *re* intending purchasers of patents, &c.

Closely connected with this is the question of "aeroplane accessories." The writer has no idea of how many firms are "kept going" at the present time solely in manufacturing motor car accessories, but it must be a very large one. That the same will ever be proportionally true in accessories for aeronautical vehicles may be doubtful—certainly for some time to come. But it is always found that as any industry grows and becomes popular—so do the "accessories"—faster in fact than the industry itself.

Now a large number of such accessories would be of a distinct inventive character, and as such liable at any moment to become included in "model work."

Apart altogether from the question of accessories in general, there is plenty of scope at the present time for *self-recording instruments* of all kinds. What we want to know as soon and as quickly as we can is: *everything that every part of the aeroplane does under every circumstance*, or at any rate as much about it as we can. Undoubtedly much can be learnt from careful and painstaking research work carried out by means of "models." So far it cannot be said that the undertaking of research work has been viewed with much favour by aeromodellists in general. The reason of this probably is that there is not, or, to speak more correctly, there does not appear to be as much "sport" in this kind of work as in competition and record breaking flights. We do not know exactly how any particular person would define the term "sport." Undoubtedly it is something which affords "excitement" and very possibly "risk." Now some research work is undoubtedly almost, if not entirely, devoid of both these elements, but there is plenty which is not. There is plenty of experimental work in which the least carelessness or failure in any part of the mechanism means not only injury but even the certain death of the operator; just as there is other research work which, whilst fairly safe so long as one exercises ordinary care, most certainly could not be classed as lacking in "excitement."

Every art and science are so intimately bound up with one another at the present day that the worker in any one particular field, or even some especial portion of that field, not unfrequently finds his progress brought to a temporary check by his lack of knowledge of something in itself quite foreign to his own particular subject. Probably to no other subject does this fact apply so much or so often as it does to aeronautics. Not only does the student of aeronautics require a first-class knowledge of all mechanical subjects (to say nothing of mathematics) as well as motors, but he is bound ere long to find that he must add a knowledge of electricity as well.

Electrical energy, when it comes to a question of h.p. per given weight, is at present not in the running as a motive power for actually driving our flying machines—but we cannot drive our aero motors without its assistance, and if it at any time refuse its kindly aid our motor at once becomes useless.

Again, there is the question of "Wireless." It is extremely difficult to keep abreast of the latest wave in the ocean of knowledge—but we believe that up to the present, although wireless messages have been sent by an aeroplane in flight, they have not yet actually been received by the same. In the case of airships an allowance of a pound weight per mile is usually allowed—*i.e.*, to send out messages to a station and receive them from the same at a distance of 100 miles necessitates an apparatus about 100 lbs. in weight, viz., about 70 lbs. for the transmitting and 30 for the receiving parts.

Of course, nowadays, even so large a weight as 100 lbs. is not in any way prohibitive even in the case of an aeroplane, but supposing the apparatus so improved that the same results could be obtained with an apparatus of only one-half the weight, then this means one of two things: either for the same weight an apparatus having a much greater range; or the same range, but the ability to carry 50 lbs. more in the way of fuel, *i.e.*, a greater range of operations.

When one endeavours, however feebly, to take a broader and more extended view of what model work should or at any rate *could* be, one cannot help feeling some regrets that such fine mechanical ability and skill, to say nothing of technical and scientific knowledge correctly applied, should be devoted to the mere sporting side of the question, and so little to the research side.

Without in any way going into such a vexed question of how much or how little use may be made of airships and aeroplanes in the next great international struggle, it is universally agreed that use will be made of them, and that the *first*, and in all probability the *decisive*, battle will take place in the air. Even assuming this not to be the case—their value as detectors of enemies either in the air or on the sea (fog alone excepted) can scarcely be overestimated. Once detected, the knowledge of the exact whereabouts of the enemy at headquarters might be priceless. To fly with the news would be absurd; how can a speed of even, say, 140 miles per hour, compare with a speed of some 186,000 miles per second, or, in other words, the, to us, instantaneous transmission that "wireless" gives us? We thus see that the future of "wireless" and of aeronautical work, some of it undoubtedly model, are intimately bound up together. In fact, the more deeply one probes the subject, the more difficult it becomes to say what art or science is *not* more or less intimately bound up with aeronautics.

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

Affiliation.—Stony Stratford and District Kite and Model Aeroplane Club have become affiliated to the Association.

Club Stands at Olympia.—Croydon and District Aero Club have reserved a club stand, thus bringing the number of clubs to six. Other clubs please note and reserve a stand without delay, so as to save disappointment.

Prize Distribution and Lecture.—On January 9th, the *Model Engineer* (Aviation Section) Prize Distribution was held at Caxton Hall, Westminster, before a large gathering of members and friends. The President, Sir John C. Shelley, Bart., presided, and was supported by Lady Shelley, Messrs. A. W. Marshall, representing *Model Engineer*; B. Cooper, A.F.Ae.S. (Sec. Aeronautical Society); F. Handley-Page, A.F.Ae.S.; V. E. Johnson, M.A., Model Editor FLIGHT; E. E. Chiozza Money and members of the Advisory Council. Lady Shelley presented the following prizes:—In Class 1.—Power-driven models: D. Hiscox, Bronze Medal and 1st Class Diploma. Class 2.—Hydro-aeroplanes: Mr. L. H. Slatter, Silver Medal and 1st Class Diploma; Mr. W. J. Williams, 1st Class Diploma; Mr. F. W. Jannaway, 2nd Class Diploma. Class 3.—Scale models: 1st, Mr. C. Desoutter, Silver Medal and 1st Class Diploma; 2nd, Mr. D. Hiscox, Bronze Medal and 1st Class Diploma; Mr. E. Micholls, 1st Class Diploma; 3rd, Mr. C. J. Lane, 2nd Class Diploma. Class 4.—Rise-off-ground models: J. E. Louch, Silver Medal and 1st Class Diploma; F. Wilkinson, Bronze Medal and 1st Class Diploma; L. H. Slatter, 1st Class Diploma; H. C. Bond, 2nd Class Diploma. Class 5.—Aero. motors: 1st, Mr. F. Mayer, Silver Medal and 1st Class Diploma; 2nd, Mr. C. Desoutter, 1st Class Diploma. All the above medals and diplomas were presented by Mr. J. Percival Marshall. The Leytonstone Ae. Club were presented with the handsome silver medals, presented by Mr. F. K. McClean, for the team contest in connection with the above. The team were: J. E. Louch, H. C. Bond, S. C. Hersom, F. E. Grattan, F. H. Hawthorn and H. Bedford. After the presentation Sir John called upon Mr. F. Handley Page, A.F.Ae.S., to lecture on "The Dependence of Aviation on Experimental Model Work," which was so ably delivered, that all present were only too sorry when over, but a full account will be given on Mr. Johnson's page. Special votes of thanks were accorded to the lecturer, moved by the hon. sec., seconded by Mr. B. Cooper; to Mr. Percival Marshall, moved by Mr. L. Ingram, seconded by Mr. V. E. Johnson; to Mr. F. K. McClean, moved by Mr. F. E. Grattan, and seconded by Mr. Towers, both of Leytonstone Club; to Sir John and Lady Shelley, by the hon. secretary, seconded by Mr. A. F. Houlberg. The meeting was the most interesting and instructive one that has been held, and it is hoped that other full-size designers and makers will come forward and give lectures, for it is by model experiments that money and time can be saved.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

JAN. 18TH, at 10 a.m., flying, Wanstead Flats, as usual. If wet meet at club room.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

JAN. 17TH, flying at Sudbury.

Sheffield Ae.C. (50, SPRINGHOUSE RD., WALKLEY, SHEFFIELD).

JAN. 17TH, at 2.30 p.m., general meeting at club room to decide whether the workshop is to be continued or not, also other business. Every member should make an effort to be present. Jan. 24th, at Standhouse Aerodrome, Intake, at 2.30 p.m., the tractor biplane contest for Mr. Manton's medal (weather permitting).

Wimbledon and District (165, HOLLAND ROAD, W.).

JAN. 17TH and 18th, flying as usual.

UNAFFILIATED CLUBS.

Edinburgh Aeronautical Society (41, DRUMSHEUGH GARDENS).

MR. W. H. EWEN will give two cinematograph lectures on "Learning to Fly" in the Princes Cinema, Princes Street, at 3 p.m. and 8 p.m., on Tuesday, Jan. 20th. Members, on showing their membership card, will be admitted free.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

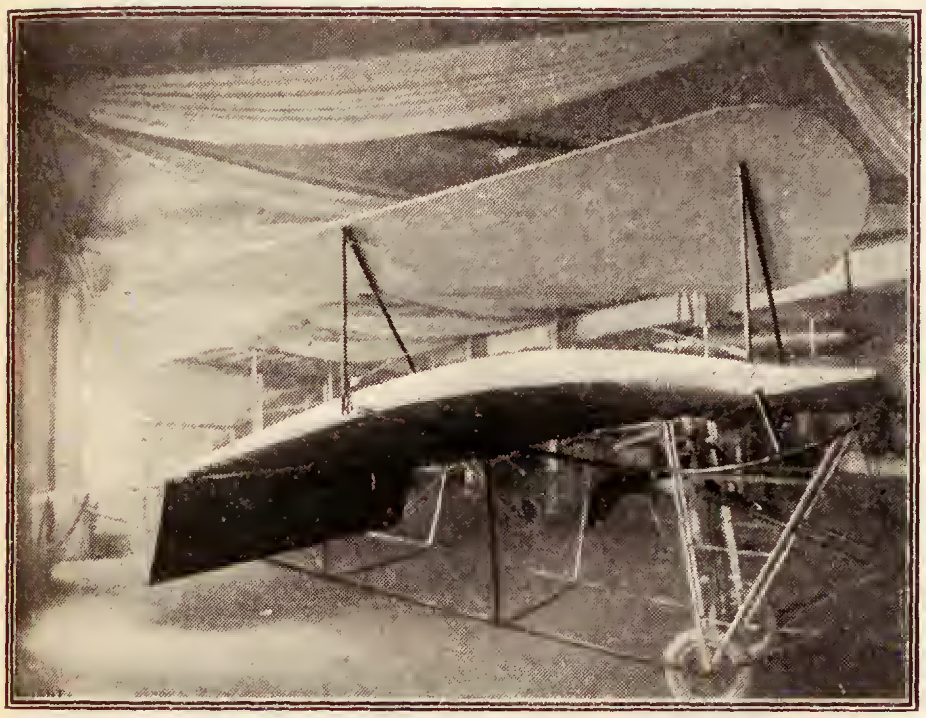
JAN. 17TH, Woolwich Common, 3.30 p.m. until dusk. Jan. 18th, Blackheath, 7.30 to 10 a.m.; Lee Aerodrome, 10.30 a.m. to 12.45 p.m. Members are requested to accelerate the construction of models intended for the club's first indoor exhibition, to be held at the Central Hall, High Street, Peckham, on the last Thursday in this month, 7 to 10 p.m. Admittance free. Every member is expected to exhibit.

CORRESPONDENCE.

An American Stabilizer.

[1821] In the January 10th issue of FLIGHT, page 49, mention is made of a new form of stabilizer that is being tried in America on a Curtiss biplane, and which, from the account, "materially increased its lateral stability." Four years ago in New York I tried out almost an identical device with Mr. Walden on a monoplane, but instead of using one large central plane there were two small flat ones, each tilted up on its inside edge, and mounted about 2 ft. above the extremity of each wing tip, as shown in the accompanying photograph. Like Mr. Fiske's arrangement, these small planes were supposed to combine the good qualities of a dihedral without any of the disadvantages, but I must admit that the result of experiments made at the time showed the machine to be more stable without them than when they were in place.

Whenever a side-gust struck these auxiliary surfaces the machine would rock violently, so that they had to be discarded. Theoretically, they might have restored balance in the case of a side-slip, but as in those days one did not indulge in such things intentionally, and I never had the misfortune to do it accidentally, I never determined whether they would work or not. The machine was shown at the first aero-motor show in New York, and was commented upon in the technical press at the time. It would be interesting to know that, if the device used on the Curtiss biplane really does improve its lateral stability, whether a plain vertical fin mounted in the same position would not be equally effective.



G. M. DYOTT.

A Warning to Pilots.

[1822] After reading Mr. Harris Booth's interesting article on the subject of air speed indicators, I expected to find your last issue full of correspondence on the subject. Is it that pilots take no interest in the instrument which is going to be the means of saving innumerable lives, or is it that they think the liquid gravity controlled air speed indicator good enough?

I am a little doubtful about writing on this subject, as having myself placed a spring controlled air speed indicator on the market I do not want to appear to be pushing my own inventions; on the other hand, the matter is so important that I think it is my duty to back up what Mr. Booth has said on the subject.

Without going deeply into details as to the most usual types of accidents to aeroplanes, I think it may be safely stated that more occur due to "stalling" than to any other cause, consequently any instrument that can be depended upon to give an exact indication of the speed at which the machine is moving through the air must be of immense value, as provided that the speed is kept within the flying limits of the particular machine, stalling cannot take place.

Take an example of a machine capable of flying normally at 65 m.p.h., its most efficient climbing speed may be in the neighbourhood of 45 m.p.h., and its most efficient gliding speed will probably also be about 45 m.p.h. Fitted with a *spring-controlled* air speed indicator of reliable make, it will be quite safe to elevate the head of the machine to such an extent that the speed drops until it shows 45 m.p.h., and the pilot will then know that he is climbing *safely* at such an angle that he will arrive at a maximum height in the minimum time. (A small allowance is required for loading.) Now, supposing the motor slowly loses power, the pilot still keeping his speed indicator at 45 m.p.h. To do so he will find he has to move his elevator so as to climb less steeply, and the more the engine fails the more he will have to lower the head of the machine until in the extreme case the motor stops altogether. The head of the machine, to maintain the 45 m.p.h., will by this time have had to be lowered until the machine is planing at approximately its best gliding angle, and all this has been done simply by the pilot keeping the pointer of his air speed indicator on 45 m.p.h.

The above machine gliding at 45 m.p.h. will probably glide efficiently at something under this speed, so that the machine will always be well in hand by observing the air speed indicator, and keeping it anywhere between 40 and 50 m.p.h.

If a gust hits the machine, the indicator records the change in speed immediately, so that an inexperienced pilot with an air speed indicator can get better results all round than a more experienced pilot without such an instrument. All the previous remarks are based on having a *spring-controlled instrument*, and do not apply at all where a *gravity-controlled one* is used.

Returning to our machine climbing at 45 m.p.h., suppose as before the engine starts to lose power or the pilot elevates the head of the machine so much that the speed falls to such an extent that it begins to pancake. This means an acceleration downwards acting on the column of liquid, thereby causing the liquid to rise in the tube and to show a much higher speed than that which should be shown due to the pressure on the Pitot tube. The pilot gets a false impression of his speed, and if not very experienced he thinks he can put the head of the machine up still more, whereas the opposite movement is what is immediately necessary.

In the case of a machine gliding at its proper speed, the pilot through inattention or changes in the atmosphere may drop the speed of the machine somewhat. Acceleration downwards takes place, and the reading on the liquid air speed indicator may actually show a higher speed than before, although the speed of the aeroplane may be much slower and actually in a state of stalling.

There is not the slightest doubt that *liquid air speed gauges must go*, and in fact several other gravity-controlled instruments as well, and the sooner the better, as every pilot who goes aloft relying on one is relying on not only an instrument which gives wrong readings, but unfortunately gives a false sense of security at the very moment when the air speed indicator should be of the utmost value, namely, in bad winds, in climbing, in gliding and banking, and in landing.

I think Mr. Booth deserves great thanks from all interested in aviation for pointing out this important matter.

E. HOLLOCOOMBE CLIFT, A.F.Ae.S.

Sinclair Road, W.

[1823] With regard to Mr. Harris Booth's interesting communication on the failure of the Pitot tube liquid gauge to indicate changes of speed relatively to the air caused by gusts, it seems pertinent to remind your readers that a Pitot-tube anemometer,* with a spring control, and balanced for the inertia effects Mr. Booth discusses, was exhibited at the International Congress at the Paris Aeronautical Exhibition just over a year ago. With regard to inertia effects in general, instruments and apparatus for use on aeroplanes are being put forward in large numbers, whose action depends on the action of gravity on pendulum bobs, columns of mercury and so on.

Sometimes the models are pretty and ingenious mechanical arrangements, and work nicely on a table. But in all such cases the application of an ounce of theory, in the shape of the elementary rule that the effective weight of the columns of mercury, &c., is compounded of the earth's attraction and the reversed acceleration of the instrument relatively to the earth, can alone predetermine whether the apparatus is sound in principle and should be experimented with, or unsound and to be dropped.

If "practical" engineers prefer to try to find exceptions to Newton's laws of motion by mounting expensive full size apparatus on aeroplanes, they are not the only people in the world spending money on schemes that are predestined to fail.

ARCHIBALD LOW.

[* Mr. Low presumably refers to the Toissiant Lepère air-speed recorder, described in FLIGHT for July 5th last, in which the two leads from the Pitot tube are connected to two chambers, each of which contains a concertina bellows, and so arranged that whilst the outsides of the latter are subjected to the Pitot tube pressures, their interiors are open to the atmosphere. A spring is incorporated in this instrument to regulate the movement of the bellows and of the pointer attached thereto.—ED.]

Aeronautical Courses for Students.

[1824] With your permission I wish to take the opportunity of replying to Mr. L. Blin Desbleds' letter, published in your issue of the 3rd inst., and to set forth as a matter of history, some of the facts relating to the aeronautical work at this Institution.

In the first place, however, let me clear the ground by pointing out that Mr. Posner's letter in your issue of December 20th, 1913, on which Mr. Desbleds comments, does not claim that the proposed club is the first of its kind, but that the aeronautical course at this Polytechnic "is believed to be the only complete course at present being given in England."

During the session 1908-09 Dr. R. Mullineux Walmsley, the Principal of the Northampton Polytechnic, and the writer, considered the question of inaugurating complete courses of instruction in aeronautics of a pioneer character, and requisitions were made to the educational authorities with this end in view. Before the end of April, 1909, it was definitely decided that the instruction should consist of :—(1) Lectures in Aeronautics; (2) Drawing Office Practice; (3) Laboratory; (4) Calculations.

Following these decisions it became necessary to find a special lecturer and instructor, and Dr. Walmsley, after making enquiries among well-known experts, approached Mr. Blin Desbleds in May, 1909. The provisional proposals were finally approved by the Governing Body in June, 1909, and Mr. Desbleds was appointed "Instructor in Aeronautical Engineering" early in July, 1909. Complete syllabuses for the session 1909-10 were in type early in July, 1909, before any announcement of similar work elsewhere had been made, and the whole scheme was widely referred to in the Press at that date. Mr. Blin Desbleds was announced as the lecturer, and for the other work he had as colleagues several full-time members of the staff, including the writer of this letter and Mr. R. O. Boswall, B.Sc.

It is worthy of note that in organising and developing these instruction courses no attempt was made to deal with the work from the popular point of view. They were, and are, a serious and definite attempt to place educational work in aeronautics on a sound engineering basis; and the Club recently formed requires as a condition that its members shall also attend for instruction a part or parts of the regular class work. For the session's work, 1909–10, twenty-three students joined for the full course of instruction in the four subjects, and, in addition, thirty-five for the lectures, nine for the drawing office work, giving totals as follows: Lectures 58, drawing 32, laboratory 23, calculations 23. The work was carried on through the session 1909–10, and was continued and considerably extended in the sessions 1910–11, 1911–12 and 1912–13, with Mr. Handley Page as lecturer.

In the current session specialisation is the key note, the rapid developments in the science and practice of aviation rendering this necessary. The lecturers and instructors are:—Mr. C. E. Larard, M.Inst.C.E., M.Inst.M.E, Head of the Mechanical Engineering Department; Mr. F. Handley Page, A.F.Aë.S.; Mr. G. A. Burls, M.Inst.C.E., M.I.A.E.; Mr. T. W. K. Clarke, B.A., A.F.Aë.S.; Mr. R. O. Boswall, B.Sc., A.F.Aë.S.

The lectures are divided as follows:—

(*a*) Three series by Mr. F. Handley Page, dealing with: (1) Principles and Data; (2) Design Data; (3) Machines.

(*b*) Aerial Propellers (Their Theory and Design). By Mr. T. W. K. Clarke (by special permission of the Superintendent of the Royal Aircraft Factory).

(*c*) Aero Engines. By Mr. G. A. Burls.

The other work in drawing, design, calculations and laboratories represents a considerable development on the original scheme.

I would emphasize the fact that now, as during the session 1909-10 and onwards, real laboratory work forms an essential part of the instruction. No course of instruction worthy of the name can be said to be "complete" without experimental work in a properly-equipped laboratory. At the Northampton Polytechnic Institute there is a special aeronautical laboratory containing much valuable apparatus suitable to the students' requirements, as well as other apparatus for research work, with the aid of which valuable researches have already been made, with subsequent publication. It is, therefore, claimed that the course offered is a "complete" one, and I have yet to learn that such a course as ours is available elsewhere, either in this country or abroad.

CHARLES E. LARARD.

Mechanical Engineering Department, Head of Department.
Northampton Polytechnic Institute,
London, E.C.
January 13th, 1914.

[1825] When writing as secretary ot our new Aeronautical Club at the Northampton Polytechnic, Clerkenwell, E.C., no claim was made by me that we were the first club founded for this purpose. Others have been founded before, although lack of funds has generally limited the scope of their operations to the building of gliders or models.

We have, however, the good fortune to have been presented by the Governing Body of our Polytechnic with all the materials, free of charge, for a full-size power-driven aeroplane, as well as having the necessary tools to build it with, and workshop and laboratory accommodation to build it in.

Arrangements are made that, when the machine is complete, one of the club members who already has his pilot's certificate will instruct the members in flying.

The benefits of the club are evidently appreciated by the members who applied for particulars and have since joined. We had to limit the membership to those who would at least take the Institution's Aeronautical Workshop and Laboratory Course so that the work might be carried out on an engineering basis, as befits a club connected with a serious educational institution.

Anyone now desirous of joining the club should write to me at the address below. There are vacancies for three or four more members.

H. POSNER,
Northampton Institute. Secretary London Aero Club.
St. John's Street, E.C.

* * *

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

Meeting.—The fifth meeting of the forty-ninth session will be held on Wednesday, January 21st, at 8.30 p.m., when Sir Alfred Keogh, K.C.B., F.R.S., will preside. Mr. Leonard Bairstow, A.R.C.Sc., will read a paper, to be followed by a discussion, on "The Stability of Aeroplanes," illustrated by experiments with model gliders.

Members are reminded that, under the Rules, they may introduce visitors to General Meetings.

Tickets for visitors, not introduced, may be obtained from the Secretary, 11, Adam Street, Adelphi, W.C.

BERTRAM G. COOPER, Secretary.

* * *

NEW COMPANY REGISTERED.

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* * *

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	Imports.		Exports.		Re-Exportation.	
	1912.	1913.	1912.	1913.	1912.	1913.
	£	£	£	£	£	£
January	619	12,097	2,412	4,005	—	1,510
February	3,110	17,361	36	3,447	—	690
March ...	640	20,425	950	1,924	600	1,042
April ...	4,820	15,593	72	5,524	50	1,413
May ...	7,494	51,241	1,350	3,726	154	830
June ...	7,928	14,905	419	1,408	300	1,106
July ...	13,794	14,469	5,376	3,812	967	1,250
August...	8,559	17,993	1,342	2,805	2,040	510
September	6,575	19,409	2,885	6,263	1,626	1,470
October	6,836	21,041	3,128	3,674	605	2,163
November	8,455	16,607	2,002	3,306	405	1,449
December	11,290	22,955	1,824	6,851	3	1,439
	80,120	244,096	21,796	46,745	6,840	14,872

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OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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CONTENTS.

	PAGE
Editorial Comment:	
The Aeroplane in War. A New Phase	79
Aircraft and Wireless	80
Men of Moment in the World of Flight: The Pashley Brothers	80
Gravity Controlled Velometers	82
The Forlanini Airship	84
The "Upside-Down" Dinner	86
From the British Flying Grounds	89
Royal Aero Club. Official Notices	91
Eddies. By "Will o' the Wisp"	92
Science and Aviation	93
Flying at Hendon	95
The Euler Hydro-triplane	95
Aero Engines at the Paris Show, 1913	97
The Stability of Aeroplanes. By Leonard Bairstow, A.R.C.Sc.	98
Foreign Aircraft News	101
Models. Edited by V. E. Johnson, M.A.	103
Correspondence...	104

EDITORIAL COMMENT.

The Aeroplane in War. A New Phase.

We have come to accept the aeroplane as being an essential part of the equipment of a modern army in the field, but hitherto the discussion as to its actual and potential uses has been confined entirely to the combatant side of war. That is to say, authorities and experts have agreed, for example, that for reconnaissance work aircraft are indispensable, the only problem connected with this side of their work being the exact limitations of their work in the face of hostile craft, and their precise value to a commander who is operating in close country. On the question of the actual combatant value of the aeroplane—that is, its use for purposes of aggression—the views are more diverse, and much interesting discussion has eventuated between the two schools of military thought, the one which holds that the use of aircraft will be entirely restricted to scouting and reconnaissance generally, and the other which attaches distinct aggressive value to the aeroplane and the dirigible.

It has remained for Lieut.-Col. Donegan, of the Royal Army Medical Corps, to call attention to the possibilities of aircraft for medical service in time of war. In the course of a lecture at the United Service Institution last week, he described a portable surgical equipment, invented and arranged by himself, for use in connection with aeroplanes and medical field service. The equipment consists of a collapsible operating table, which can also be utilised as a bed and a stretcher, and enough surgical material for fifteen or twenty operations. The table has a heating arrangement, and is practically unbreakable, while the whole equipment weighs about 90 pounds. Col. Donegan estimates that a modern military biplane could convey it, with three medical assistants in addition to the pilot to any part of the battlefield at which it might be needed.

Discussing the whole question of the use of aircraft by the medical department of an army in the field, Col. Donegan said that in many instances a captive balloon, suitably marked, would indicate the position of the field hospital far better than flags. Airships would be useful for swiftly conveying certain classes of patients to a base hospital. Aeroplanes would not be as useful for this duty, but he foretold that in the wars of the future, when the aeroplanes of an army had carried out their work of scouting and the main engagement had commenced, they would be placed at the disposal of the medical corps. They could go out and scout for wounded, and would bring information to the officer commanding, which would enable him to decide, without guesswork, where and in what numbers his staff was needed. They could bring specialists from headquarters or the nearest city, and, if necessary, they could convey a wounded man in one hour a greater distance than he could be transported in four days by ordinary field service means. Aeroplanes could save an enormous amount of communication by heliograph or wireless, as the commanding officer could travel swiftly to any given place at any moment, and see what the position was with his own eyes.

Aeroplanes for military purposes would probably grow in size and power, as the last French manœuvres had demonstrated that three observation officers were needed, in addition to the pilot, to study cavalry, infantry and artillery dispositions respectively, and when the necessary aircraft were off military duty the three vacant places would be filled by the three surgical assistants, plus the portable equipment.

We have no comment of our own to offer, save that Col. Donegan's lecture, interesting as it is from the purely technical point of view relating to the treatment and removal of the wounded on the field of battle, becomes doubly so when it is regarded as yet another instance of how entirely commonplace dynamic flight has become in these latter days. At the risk of becoming hackneyed, we cannot refrain from saying that it is all very wonderful how the thing has become so much of an accepted fact, when we reflect that not ten years ago the man who prophesied that we should ever fly at all would have been regarded as well qualified for a lunatic asylum.

It is significant, too, that Col. Donegan's military audience had no word of criticism to offer upon the possibility of utilizing the aeroplane in the manner suggested. Apparently, they were content to accept the entire feasibility of the idea. Brig.-Gen. Stone certainly thought that Col. Donegan was unduly sanguine as to the availability of a sufficient number of machines for carrying out the work outlined. He suggested that the medical service should be supplied with such a number of aeroplanes as might be necessary, and that they should form part of the Army establishment. Lieut.-Gen. Bethune, who presided, agreed that the lecturer had made out a good case for his proposals, and in order that they might be efficiently carried out, he thought that a sufficient number of suitable machines ought to be provided and earmarked for the purpose. Not a word, it will be seen, as to the physical possibility of carrying out the work on the suggested lines. That anything will be done yet, it would be too much to hope—we must first get enough machines for our combatant needs—but it is quite clear that the uses of aircraft in war have by no means been exhausted in the discussions that have turned about them.

Aircraft and Wireless.

It has been an open secret that Mr. Marconi has been carefully studying a system of transmitting wireless messages from aeroplanes. It is therefore gratifying to learn that he has made such progress that experiments are shortly to be carried out at Hendon which will demonstrate the degree of success obtained. At present this branch of wireless telegraphy has not progressed much beyond the elementary stage, but the increasing range of the aeroplane has made an improved system essential, and it is anticipated that Mr. Marconi, who has made several flights with Mr. Hamel, will evolve apparatus which will meet the demands of the naval and military authorities.

Very little has been heard as to the details of wireless experiments which have been carried out on the Continent, though it is understood that the French naval authorities have met with a very fair measure of success both in the transmission and receiving of wireless messages by aircraft, and particularly by aeroplanes. Nor have we heard much more of the experimental work which we have reason to believe has been in course of execution on this side of the Channel, and, in the light of the above information, it would seem that the reason is because there has been nothing to tell. In other words, the measure of success attained has not been such as to encourage the experimenters to talk about it. That the difficulties will be solved we have no manner of doubt, and once they have been overcome it is manifest that the usefulness of the aeroplane, particularly for military and naval work, will be very greatly extended. In fact, a really reliable wireless installation suitable for such work would increase the value of scouting aircraft out of all knowledge.

THE PASHLEY BROTHERS.

PILOTS.

THE first acquaintance of the Pashley brothers with practical aviation dates back to May, 1909, when they commenced experimenting with a glider. Some time after that their ambition for something a little more exciting was met by a 25 h.p. Anzani-Blériot on which Cecil Pashley made several excellent flights, while Eric at his first attempt flew the length of Brooklands aerodrome at a height of 30 ft. In January, 1911, they did some flying on a Lane monoplane, and later, on joining the Universal Aviation Co., a lot of work was carried out on a Sommer biplane, on which Cecil qualified for his *brevet* in July and Eric in September, the qualifying flights being made at Brooklands. Then some good results were obtained with a Humber monoplane until July, 1912, when the Sommer biplane was reverted to, and on this several of the week-end races were secured. In January, 1913, Eric Pashley was starting on a cross-country flight to Shoreham, when ensued the collision with another machine which led to the historic case in the High Courts which was reported in FLIGHT a week or two back. In the following May, having transferred their headquarters to Shoreham, both brothers commenced flying a Henry Farman, and their activities during the season included some tours by air, embracing visits to a large number of towns in the South of England, the aggregate distance traversed being very little short of 10,000 miles. It will be remembered that several photographs taken from the Pashleys' Farman machine by Mr. Clarence Winchester have been reproduced in these pages. Unfortunately Eric Pashley was involved in a motor cycle accident in August last which necessitated being laid up for some time, but he has since recovered, and is able to pilot the machine again. Whenever the weather is not too bad, either one or the other of the brothers may be seen flying the Farman 'bus at Shoreham, from which place they often make cross-country trips with passengers.

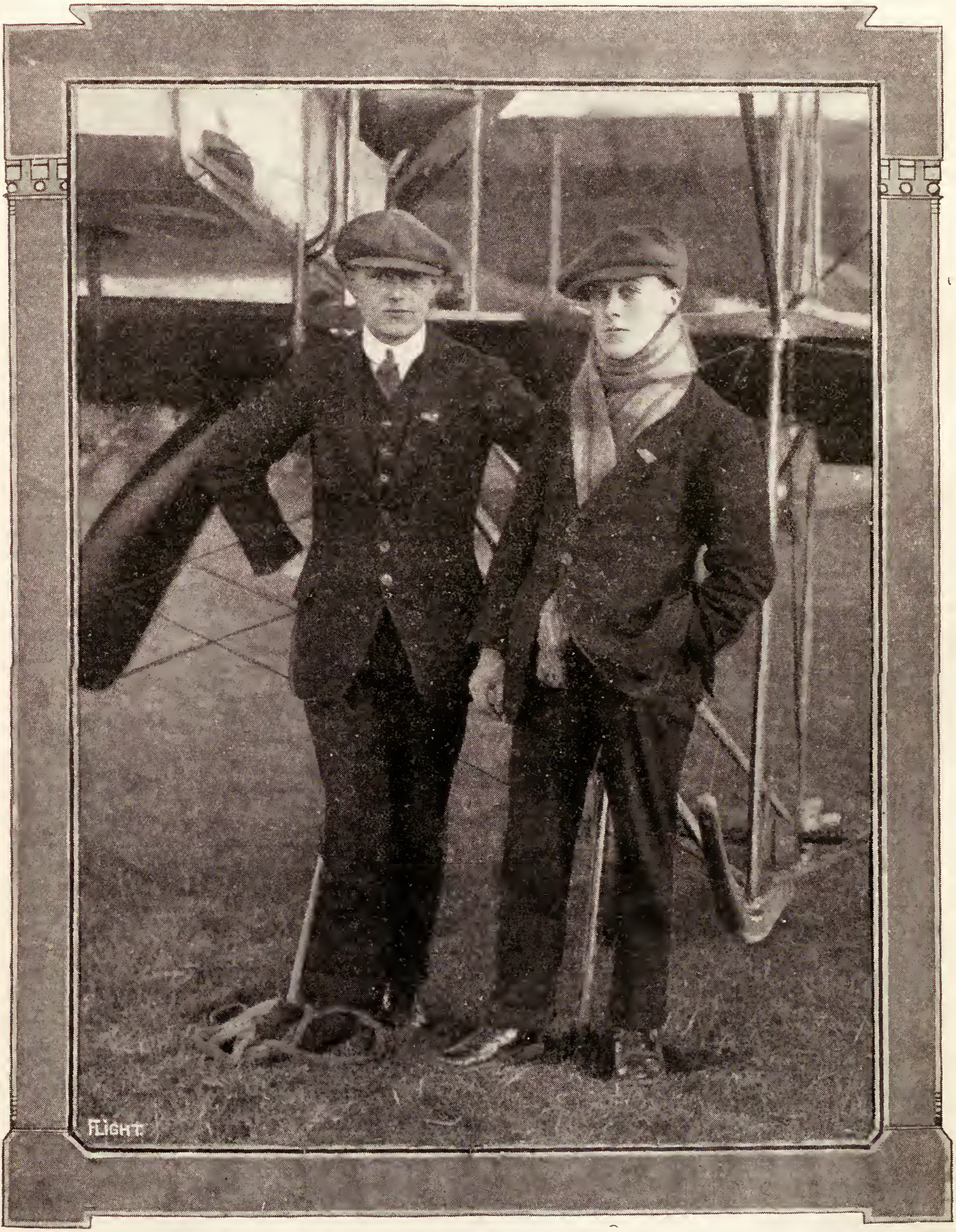
THE HAWK.

French Military Pilots' Certificates.

SEVERAL modifications have recently been made in the regulations governing the issue of the French military or "superior" pilot's certificate which may be secured by civilian pilots through the Aero Club of France. Candidates must produce a certificate showing that they have fulfilled their obligations regarding military service, and they must pass an examination in map reading, meteorology, construction and regulation of aeroplanes, and the working of motors. They will also have to make certain practical tests in the air. 1. A flight lasting more than an hour, the altitude during this time to be at least 1,000 metres, and not more than 1,200 metres. 2. Make a *vol plané* landing with motor stopped from a height of 500 metres above the ground, the machine to land not more than 200 metres from the spot indicated in advance, and without the motor being switched on again. 3. Three cross-country flights, the first a triangular one of 200 kiloms. (the shortest side of the course to be more than 20 kiloms.) with two stops at predetermined points, the flight to be made on one machine and in a maximum time of 48 hours.

The second and third flights will be of 150 kiloms. in a straight line, one to be made non-stop and the other to be made between sunrise and sunset with a stop indicated in advance.

MEN OF MOMENT IN THE WORLD OF FLIGHT.



THE PASHLEY BROTHERS—ERIC AND CECIL.

GRAVITY CONTROLLED VELOMETERS.

Two main kinds of instrument are used for indicating the speed of an aeroplane through the air. Both depend on the dynamic pressure of the air acting on some part of the instrument, but they differ in the nature of the opposing force. When this control is by springs or their equivalent we may call the instrument an air speed indicator, and when gravity is the controlling force the term velometer may be used.

These appliances are distinct and are useful for different purposes. The spring controlled air speed indicator will tell the true air speed at any moment, and when it is desired to know this, as for instance for purposes of scientific investigation, it should be used. It also has the advantage of not depending on a liquid gauge, so that it is perhaps easier to make fool proof.

The velometer, on the other hand, does not tell the true air speed at any moment, but it does give definite information as to safety, warning the pilot if he is in danger of over-stepping the limits of control of his machine.

It is suggested that some confusion between the two objects exists in the article in FLIGHT of January 3rd, entitled "A Warning to Pilots," since in that article pilots are warned against the very peculiarity which makes for safety in the velometer type of instrument. This would have been clear if Mr. Booth had carried his argument a little further in the above article.

Mr. Booth showed, quite rightly, that since the apparent weight of objects on an aeroplane is affected by any up or down acceleration of the aeroplane, therefore the apparent weight of the liquid in the gauge is so affected. This was, I think, pointed out by Mr. Horace Darwin last year in his paper before the Aeronautical Society. The result is that the velometer does not always read the true air speed. Here Mr. Booth's argument stops. Let us carry it a little further and consider, firstly, what it is that a practical flyer should be informed of so that he can fly safely, and, secondly, what it is that the velometer tells him.

It will then be plain that the two are the same, and that the velometer tells him exactly what he wants to know.

The argument following may be summarized by saying that gravity is our enemy on an aeroplane, and air speed is our friend, and the velometer, by balancing gravity against air speed, shows us whether friend or foe is the stronger.

In Mr. Booth's first paragraph he mentions that the velometer is used as a safeguard against stalling.

The term "stalling" denotes the condition of affairs when the wings have reached a certain large angle of incidence. Beyond this angle, which is different for different wing shapes, the form of the air-flow round the wing changes, and a dead air region forms above the wings. The results of this are :—

(1) The lift falls suddenly, and a further increase of angle of incidence reduces the lift still more.

(2) The drift of the wing is increased considerably.

These cause the machine to be uncontrollable, (1) causing the ordinary warping motion to have an effect in the opposite direction to that expected, and (2) causing the aeroplane to further lose speed, so that an unusually prolonged dive is necessary before the ordinary speed is regained.

The above effects must be familiar to all pilots and students of flight, and I merely recapitulate them to point out that the cause of the trouble is in the largeness of the angle of incidence, and only incidentally the smallness of the speed. Such uncontrollability is bound to result, whatever the speed, if only the angle of incidence is made large enough.

It is, therefore, of excessive angle of incidence that flyers require to be warned.

Let us now further consider what are the exact conditions under which excessive angle of incidence occurs.

The lift produced by the wings is, in flight, always equal to the apparent weight of the aeroplane.

The latter is the sum of the components perpendicular to the wings of (a) the actual weight plus (b) the force necessary for any acceleration that the machine is performing, as, for instance, the centrifugal force during a banked turn. When the angle of incidence is nearly as great as the critical angle, the planes have reached their maximum lift coefficient. The lift which occurs then cannot be increased without increasing the speed, and it (*i.e.*, the lift at the critical angle) is equal to a quantity which varies as the square of the speed. As long as the apparent weight of the aeroplane is less than this quantity, so long will the lift coefficient be less than the maximum, and the angle of incidence less than its critical value.

To put it more exactly, the maximum lift is equal to : (maximum lift coefficient) × (area of planes) × (ρ, the density of air) × $(\text{speed})^2$.

The first two terms are constants, so we see that for safety it is necessary that : (apparent weight of aeroplane) $<$ (*a* constant) × ρ × $(\text{speed})^2$.

Turn now to the velometer and consider what it shows. This instrument balances a pressure due to the speed through the air against the apparent weight of a column of liquid.

The pressure received from the pressure head is equal to : (*a* constant) × ρ × $(\text{speed})^2$.

The apparent weight of the column of liquid is proportional to the apparent weight of everything else in the aeroplane, and therefore, of course, to the apparent weight of the aeroplane itself.

The velometer, therefore, shows us the relation of (apparent weight of aeroplane) to (*a* constant) × ρ × $(\text{speed})^2$. And this is what the flyer wants to know, as has been shown above.

The two constants must, in practice of course, be calculated, and so the minimum reading for safety determined. This will be equal to the minimum safe speed reading, which one knows for any given aeroplane in terms of miles per hour for straight flight.

It has now been shown that the velometer may be relied on as a safety indicator whether flying straight or doing banked turns, sudden dives or flattening out.

Even with the velometer, however, there are times when full protection is not afforded, and it is for these times that a "warning to flyers" may be useful.

Thus a reading which is only just safe when flying straight may not be quite safe when turning. This is because it may be necessary to warp or bring the dihedral angle into effect, and both these increase the angle of incidence of part of the wing, and the flyer is not safe if any part of the wing exceeds the critical angle.

It will, therefore, be advisable always to have a good margin, and especially when turning.

Again, in the matter of turns, it must be remembered that the velometer is only a guide which asserts that the controls will work (*i.e.*, that the critical angle has not been exceeded). It must be remembered that as the speed is greater than that registered by the velometer, so the centrifugal force is greater, and the total force on the wings is correspondingly increased. A lift accelerometer would be the best indicator to give warning of the overloading of the wings which accompanies too sharp a turn. This instrument has only up to now been used in an aeroplane for research, and has not so far been used as a permanent fitting, and in default of this the velometer and angle of bank must be watched.

With regard to Mr. Booth's reference to gusts, it is a matter of experience that most gusts are so local that the greater part of the acceleration is over before any correcting can be done. In turbulent air it is usually sufficient to see that the mean reading of the velometer is above the safe minimum.

I fear that Mr. Booth's "second test" will be found a failure. No flyer could fail to notice the fierce fluctuations which are produced in an undamped velometer in a gusty wind. Mr. Booth would of course be right if every gust attacked every part of the aeroplane with equal intensity at the same instant and exactly in the direction of its travel. The turbulent motion of the wind is, however, very different from this. Gusts in every direction attack sometimes one part of the aeroplane, sometimes another. At one moment a local head gust affecting only the pressure tube and the part of the wing near it will send the liquid up in the gauge and merely lift one wing a little. At the next, perhaps, an up gust will envelop the whole aeroplane, raising it with a sudden jerk, and leaving the liquid to fall far down in the tube owing to the temporary increase of apparent gravity. The fluctuations of an undamped instrument are, in fact, so great that considerable damping is usually necessary for ease of reading.

When the aeroplane enters an extensive and strong up current, it may be necessary to use the elevator to keep a safe reading, but the effects of most up gusts are so temporary that even if they cause the critical angle to be reached, no harm is done, so far as experience extends, *i.e.* with winds in which the maximum readings have reached 55 m.p.h., at the R.A.F. Observatory, at Pyestock.

In the editorial remarks on Mr. Booth's article, it is to be observed that an ordinary U tube is referred to. Acceleration or tilting of this in its own plane will of course introduce a grave zero error. This difficulty has been overcome by Mr. F. Short's velometer, now used as a standard in the Army (and made by Messrs. Elliott Bros., Central Buildings, Westminster, and Messrs. Casella and Co., of 11, Rochester Row, Victoria Street. The method adopted is to split one limb of the U into two, putting half of it on each side of the other limb, thus: ɯ. The two outer limbs are connected together at the top and both connected to the Pitot tube.

Before leaving the subject, I should like to point out one more consideration which may have escaped the notice of scientists less experienced than Mr. Booth.

In the matter of high flying it is necessary to go faster as the air gets thinner. This is allowed for on all air speed indicators as well as in the velometer, by the fact that the density of the air is one of the factors determining the reading. It will therefore be safe if pilots keep the instrumental reading above the known minimum safe reading. They will be travelling faster than when near the ground, but the angle of incidence will be the same. In conclusion, the above considerations will, it is hoped, show that there is no occasion for that vague distrust of the velometer which Mr. Booth attributes to pilots. As long as the instrument and its connections are kept free from leaks and obstructions, so long may it be relied upon. And it is found that a short experience of its use convinces pilots of its value.

E. T. BUSK, A.F.Ae.S.

* * * *

Mr. Frank McClean's Progress along the Nile.

ON the 16th inst. Mr. McClean arrived on his Short waterplane at Luxor, and later went on to Assuan, while two days later he made some flights to the delight of the great crowd which had gathered to see the machine. On Monday he started to continue his flight south to Khartoum, but after flying about 130 miles had to return to Assuan, owing to trouble with the motor. He has had very bad luck with his motor, and had to spend several days at Assiut on account of a broken ball race which distributed itself in the crankcase.

Bonnier at Alexandria.

ON his Nieuport monoplane, and accompanied by his passenger, Bonnier, on the 14th inst., flew from Cairo to Alexandria in 2 hours 20 mins.

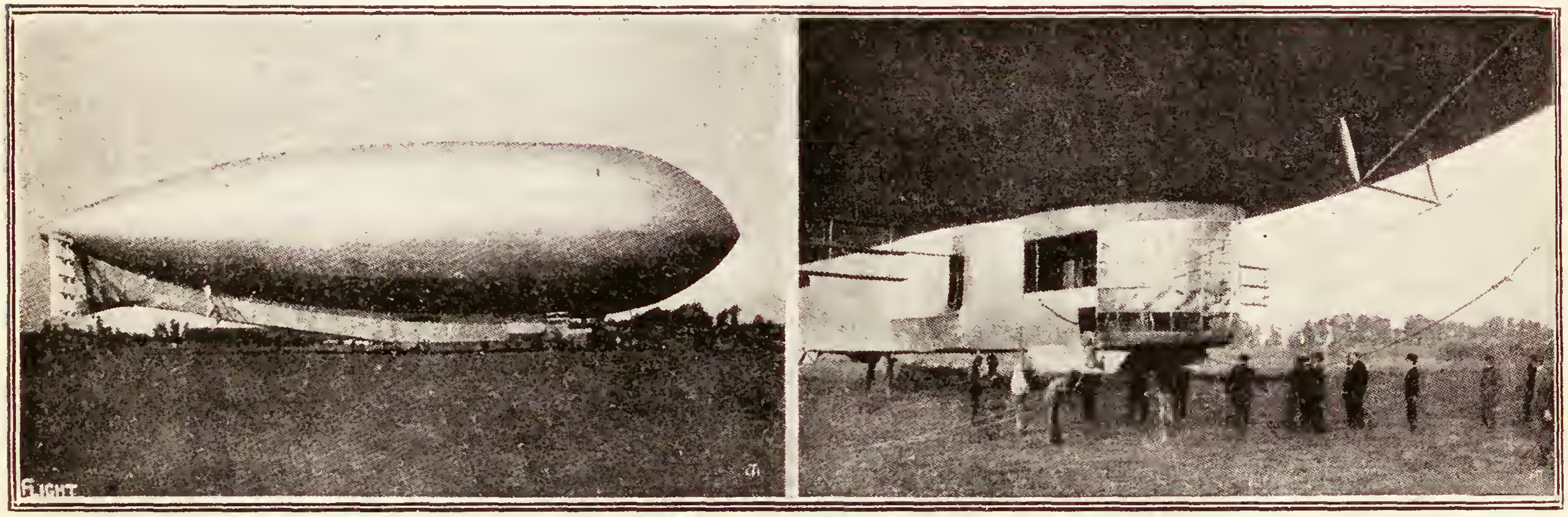
Marc Pourpe in Egypt.

WITH the intention of making a sight-seeing tour through Egypt, Pourpe left Khartoum on his Morane-Saulnier monoplane on Monday. He arrived at Atbara 4 hrs. 10 mins. later and stayed there for the day. The next day he went on to Abu Hamed, a trip of 2 hrs. 20 mins.

MR. FRANK McCLEAN IN EGYPT.—Banking on a sharp "taxi-turn" on the Nile on his 160 h.p. Gnome-engined Short waterplane.

THE FORLANINI AIRSHIP.

In view of the announcement that the Admiralty has ordered from Messrs. Armstrong, Whitworth and Co. a semi-rigid airship of the Forlanini type, the pictures and details of the system developed by the Italian engineer Forlanini, as exemplified in the airship "City of Milan," are of interest. This vessel made several trial trips in the neighbourhood of Milan last August, and during one of them Capt. Murray Sueter, R.N., of the Admiralty Air Department, was included among the passengers.



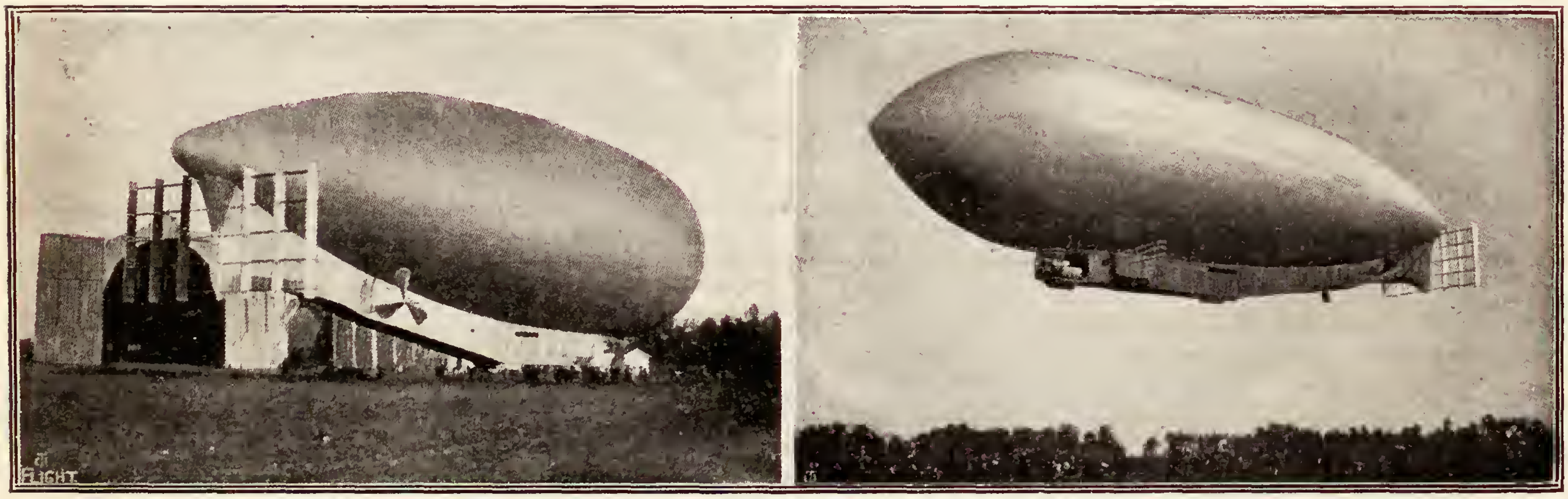
THE FORLANINI DIRIGIBLE, "CITY OF MILAN."—Her length is 72 metres and maximum diameter 18 metres. On the right is seen the observation cabin in front, the forward elevating planes and ventilators.

The general design of this latest Forlanini airship is similar to the original one called the "Leonardo da Vinci," which made her first ascent in July, 1909, but the envelope is nearly twice as long, while the diameter has not been increased very much. The actual length is 72 metres, while the maximum diameter is 18 metres, so that the ratio of maximum diameter to length is 1 to 4. The capacity of the envelope is 12,000 cubic metres.

Instead of occupying the usual position at the bottom of the envelope, the air-chamber of the "City of Milan," which compensates for the loss of gas, conforms to the shape o. the envelope; it communicates with the external air by means of apertures in the car, to be seen behind the pilot's cabin and beneath the forward elevating planes. It is provided with two fans, one of comparatively large power for use when the airship is at rest, and the other of less power for use when the airship is in motion, at such times as the compensation of the interior pressure is not already provided by the relative wind.

With a view to ensuring that the envelope maintains its proper shape, because of the high speed of which the "City of Milan" is capable, the car is directly attached to the rigid framework which forms the bottom of the envelope, to which are also fixed the supports for the propellers and the control planes.

The elevating surfaces are in duplicate, the front ones being arranged in three superimposed planes, and the rear set forming a grid with the rudders at the extreme rear. Besides acting as stabilisers—there being no fixed empennage—a certain amount of dynamic support is derived from them when the airship is in motion. The car, which occupies more than a third of the length of the envelope, is very large. In the front part, protected by mica and cellon windows, is the pilot's cabin, capable of accommodating a large crew, in which are situated the control levers, and a neatly arranged and very complete set of observation instruments. The rudder control is in the centre, whilst the elevator control is on the pilot's left.



Three-quarter views of the Forlanini airship, "City of Milan," as seen from behind and from in front.

The controls are worked by motor or by hand, the change from one to the other being effected by a simple clutch mechanism. The grouping of the control levers is such that they can be operated by one man.

In the middle part ot the car are the two water-cooled motors of 80–85 h.p. each, which work conjointly or independently. The two wooden propellers have a diameter of 4·2 metres, and a pitch of 6 metres.

* *

The Spiess Airship over Paris.

On the 16th inst., the French rigid dirigible "Spiess" with nine persons on board, made a trial trip above Paris. Leaving St. Cyr a few minutes after two, she passed above Puteaux and then followed the course of the Seine through the French capital, being manœuvred above the Government buildings on the way. She returned to her hangar at St. Cyr at four o'clock.

* *

Seventeen-Hour Voyage by "Adjudant Vincenot."

Leaving her hangar at Issy at 5.15 p.m. on the 16th inst., the dirigible "Adjudant Vincenot" was steered to Verdun and back without a stop, the journey taking over 17 hours, and the headquarters at Issy being regained at 11.20 a.m. on Saturday morning. The dirigible carried eight persons, and several times was in wireless communication with the Eiffel Tower.

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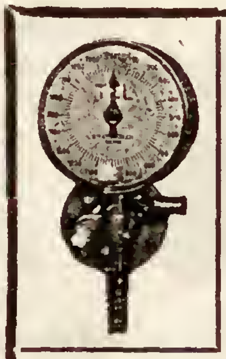

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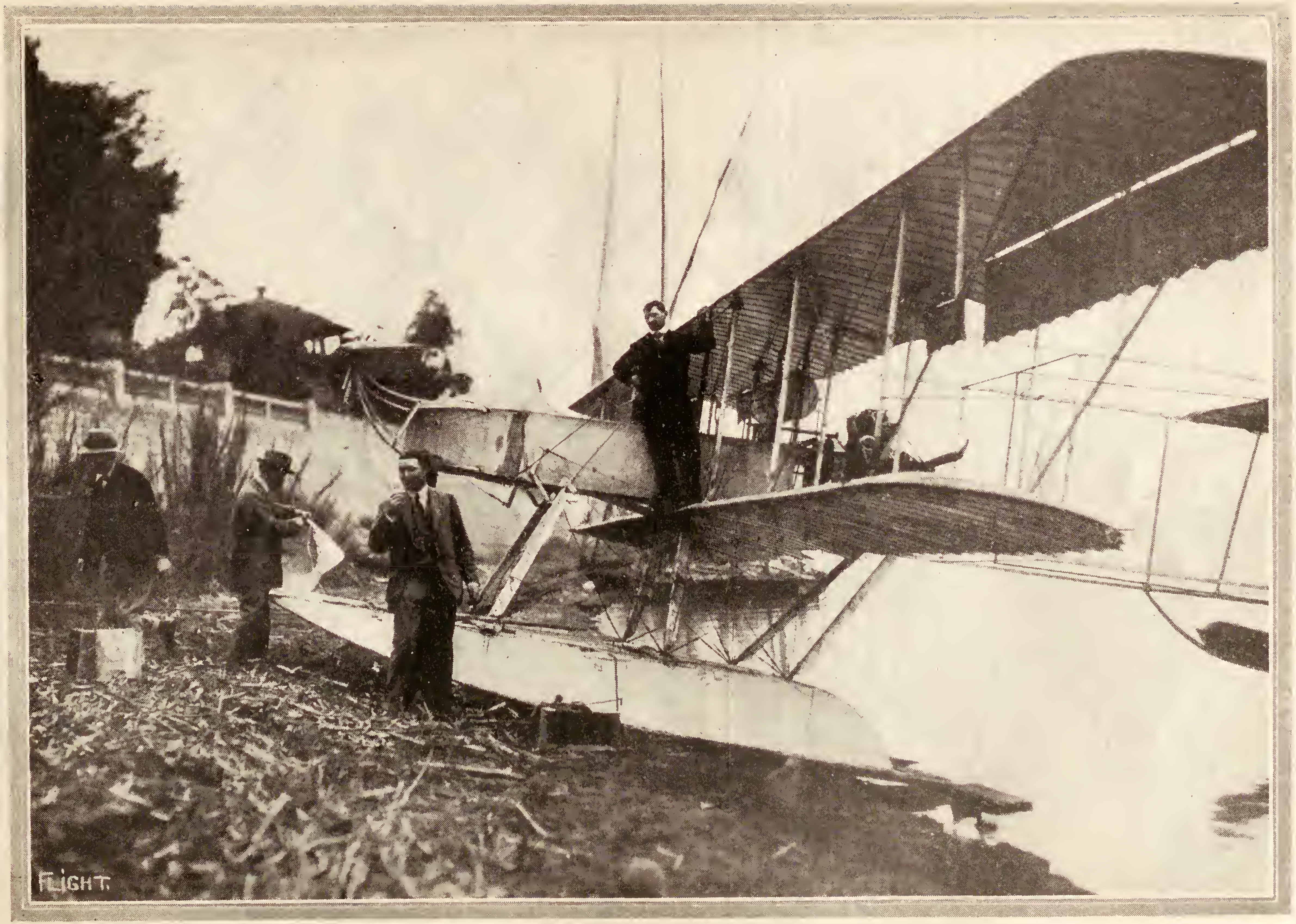
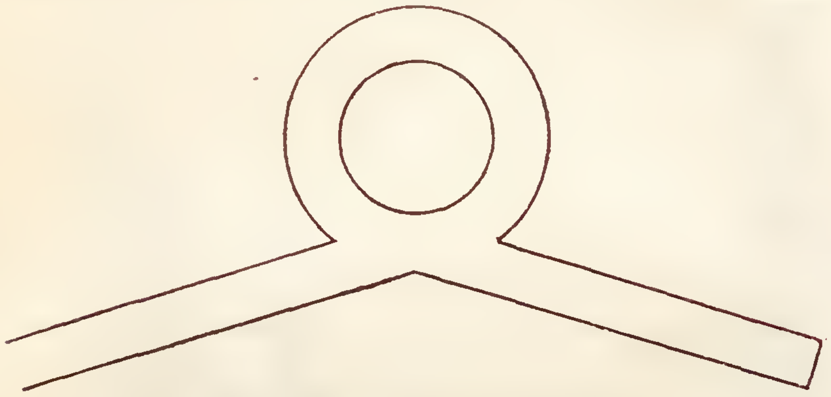


MR. FRANK McCLEAN AND HIS SHORT WATERPLANE AT CAIRO.—Mr. Frank McClean is seen standing on the ground in the centre of the picture without a hat on, the photograph being taken just prior to Mr. McClean's flight to Assiut.

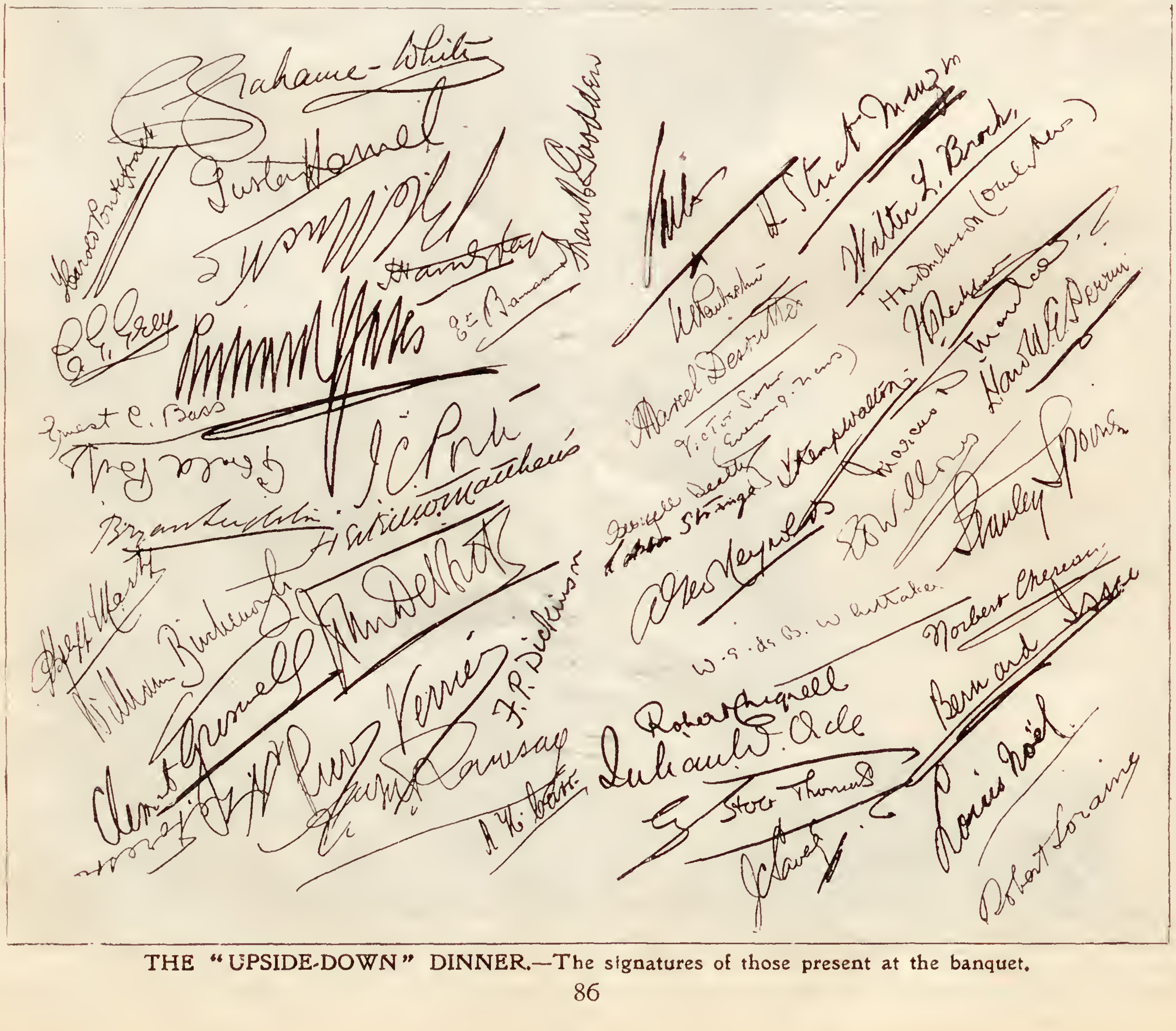
THE "UPSIDE-DOWN" DINNER.

WHEN the announcement was made of the holding of an upside-down dinner in honour of Mr. B. C. Hucks and Mr. Gustav Hamel by the Hendon aviators, much fun instantly suggested itself to the average mind, and those who were fortunate enough to attend were not disappointed. The function, which took place at the Royal Automobile Club on Friday night of last week, was further unique from the fact that it was attended only by those intimately associated with aviation, and a jollier and more thoroughly amusing evening could hardly be spent than that in which the guests participated under the quaint conditions. The menu itself was a work of art, and from first to last, including the shape of the table, everything was carried out with the one thing in mind, of its being a "looping the loop, upside-down" function. Evidently the press photographers had entered into the scheme, as they were awaiting the guests at eight o'clock to take their snaps before the commencement, the result of their flashlight bombs being very assertive for some considerable time into the evening. The guests having been called together by the megaphone man with the intimation that "coffee was served," the chairman, Mr. Claude Grahame-White, after the toast of "The King," announced that "You may smoke," the waiters, arrayed in mechanics overalls, at once circling round the room with coffee, clear and thick, liqueurs and tooth-picks. The Savoury consisted of *Canapé à la Chanteloup*, Sweets of a *Soufflé à la Hucks*, the Vegetable of *Asperges renversées*, the Roast being *Bécassines à la Hamel* with *Salade à la Blériot*, the Entrée a *Vol au Vent à la Hendon* and the Joint *Baron de Pauillac à l'Aviation*.



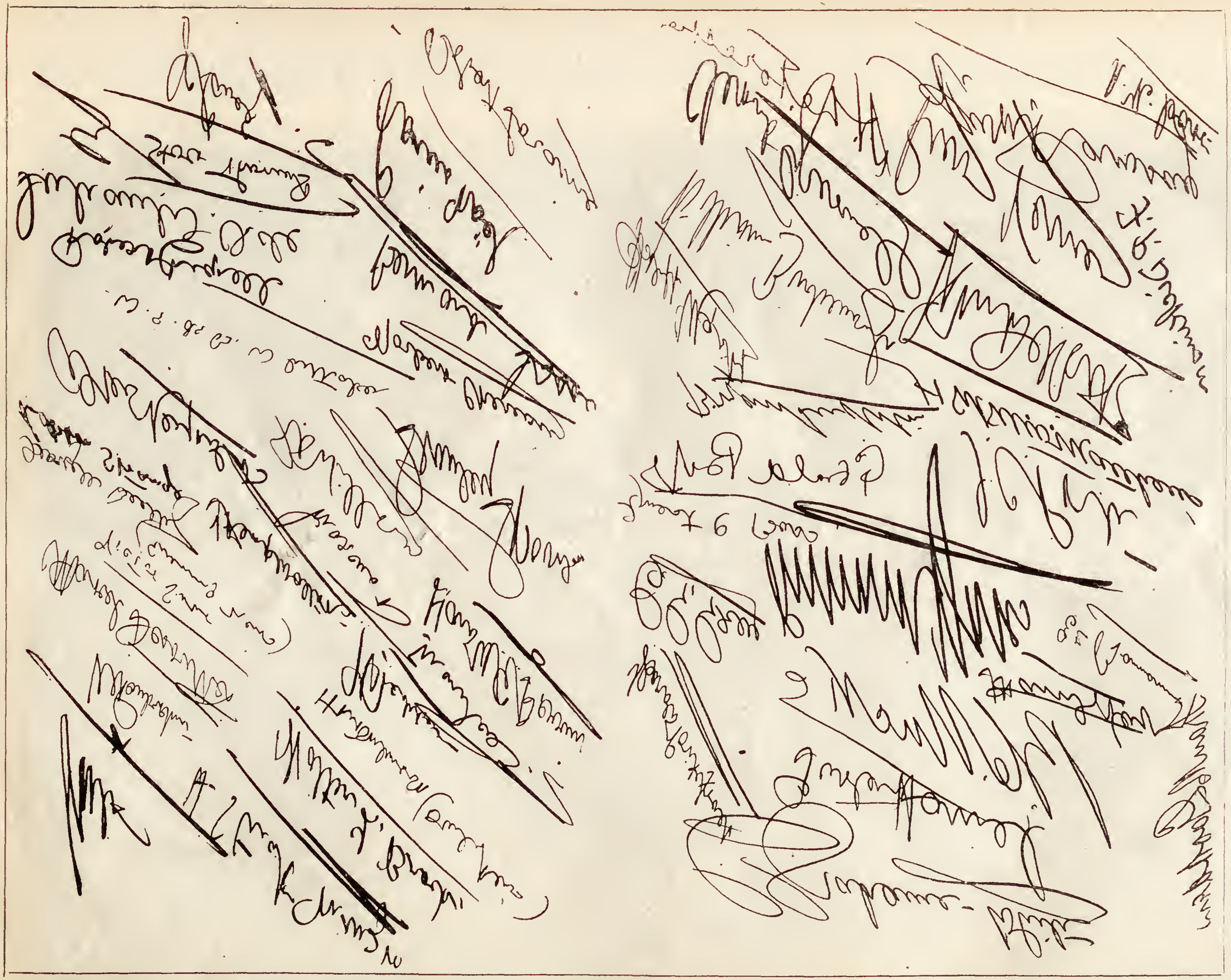
The loop plan of the tables.

Then followed for fish the "looping lobster," which was specially announced per the megaphone man as "The lobster is now looping." In solemn procession the great dish with one King Lobster, upside down in the centre surrounded by a host of smaller brethren, was carried round the outline of the looped tables, from the chairman back to the chairman, before being scattered in portions to the guests. With, appropriately, a *Consommé de Volaille à la Grahame-White*, and *Hors d'œuvres*, the more material part of the evening's entertainment concluded, and the health of the King having been given by the chairman prior to the banquet, when Mr. Hucks endeavoured to do honour to it by drinking Giesler from a glass upside down, the speeches opened with a series of very interesting reminiscences by the chairman. In referring to Mr. B. C. Hucks and Mr. Hamel, he pointed out that the Hendon aviators thought that the best way to do honour to these popular pilots was to call all their flying brethren together at a gathering of this character, and the directors of the London Aerodrome had contributed a special gold medal to be presented to each of the guests of the evening, by way of commemoration. In mentioning Mr. Hucks first, as being the first to loop the loop in England, he thought that Mr. Hamel might be coupled with him *co-aequo*, he having been the first to take up a woman to loop the loop, although he, the chairman, was extremely sorry to say that Miss Trebawke Davies, the very courageous lady in question, was at that moment very seriously ill, and he felt that he would be echoing the sentiments of everybody present if he sent Miss Davies a telegram from them all wishing her sincerely a very speedy recovery—a



C. Grahame-White
Gustav Hamel
Harold Pontefract
Frank Goodden
C. G. Grey
E. Baumann
Ernest C. Bass
J. C. Porte
William Birchenough
F. P. Dickinson
A. H. Carr
Walter L. Brock
Marcel Desoutter
Victor Sims (Evening News)
Harold E. Perrin
Stanley Spooner
W. S. de B. Whittaker
Norbert Chereau
Bernard Isaac
Robert Chignell
G. Holt Thomas
Louis Noël
Robert Loraine

THE "UPSIDE-DOWN" DINNER.—The signatures of those present at the banquet.



THE HOSTS AND GUESTS.

Bass, Capt. E.
Baumann, E.
Beatty, G. W.
Birchenough, W.
Biss, G.
Brock, W. L.
Carr, R. H.
Cates, John.
Chereau, N.
Dessouter, M.
Forrestier, H. le.
Gates, Richard T.
Goodden, F. W.
Grahame-White, C.
Greswell, C.
Grey, C. G.
Hamel, Gustav.
Handley Page, F.
Holt Thomas, G.
Hucks, B. C.
Isaac, Bernard.
Ledeboer, J. H.
Leighton, Sir Bryan.
Loraine, Robert.
Manton, M. D.
Marty, P.
Noel, L.
North, J. D.
Orde, J. W.
Perrin, H. E.
Pontefract, H.
Porte, Lieut. J. C.
Ramsay, A. M.
Reynolds, A. G.
Savage, J. C.
Spooner, Stanley.
Strange, L. A.
Walton, T. K.
Whitehouse, R.
Whittaker, W. E. de B.
Willows, E. T.
Withers, J. E.
Verrier, P.

The "Upside-Down Dinner" given by the Hendon aviators at the Royal Automobile Club on Friday of last week to Mr. B. C. Hucks and Mr. Gustav Hamel, by way of celebrating the splendid upside-down flying of these two popular pilots. To be in keeping with the spirit of the dinner, we give above the signatures reversed and upside-down of all those who took part in this quaint celebration. Without a key to this apparent jumble it would no doubt be pretty difficult for many of the signatures to be deciphered, but by the aid of a reproduction of the same signatures the right way up which we give, the solution is easy. The names of those present and whose signatures appear above are given at the side on the right.

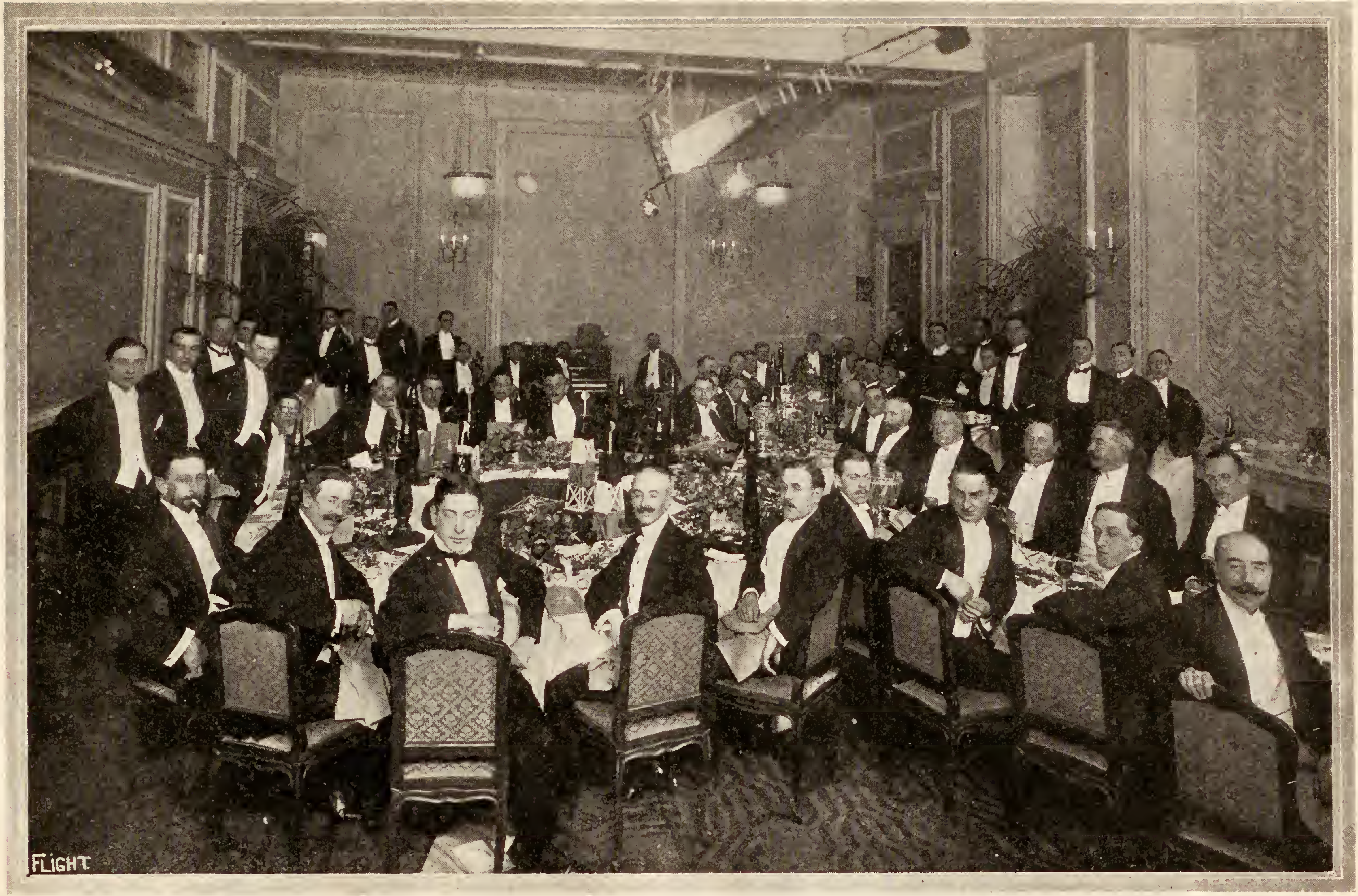


Photo by Fradelle and Young.

THE "UPSIDE-DOWN DINNER" GIVEN BY THE HENDON AVIATORS TO MR. B. C. HUCKS AND MR. GUSTAV HAMEL AT THE ROYAL AUTOMOBILE CLUB ON JANUARY 16TH.—A photograph of the guests showing, standing on the left, from left to right, Mr. Gustav Hamel, Mr. Claude Grahame-White (the Chairman), and Mr. B. C. Hucks. Note the form of the loop in which the table was set, in the centre loop being a reproduction in miniature of the Hendon Aerodrome, whilst the legs of the tables pointing towards the ceiling helped to give effect to the idea of the upside-down banquet. Hanging overhead was a large replica of an aeroplane, whilst the decorations on the table were also carried out in the form of continuous loops, from end to end, of ribbon, smilax, &c.

proposition which was carried with acclamation. After making very complimentary reference to other flying men who were held in high esteem at the aerodrome, including Mr. G. Lee Temple, Mr. Crawshay, &c., Mr. Grahame-White formally presented the gold medals to Mr. Hucks and Mr. Hamel.

Mr. B. C. Hucks, in replying, started his speech by "finally" wishing everybody as much luck as he had had himself, and gradually worked back by humorous and serious references, to thirdly, secondly and firstly. He thought when he first saw Pegoud perform his looping that it was entirely out of his line, in other words it was outside the sphere of everyday flying, although he might say that he had exactly the same feeling when he saw Mr. Claude Grahame-White fly at Park Royal, when he fought so well in the London–Manchester race. However, he ultimately, contrary to everybody's advice and wishes, decided to attempt the feat in France, and say nothing to anybody until he had either accomplished it or failed, with the result that he very quickly became master of this evolution, and he now considered it very simple so long as it was certain that the machine was so arranged as to stand the strain. Subject to this, there was, he thought, practically no risk in flying upside-down or looping provided that the personal element was equal to that feat. Up to the present moment he had completed 116 loops, and had promised Leeds the following week to bring it up to 130.

Mr. Gustav Hamel followed with a characteristic speech, and described how he went about his first looping of the loop. Although many people said he had not done it, he himself was satisfied he did. He determined that if he was going to break his neck he would do it from a real good height, and so he climbed rather more than some might have thought necessary, but from the terrific vertical dive which he afterwards indulged in it was just as well that he had done so.

Mr. B. C. Hucks, in proposing "The Hendon Aviators," coupled with the toast the name of Mr. "Gates T. Richard," the latter, who was otherwise known as Mr. Richard T. Gates, responding in a delightful speech, crowded with reminiscences and anecdotes, which kept the guests in a continuous roar of laughter, they at each pause clamouring for more.

The rest of the toasts, in the order of their giving, were: "British Aviation," proposed by Mr. G. Holt Thomas, and responded to by Mr. J. H. Ledeboer; "The Foreign Aviators," by Mr. Harold E. Perrin, the secretary of the Royal Aero Club, the reply being in the hands of Mr. Norbert Chereau; "The Press," given by Mr. Richard T. Gates, and responded to by Mr. C. G. Grey; and finally "The Chairman," by Mr. F. Handley Page, responded to by Mr. Claude Grahame-White.

Prior to the actual dinner and during the banquet, excellent ragtime and tango music by a band of darkies, whose playing and singing was perfectly delightful and in keeping with the spirits of the company present, was enjoyed. To many the vocal efforts of Mr. Claude Grahame-White were a revelation, he giving several selections and only with difficulty was able to resist the pressure over and over again for well-deserved encores.

A surprise was sprung in the appearance of Mr. Charles Coborn, who, after singing the ancient song of his own composition, "Two lovely black eyes" in every conceivable language under the sun, finished by giving a verse, standing on his head in the centre of the room, for a man of Mr. Charles Coborn's age a feat of no mean character.

All concerned with the getting up of this unique function are deserving of the highest praise, not the least worthy being Mons. Pruger of the Royal Automobile Club, for the excellent details of the menu and arrangements of the room.

In this issue, we give as a memento of the occasion a reproduction of the whole of the signatures of the pilots and others present at the gathering (other than the flying fox, introduced during the banquet, and whose habits are of the upside-down order), together with a list of all those participating, and a photograph showing the major portion of the banquetting room, with the tables arranged in the form of a loop.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Monday last week, Sub-Lieut. Pierce, R.N.R., making some good flights round the aerodrome in the snow. Later when snow ceased he flew to Isle of Grain, getting back just before dusk, and finishing with a fine long glide.

Com. Samson flying Tuesday in fine form on the little S. 3. Lieut. Pierce piloted the gunnery machine, S. 34, with Lieut. Clarke Hall as gunner. In the afternoon, Lieut. Littleton flew to Grain, in spite of a very high wind, returning late in the evening.

Wednesday no flying, but Thursday Com. Samson on the rebuilt Short 100 h.p. Gnome tractor making a long flight. Capt. Courtney on S. 3 flying well and banking heavily at turns. Davis flying high on Sopwith 33. Lieut. Marix on the H. Farman in fine style doing some pretty spiral glides from about 2,000 ft. Lieut. Davis went up on Avro 16. Later Lieut. Pierce took up a visitor for a long high flight on Avro 16. Samson again took up Dep. 7 for a little fancy flying. P.Os. Andrews and Bateman flying well on Avro 41. Marix took up Dep. 36 for a short time, and also went for a short turn on Avro 41. M. Farman was also taken up by different pilots.

Saturday, Lieut. Pierce piloting the Short gun machine with Lieut. Clarke Hall as passenger and gunner. Lieut. Marix was making some very fine banks and spirals on S. 65. Com. Samson on No. 3 for a long high flight. Lieut. Davis flying exceptionally well on Bristol 43. Lieut. C. Hall on M. Farman 70. In the afternoon all the school pilots making short but high aerodrome flights, mostly finishing with well-judged spirals. Lieut. Littleton flying S. 64 in fine style. Com. Samson making alarming fancy flights on S. 3. Capt. Courtney instructing in passenger seat on the S. 2 50 h.p. Gnome.

Civilian Flying.—On Friday last week, Mr. Gordon Bell was up testing a new Short tractor biplane, 100 h.p. Gnome. Taking Mr. Fairey and Mr. M. Wright together as passengers, he climbed to a good height and flew across and across the aerodrome, banking heavily at turns. After flying for about 20 mins., his engine started missing badly. Again in the afternoon he made numerous flights alone, and with passengers.

Saturday he was up again, engine running much better. Taking Mr. Nicholls up as passenger, he made a high and long flight, finishing with a very fine spiral *vol plané*. Then Mr. Bell took up two passengers at a time. All the afternoon he was making numerous short flights, and little fancy flying.

Sunday proved to be good flying weather, so Mr. Bell went for another flight in the early hours. After getting between the village and sea, he started turning round and round in small circles, switching his engine on and off—rather a risky trick, for about there there are trees covering nearly all the ground, so that if his engine did not happen to pick up again, the result might be unpleasant. After making one or two more short flights, the machine was rehoused for the day.

Gliding.—On Wednesday last week, Mr. Maurice Wright had out his "Wright" glider on the hill behind the hangars. It was extremely gusty, and one caught the machine while Mr. Wright was making a good glide, turning it over, throwing Mr. Wright out, he escaping with a few slight cuts. Later, Mr. Marden made a fine glide lasting about 5 mins. at about 50 ft. high. The wind became too gusty to do anything further, so they took the machine in again.

Brooklands Aerodrome.

Monday last week, Mr. Pixton flew to Farnborough on No. 8 Sopwith biplane.

Tuesday and Wednesday weather was too bad for flying, but Thursday the Bristol and Vickers Schools were busy with pupils. Lieuts. Watkins (second half), Cull, and Smyth-Piggott passed their *brevet* tests in excellent style on Bristol biplanes, in a wind blowing up to 18 m.p.h., each pupil rising to an altitude of 600 ft., and making a good landing. Mr. Barnwell was out on the Vickers gun-carrying biplane with a passenger. Mr. Pixton was testing the No. 9 Sopwith biplane. The 80 h.p. Avro biplane arrived from Manchester; also a new 50 h.p. Avro biplane, which has been ordered by Mr. Hall, of Hendon. Mr. J. Alcock was flying well on Mr. Coatalen's Maurice Farman biplane.

Mr. Davis was doing good circuits and figures of eight on Friday on his Avro. The Vickers and Bristol Schools accomplished a lot of useful work with pupils. Mr. Barnwell was testing the new Vickers Radial (50 h.p.) engine on a biplane. One of Mr. Barnwell's old Vickers pupils, Mr. V. Waterfall, was piloting the Martinsyde monoplane in a masterly fashion, doing straights and circuits with extremely well-judged landings. This pilot shows great promise, and is a credit to Mr. Barnwell, for it is one thing to float around on a school 'bus, but quite another thing to handle one of the fastest monoplanes in the world well on a first trial. Mr. Waterfall afterwards remarked that the Martinsyde machine proved extremely easy to handle, and answered its controls perfectly.

On Saturday, Mr. Alcock was out again on the Maurice Farman (100 h.p. Sunbeam) and Mr. Barnwell on the Vickers (100 h.p. Gnome engine) gun-carrying biplane. The Vickers and Bristol Schools were hard at work. Mr. Barnwell was also testing the 50 h.p. Vickers Radial engine. Mr. Raynham made some fine flights with and without passengers on the 80 h.p. Avro biplane, afterwards taking up Mr. Davis on his 50 h.p. Avro biplane for instruction, Mr. Davis then making several good flights alone. Mr. Merriam made a number of good flights with and without passengers. Mr. Pixton was busy testing a Sopwith biplane. Mr. Elsdon was out on a Vickers school biplane.

There were some splendid exhibition flights on Sunday, Mr. Raynham being first out on the 80 h.p. Avro biplane, on which he ascended to an altitude of 5,500 ft., making an extremely fine spiral descent with propeller stationary and landing right in front of his shed, one of the finest performances this pilot has ever put up and an excellent testimony to the qualities of his machine. Mr. Merriam then went up on an ordinary 50 h.p. Bristol school biplane, and climbed to a height of 1,700 ft. in 7 mins., making a splendid landing with propeller stationary, right in front of the enclosure. Mr. Halford also made several flights on a Bristol biplane. The Martinsyde monoplane was also making a number of good flights. Messrs. Barnwell and Elsdon were out several times on the 50 h.p. Vickers Radial. Mr. Pixton made a number of fine flights with and without passengers, on a Sopwith biplane, and at one time was flying side by side with Mr. Raynham on the 80 h p. Avro, thus affording the spectators an excellent opportunity of judging the merits of the two machines. Mr. J. Alcock took up Mr. Chapman, of Kingston Road, Leatherhead, and Master Chapman, a bright little chap of only three years of age, who thoroughly enjoyed his first trip in the air. The winner of the ballot for the free passenger flight, Mr. W. Squire, of Weybridge, had a nice trip with Mr. Raynham on the 80 h.p. Avro biplane.

The Sopwith Co. expect to have at Brooklands within a few days one of their biplanes fitted with a 100 h.p. Gnome engine, of which great things are expected. The machine in size will be between the ordinary pattern and the famous "baby" machine on which Mr. Hawker accomplished such a wonderful performance before he took it to Australia with him for exhibition purposes. One of the well-known *habitués* at Brooklands, Mr. Hurst, who has had flights on no less than 22 different machines, has joined Mr. Barnwell's pupils at the Vickers School, and should prove an apt pupil, for he has done almost everything except to pilot a machine.

Bristol School.—On Monday, 12th inst., and two following days no tuition was possible owing to the strong wind and rain.

Thursday, 15th, Halford testing, then with Lieut. Cull. Merriam followed taking Lieut. Pigott for a high flight teaching pupil to spiral; afterwards with Air-Mechanic Locker on circuits. Lieut. Watkins, Pigott and Cull flying long solos on circuits and figures of 8 in a steady wind. Merriam with Lieut. Binney who took controls at intervals for a long high flight. Lieut. Watkins, Lieut. Pigott and Lieut. Cull then flew for their certificates. Although the air was very bumpy, all three took their *brevets* in excellent style, flying skilfully at a height of 600 ft. Merriam afterwards took Mr. Racine-Jacques for a high flight in a strong wind, which finished the morning's work. Merriam made a trial in the afternoon, afterwards with Air-Mechanic Locker and Lieut. Fraser (new pupil). Halford out with Lieut. Binney on circuits and *vol plané* landings. Rain then prevented any further flying.

Herr Roempler, the skilful pilot of the D.F.W. aeroplane now at Brooklands.

The next morning, Halford made a test, and then took Lieut. Binney for two flights, afterwards taking Air-Mechanic Locker for banked turns and *vol plané* landings. Merriam then sat behind Lieut. Binney and Air-Mechanic Locker on several straights, and with Mr. Racine-Jacques for landing practice. Halford took Lieut. Binney for rolling practice, but fog prevented further tuition in the morning. In the afternoon, Merriam and Halford giving tuition to Lieut. Binney and Mr. Racine-Jacques respectively, the latter instructor then taking Air-Mechanic Locker for two long flights and Mr. Racine-Jacques for one. Fog again made tuition impossible.

On Saturday, Halford out first for a trial flight, afterwards taking Lieut. Binney and Air-Mechanic Locker each for two flights at a good height. Merriam then sat behind Lieut. Binney, Air-Mechanic Locker and Mr. Racine-Jacques, the pupils executing circuits and figures of eight. After taking Lieut. Binney to 2,000 ft. with spiral descent, Merriam went up with Lieut. Palmer, the pupil having control most of the time. Halford finished by taking Lieut. Binney and Air-Mechanic Locker for straights.

Vickers School.—Thursday, last week, Instructors Barnwell, Elsdon, and Knight on biplanes with Lieuts. Crosbie and Monckton. Barnwell testing gun-carrying biplane.

Next day, Barnwell, Elsdon, and Knight with Lieuts. Crosbie and Monckton. Barnwell testing biplane 26, with Vickers Radial engine.

Saturday, Knight and Elsdon on biplane with Lieut. Monckton. Barnwell testing new gun-carrying biplane; and on Sunday, Barnwell and Elsdon on biplane 26 with passengers.

Eastbourne Aerodrome.

Inclement weather last week prevented any school work being done until Saturday, when Gassler had the E.A.C. biplane out, and after the usual test flight took Mrs. Salmon up for two lessons. Mr. Hunt had three practice stunts on the Bristol. Lieut. Davies, R.N., arrived at the aerodrome from Eastchurch on an 80 h.p. Bristol.

The weather keeping fine on Sunday, Gassler and Mr. Thornely went up together on the Bristol. Gassler then gave Mrs. Salmon three successive flights.

It was too gusty for school work on Monday, but Lieut. Davies had his 80 h.p. Bristol out, and flew back to Eastchurch.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday to Thursday last week too windy for school work. Friday, Messrs. Cowley, Parker, and Moore straights with Instructor Strange in passenger seat. Mr. Norris solo circuits; Mr. Cripps solo straights, circuits, &c. Mr. Lindop (new pupil) rolling with instructor.

Hall School.—Monday last week, gale and snow, but notwithstanding J. L. Hall made several circuits in blinding snow storm.

Tuesday and Wednesday, gale, very cold, and no practice.

J. L. Hall flying for ¼ hour Thursday on No. 1 Caudron.

Friday, in morning, A. L. Brookes four straights, J. L. Hall instructing. Later, Denys Ware made a very pretty flight on No. 1 Caudron, landing with spiral *vol plané* from 1,000 ft. In afternoon, Messrs. H. Gearing and A. L. Brookes made three straights each, the former with tail well up. Saturday, J. L. Hall exhibitions on Caudron; too windy for school practice.

Salisbury Plain.

Bristol School.—On Monday, 12th, strong wind made tuition impossible. The next day Sippe took Voigt for a test on the 80 h.p. Bristol tractor, but the wind was still too strong for tuition. Tuition was also impossible on Wednesday and Thursday, while on Friday, although the weather had not moderated, Voigt made a trial, and then took Mr. Stutt for two flights. In the afternoon Voigt took Capt. Walcott for two flights, whilst Jullerot went up with Mr. Gipps and Mr. Stutt, the latter pupil receiving lessons in *vol plané* landings. Mr. Stutt then made a long solo on the biplane.

On Saturday the weather made tuition impossible until the afternoon, when Voigt took Mr. Stutt for several flights, giving him landing and *vol plané* practice. Jullerot meanwhile was out testing a new 80 h.p. tractor biplane.

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Military Aviation in Siam.

After a long period of training, the three Siamese officers, who were selected by the military authorities to learn flying, have now returned to Bangkok with three machines—two biplanes and and one monoplane. As soon as these machines are re-erected, for which purpose a French mechanic has been engaged, the officers will commence to teach their brother officers to fly.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday last, January 20th, 1914, when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Major J. D. B. Fulton, C.B., R.F.A., Mr. Mervyn O'Gorman, C.B., Mr. C. F. Pollock, Mr. R. W. Wallace, K.C., and the Secretary.

New Members.—The following new Members were elected:—B. J. A. Claudet, F. Warren Merriam, Louis Noël, Albert Picard, 2nd Lieut. C. E. C. Rabagliati, William Mair Rolph, and Max Worms.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

724 Lieut. H. E. M. Watkins, R.N.R. (Bristol Biplane, Bristol School, Brooklands). Jan. 15th, 1914.

725 Sub-Lieut. J. R. W. Smyth-Pigott, R.N. (Bristol Biplane, Bristol School, Brooklands). Jan. 15th, 1914.

726 Lieut. J. T. Call, R.N. (Bristol Biplane, Bristol School, Brooklands). Jan. 15th, 1914.

The following Certificates were passed in France:—

William Mansfield.
Lawrence Fry.

Flying to the Danger of the Public.—Mr. R. T. Gates, the Managing Director of the London Aerodrome, Hendon, attended at the invitation of the Committee and gave his views on this subject. The Committee is now considering the steps to be taken to deal with all cases of flights made to the danger of the public.

Britannia Challenge Trophy.—The Committee considered the various performances of British aviators during the year 1913, including several suggestions which had been sent in by Members and others interested in aviation.

It was unanimously decided to award the Britannia Trophy for the year 1913 to Capt. C. A. H. Longcroft of the Royal Flying Corps, for his non-stop flight on November 22nd, 1913, from Montrose to Farnborough, *via* Portsmouth. The distance measured in a straight line is about 445 miles, but the actual mileage covered by Capt. Longcroft was considerably more.

Brooklands.—The Annual Licence for competitions for the year 1914 was granted.

The Chairman of the Club.

Owing to ill-health, the Chairman of the Club, the Marquess of Tullibardine, has not so far been able to take a very active part in the work of the Club, and has been recuperating in Scotland. His Lordship hopes to return to Town early in February, when he will resume his duties as Chairman.

New Premises.

The response to the circular recently issued on the question of the Club acquiring more commodious premises shows a large majority in favour of the change, and the matter will be discussed with the Members at a General Meeting which will be shortly convened.

International Schools Race. London to Paris and Back.

The Royal Aero Club has communicated its views in connection with the London to Paris Race to the Aero-Club de France, who is now considering the matter, and as soon as the various points have been agreed upon, the regulations will be issued.

It is proposed to hold the Race on Saturday, May 9th, 1914.

International Races.

The attention of Aviators and Manufacturers is particularly drawn to the following notices regarding International Races:—

THE JACQUES SCHNEIDER MARITIME AVIATION CUP AND PRIZE, 25,000 FRS.

Mr. Jacques Schneider has given a trophy of the value of 25,000 francs and a cash prize of 25,000 francs for three years for international maritime aviation competition.

The Aero-Club de France, having won the prize last year, has organisation of the race for 1914. The Prize will be competed for over a distance of 150 nautical miles. The Contest will take place exclusively at sea, outside any port, and over a course of not less than 5 nautical miles. Further details will be announced later.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

GORDON-BENNETT AVIATION CUP.
RULES FOR 1914.

The Race for the Gordon-Bennett Aviation Cup will take place in France this year.

The Race will be over a distance of 200 kilometres on a course having a minimum distance of 5 kilometres.

Competing aircraft, before taking part in the Race, will have to pass the following preliminary test:—

A flight in a straight line out and back of about 2 kilometres, without touching the ground, at a constant height of not more than 30 metres. The speed of the test shall be the mean of the speeds of the flights out and back, which must not exceed 70 kilometres per hour. In this test the aircraft must carry sufficient petrol and oil to cover the whole course of 200 kilometres. Three attempts will be allowed to each competitor.

After the qualifying tests have been passed, no modifications may be made to the aircraft. Repairs will only be allowed with the permission and under the control of the Officials.

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International Hydro-Aeroplane Competition.

The Club has received particulars of an International Hydro-aeroplane Competition to be held on the Rivers Scheldt, Meuse and Rhine, on June 15th–25th, 1914. The contest is over a course of about 1,400 kilometres and the prizes amount to about £5,000. The organisation is in the hands of the Aero Clubs of Belgium, Germany and Holland, and the competition will be held under the rules of the Fédération Aéronautique Internationale. Further particulars may be obtained from the Royal Aero Club.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

THE ROYAL FLYING CORPS.

THE following promotion was announced by the Admiralty on the 15th inst.:—

Sub-Lieut. F. E. T. Hewlett to be Lieutenant, and reappointed to Isle of Grain Naval Air Station as Flying Officer.

The following appeared in the *London Gazette* of the 16th inst.:—

R.F.C.—Military Wing.—The undermentioned are appointed to the Reserve. Dated December 17th, 1913: Brevet Lieut.-Col. Nevile J. G. Cameron, the Queen's Own Cameron Highlanders; Capt. Edward L. Ellington, Royal Artillery; Capt. George M. Griffith, Royal Artillery; Lieut. Reginald C. H. Bewes, the King's (Liverpool Regiment); 2nd Lieut. David E. Stodart, Special Reserve; and 2nd Lieut. Gordon N. Humphreys, Special Reserve.

The following appointments were announced by the Admiralty on the 16th inst.:—

Lieuts. J. T. Babington, to the "Pembroke," for temporary service as Assistant Instructor at Central Flying School; S. D. A. Grey, to the "President," temporary, as Squadron Commander, for temporary service in Air Department; A. M. Longmore, to the "Pembroke," as Squadron Commander, for command of Calshot Naval Air Station; D. A. Oliver, to the "Pembroke," additional, for command of Fort George Naval Air Station.

Sub-Lieut. F. E. T. Hewlett, to "Pembroke," additional, for temporary service as Assistant Instructor at Central Flying School, January 15th.

The following was announced by the Admiralty on the 17th inst.:

Lieut. C. E. Robinson, R.M.L.I., to "Pembroke," additional, for course of instruction at Central Flying School, January 27th.

The following was announced by the Admiralty on the 21st inst.:

R. Gill (R.N.R.) to the "Pembroke," additional, as probationary sub-lieutenant for course of instruction at Central Flying School, to date January 27th.

EDDIES.

MR. STUART HIRST is, as his name implies, a Yorkshireman, and, in addition, is a most enthusiastic patron of aviation. Though not a pilot himself, he was until recently, chairman of the Yorkshire Aero Club, and is one of Yorkshire's representatives of the Royal Aero Club. He has lent generous and active encouragement to all that appertains to aviation in Leeds, and is now proposing that the city should present an aeroplane to the Yorkshire "Terriers" for scouting during their summer manœuvres.

This, I think, is a most excellent idea, providing facilities can be given in good time to ensure a certain number of members qualifying as pilots. It would be splendid if machines could be provided by each county in England—probably with the help of the big men of the county—to be presented to their respective corps of Territorials, and I hope that the lead suggested by Mr. Hirst will be followed by others. Should Leeds really be first in this respect, it will ever stand to their credit, and I wish them luck, and hope Mr. Hirst will have no lack of support in his excellent scheme.

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Some few weeks ago our one and only "Dreamer" made some cynical remarks about an invisible aeroplane which was, so he said, supposed to be flying in America. In these go-ahead days it is very risky to make fun of anything connected with aviation, no matter how remote the possibilities of it ever coming to pass may appear. I thought of this when I read in last week's FLIGHT that the Emaillite firm had, as the result of much trouble and experimenting, at last produced a wing-covering which is so transparent that at only the moderate altitude of a little over a thousand feet, the machine practically becomes invisible. If, and I suppose it must be, it is found that this fabric or composition will stand the strain imposed upon it when a machine is in flight, it is but a step to the making of the envelope of dirigibles of a similar material, which, owing to the size of the airship as compared with the aeroplane, will be of even more importance. Like most things, there is of course a humorous side. If all the machines at Hendon and Brooklands, used in the weekly races, were covered in this material, it would be rather a job to follow the events. I can imagine the effect of five or six pilots rounding Bittacy Hill in a cross-country race on machines that could not be seen, and I suggested to our artist that it would be a good idea to show the finish of a race at Hendon on invisible aeroplanes. I rather thought I had him there, but with the dexterity of a futurist he has given me a picture which he says shows a tight finish between a Grahame-White biplane and a Blériot at No. 1 pylon, and I must say that I am not in a position to say he has not hit it off.

Invisible Aeroplanes.

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I know the Boulevard des Italiens in Paris. It is the place where one can get a good dinner for two-fifty with a large bottle of red wine thrown in, and I have found it very handy on occasion when I wanted to make a fuss of myself on very little money. There is always a fair amount of excitement going on down that way, but I read that it was above the usual one day last week when France instead of England had her airship scare—only in this instance the ship was actually seen. It was on Friday afternoon, and the populace of the district were hard at work at their usual job in the coffee and bock line, meanwhile the garçon flicked the few empty chairs and waited for his ten-per-cent., when they were startled by seeing what they thought was a Zeppelin from Berlin flying right for their beloved opera house. Crowds soon collected on the boulevards, and it is reported that one man even fired a gun, but great cheers went up when it was found that it was the Spiess, and was flying the French flag. The Spiess is the first of the rigid airships commissioned by the French army, and was making its trial trip with nine passengers on board. In spite of a high wind it left St. Cyr at half past two, and made a fine flight of an hour and a half's duration.

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There should be some brave doings at Hendon during the coming year. There will be Nieuport England, Ltd., with several machines and pilots to stir things up, and in addition Beatty, who is now back in England and was at the Upside-down dinner, proposes to start a school with four Wright machines. Then we have Hall, who is opening out considerably, and has, I believe, just purchased a new Avro, which, with his new Caudron and the old Blériot and Caudron for instruction work, will make another quite respectable school. It is a pity the much lamented Deperdussin could not have weathered the storm and have remained with us to have still further increased the number. Hendon, the chief flying ground in the past, seems intent on remaining so in the future. Yes! I really think we ought to see something worth watching during the coming season.

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I wonder what the great Antony and his queen, Cleopatra, would think could they but come back for a while to the banks of the Nile and witness the great doings now taking place there. Even to-day, when Cook's have done so much to westernize the native till they can ask for "backsheesh" without a blush showing through their black skins, these natives are mildly astonished at the inrush of flying men and machines. Just at the moment there is a perfect glut of aviation round about Cairo, and behind the great dam of Assouan must make one of the finest places in the whole world for waterplaning.

"WILL O' THE WISP."

* * *

The Wright Automatic Stabiliser.

As we have pointed out, the automatic stabiliser with which Orville Wright has been experimenting for some time, although in principle the same as described in the original patent, as published in FLIGHT, has been improved considerably. From some information to hand it appears that whereas in the original device an important defect was that the correction was not proportionate to the disturbance, or, in other words, that a small swing of the pendulum employed for the maintenance of lateral stability set the controls going with their maximum energy, in the latest arrangement it is understood that a system of electrical contacts is employed which counteracts the inherent deficiencies of the pendulum so that the correcting effort of the automatic device is more nearly proportionate to the disturbing effect. Another improvement has been effected by concentrating as far as possible the weights at one point in order to guard against inertia and momentum effects.

SCIENCE AND AVIATION.

The following is a translation of a very interesting leading article in "l'Aero" of January 7th, 1914, *by M. R. Desmons, who is a leading French writer on aviation matters, besides being Adviser to the Chief of Staff of the French Army Aviation Corps.*

"Pegoud flies upside-down . . . . science had not foreseen this . . . ." This affirmation is, however, inexact, because several writers had studied, before these sensational Buc experiments, the condition of flight of a machine the lower surface of whose wings was convex, and had even foreseen the turning over of the machine, which they recognised as being without danger provided that this feat was executed at a sufficiently high altitude.

Among others, Mr. Brillouin wrote as follows in the *Revue de la Mécanique* in 1909:—

"If an aeroplane is unstable, a gust of wind may turn it over without any real danger . . . . In a note of the Academy (mentioned in the reports of May 18th, 1907, but not published by the Aeronautical Commission) I gave the opinion, which was then several years old to me, that the security of the pilot of a stable aeroplane would be assured by the use of a *nacelle* suspended by means of cardan joints, at the centre of gravity of the glider, so that the glider could turn over (which was always to be feared with gliders with small angles of attack) around the *nacelle* without carrying the latter with it and thus precipitating the occupant to the ground.

"I continue to think that with a stable aeroplane, constructed in this manner, the real position of security would be to climb to a few hundred metres from the ground so that the dive after the turning over would not involve the risk of striking the ground."

It was not haphazard and following a simple intuition that the eminent Professor at the French College wrote this opinion, but he supported it with a solid scientific study.

There is no need therefore to pretend, once more unjustly, that science is in error, and more especially to say, as so many have said for some time, that the scientific and mathematical studies have only resulted in the retardation of the development of aerial locomotion.

Too inadequately recognised are the works of Marey, Col. Charles Renard, Mr. Gustave Eiffel and many others who, although remaining in greater obscurity, have none the less lent efficient assistance to the magnificent conquest of the aerial element by French genius.

It is also, and here perhaps I am touching upon a fault inherent to our race, through not wishing to resort to the evidence of facts, and through not seeing for one's self that those who work methodically and scientifically on the improvement of aeroplanes obtain better results than those who, taking no notice of the results acquired either by experience or by the application of laws discovered by our technicians, pride themselves on their inventive genius and their intuition.

In his last conference to the "Société Française de Navigation Aérienne," Sub-Lieut. Delannay, Technical-Director of the English Breguet Company, demonstrated to us that, by departing from French machines and by utilising the results of French experiments (those of the Eiffel Laboratory in particular), the English constructors and Government, by slowly and methodically improving machines which at the beginning were clearly inferior to our French aeroplanes, are now building aeroplanes which are clearly superior to the best constructed in France.

A few days ago we mentioned that a Bristol biplane recently delivered had accomplished the splendid performance of rising to 1,200 ft. in 58 seconds with a passenger and three hours' fuel. If we mention that the power of this machine is only 80 h.p., we can see for ourselves that, of the biplane type, we have no machine in France capable of competing with the Bristol, and that only the small Ponnier monoplane "type cavalerie" is in a position to take up the glove.

What is the "Bristol," then? A machine derived from our old machines, but scientifically studied and improved by a technician, an apostle of the science and of laboratory experiments, and who, moreover, is French in culture—Henri Coanda, Technical Director of the celebrated English firm.

Every time, moreover, that a more or less fortunate discovery appears to run against the established laws, one hastens to proclaim, at the same time as the insecurity of these laws, the "failure of the science."

That is a very large word.

But what is science that its failure is proclaimed at every opportunity?

Its definition is complex and perhaps difficult to state in a few words. It can, however, be said that it is composed of two essential parts: analytical and synthetical observation and extrapolation. And this is summed up as follows: To observe the natural phenomena, arrange them and compare them so as to arrive at the terms of the laws which govern them, laws which will at least permit of anticipating facts not yet observed.

But we cannot ask aeronautical science, inexistent a few years ago and in which many gaps still remain to be filled up, to present such logic as permitted Leverrier to discover his planet through his insistence in searching for another which did not conform exactly to the recognised exact laws and brilliantly confirmed by this splendid discovery.

We must, nevertheless, not forget that natural phenomena are above all continuous and rational, and if a certain fact appears to us inexplicable according to knowledge already acquired, we must not hasten to conclude that such knowledge is incorrect or without any practical interest.

Much is often said of the error according to which the power developed by birds was formidable, or of the "Querelle des Sinus" (quarrel of the Sinus), but it is not said that at the time of these incorrect theories their incorrectness was explained by the state of the experimental knowledge which had then been acquired.

If aerial flight was decreed impossible, it was because the true form of the reaction of the air on the surfaces was not known, and it is only the "scientific" experiments of the Eiffel Laboratory or of the Saint-Cyr Aerotechnical Institute that have brought to light the "cause" of aeroplane flight, the sustentation by dorsal depression.

It must not be said that if an aeroplane had not flown this depression had not been discovered, because another fact could have brought out an analogous study and an analogous conclusion.

Aeronautical science is not, therefore, a failure because somebody believes they have realised an experiment not foreseen by the aviation theorists, no more so than was physical science a failure when they believed to have found in radium a body giving forth active radiations without any consumption of energy. Then also was proclaimed the failure of the universal principle, "Nothing is lost, nothing is created, everything is transformed" until the day when it was recognised that radium, like all other bodies, "wears itself away" in supplying energy.

The same thing applies to aeronautics. All the facts, even the most paradoxical, are explicable scientifically, and may be classed under the general laws which are drawn up and specified every day.

The discovery of the dorsal depression and its importance relative to the ventral depression is of such a nature as to explain many phenomena and to facilitate progress in many directions.

The aviator knew that he flew; the technician tells him why he flies, and thus gives the former means for improving his flight. Unfortunately, in France, enthusiasts as well as sceptics, we are always inventing, but we improve existing things very little, and for this reason, with French conceptions and with French scientific laws, the foreign industry creates products which soon excel our own on account of their being more methodically and scientifically improved.

R. Desmons.

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Blackburn and Hucks at Leeds.

On Wednesday, Thursday and Friday of last week, H. Blackburn had his 80 h.p. Blackburn out each day taking up passengers. In spite of heavy rain a crowd of over 10,000 went out to Moortown on Saturday to see the flying. Blackburn was up in the rain doing switchbacks and banks, after which B. C. Hucks during a 20 min. flight on the Blériot, made 8 loops at a height of about 700 ft. and flew upside down for over half a minute. On Sunday afternoon, Blackburn, with Dr. Christie, flew to York and back.

Sunbeam Activity at Brooklands.

On the M. Farman with 100 h.p. Sunbeam engine, J. Alcock for about 2 hours each day on Thursday, Friday, Saturday and Sunday last, at Brooklands, making exhibition flights and taking up passengers.

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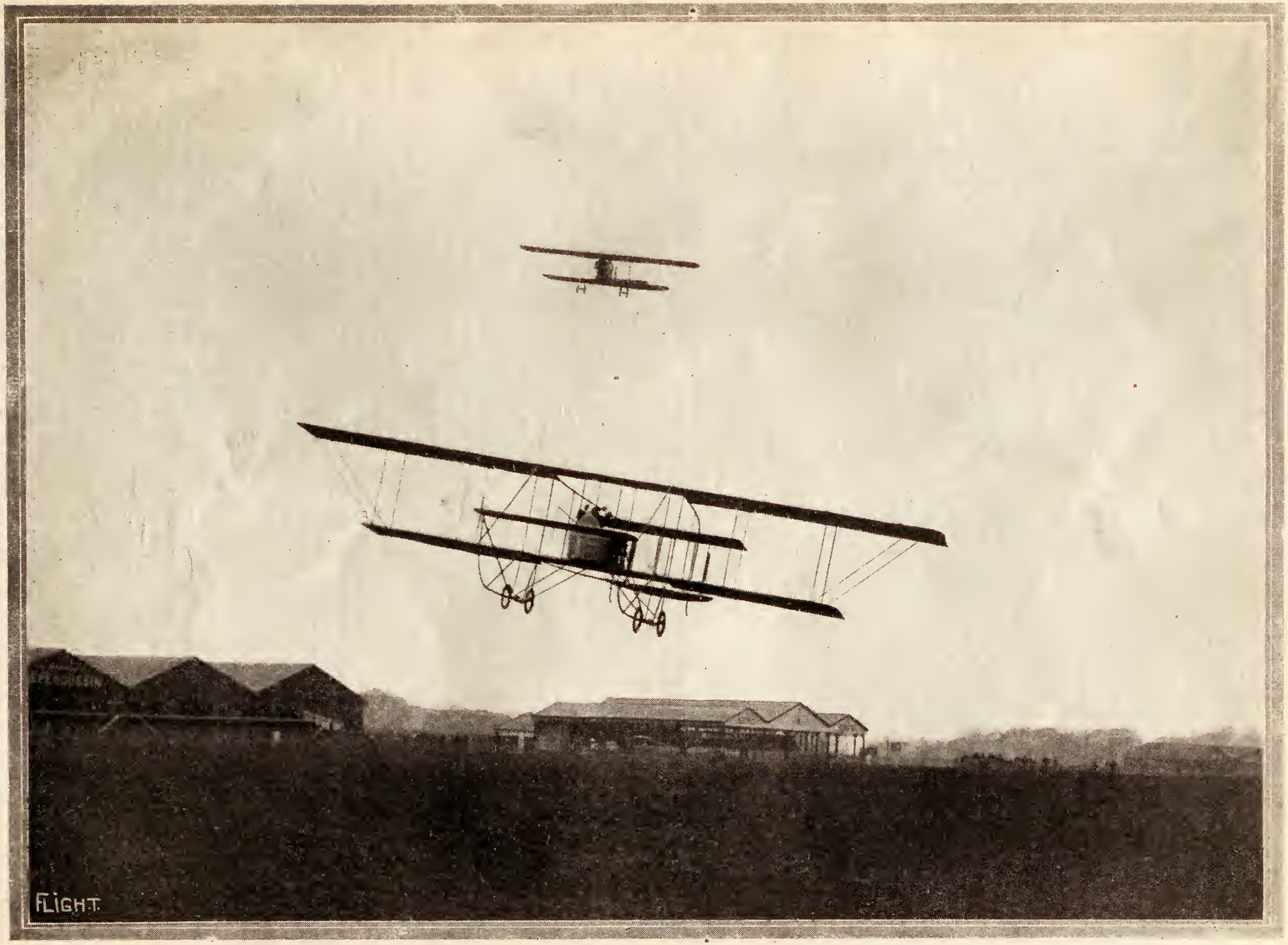
The Britannia Trophy.

It will be seen from the official notices of the Royal Aero Club on p. 91, that the Committee have awarded the Britannia Trophy, offered by Mr. H. Barber for the most meritorious performance by a British aviator during 1913, to Capt. C. A. H. Longcroft, of the Royal Flying Corps, for a non-stop flight on November 22nd from Montrose to Farnborough, *via* Portsmouth. Measured in a straight line the distance is about 445 miles, but the actual mileage covered by Capt. Longcroft, owing to deviations, was considerably more.

Mr. Hawker in Australia.

From Sydney (N.S.W.) comes word that H. G. Hawker intends to fly the Sopwith biplane from Melbourne to Sydney, a distance of 450 miles, and also that he still contemplates attempting to loop the loop.



Mr. L. Noel on the Maurice Farman, flying hands off during the speed handicap on Saturday. Above is seen the Caudron piloted by Goodden.

FLYING AT HENDON.

Last Saturday saw the third winter meeting carried out at Hendon with the usual success that has characterised these meetings in the past. The weather was ideal for flying, there being little or no wind, and in spite of the cold, damp state of the atmosphere a good number of visitors turned up. The proceedings were opened shortly after 2.30 p.m. with exhibition flights by W. Birchenough and Marcus D. Manton on 50 h.p. G.-W. 'buses, W. L. Brock on the 80 h.p. Blériot—now quite itself again after its mishap with Father Christmas a little while back—and Louis Noel on the 70 h.p. Maurice Farman. R. H. Carr also came out on the resurrected 50 h.p. G.-W. 'bus (No. 109), which disagreed with M. Osipenko in the not far-distant past. Brock made a high flight of some 3,000 or 4,000 ft., disappearing at times above the clouds, and Noel, who had a lady passenger, made one of his pretty glides with the engine stopped. Philippe Marty then came out on the 80 h.p. Morane-Saulnier with a passenger, Manton following immediately after on the twin rudder 'bus with a passenger. F. Goodden ascended next on the 45 h.p. Caudron (freshly doped), and put up some magnificent steeply-banked spirals and nose dives, quite in the Chanteloup style. In the meanwhile, L. Strange, on a G.-W. 'bus, and J. L. Hall on his 35 h.p. Caudron, joined the others in the air. Hall, by the way, will have two new machines in commission very shortly, an Avro biplane and a 50 h.p. Gnome-Caudron (two-seater) which has been constructed, we understand, by Mr. Hall himself mostly from the Caudron previously flown by G. L. Temple. An interesting feature in connection with this machine is that the planes are double surfaced.

At 3.30 p.m. a start was made for the speed handicap, which was flown in two heats of four laps each and a final heat of six laps. The starters in the first heat were R. H. Carr on the rebuilt 'bus No. 109 (2 mins. 54 secs.), F. Goodden on the 45 h.p. Caudron (1 min. 35 secs.), Louis Noel on the 20 h.p. Maurice Farman (1 min. 30 secs.), W. L. Brock with a passenger on the 80 h.p. Blériot (scratch). Carr's new mount showed a marked improvement in speed, and kept ahead throughout the race and crossing the line first. Brock gained on all but Carr, and came in second, 10 secs. behind. Goodden and Noel, who started almost simultaneously, kept together until the last lap, when Noel got in front and obtained third place by 11 secs., with Goodden 4 secs. after. Whilst the first heat was in progress, Gustav Hamel was up in his 80 h.p. Morane-Saulnier, making numerous "apple turnovers" at a height of between 1,000 and 500 ft. It is a very strange performance, this of Hamel's, no so picturesque as it is curious, for the machine has the appearance of tumbling about anyhow.

Five started in the second heat as follows:—L. Strange on a G.-W. biplane (3 mins. 35 secs.), Marcus D. Manton on the other 'bus (2 mins. 39 secs.), E. Baumann on the 45 h.p. Caudron (2 mins. 1 sec.), Pierre Verrier on a new 70 h.p. Maurice Farman (1 min. 15 secs.), and Philippe Marty on the 80 h.p. Morane-Saulnier (scratch). This heat resulted in a splendid finish, the first three machines coming in within $\frac{2}{5}$ of a second. Limit man and scratch man changed positions in this race, the latter overtaking his competitors in fine style, passing the last man by $\frac{1}{6}$ of a second only. Baumann only just failed to pass Manton by $\frac{1}{6}$ of a second, whilst Verrier also came in close upon Baumann some 8 secs. behind, Strange being 1 sec. in the rear.

Before the final was flown Hamel made a passenger flight on his Morane-Saulnier, and Hall also made another flight on his Caudron. The final heat was made up of R. H. Carr (4 mins. 23 secs.), Marcus D. Manton (3 mins. 48 secs.), W. L. Brock (40 secs.), and P. Marty (scratch). Again Carr, who flew very low in both his heats, maintained the lead throughout, Brock and Marty, who had been gradually drawing closer together, coming in second and third respectively, separated by intervals of 12 secs., Manton being last, 22 secs. behind Marty. After the final all the pilots ascended and it seemed as though they were all smitten with an attack of "loopus upsidedownitus." Hamel was turning out "turnovers" on his Morane-Saulnier, Verrier was putting up some very creditable Chevillard stunts on a new 80 h.p. Henry Farman. Manton was waltzing on the G.-W. 'bus, whilst Goodden on the Caudron, Brock on the Blériot, and Noel on the Maurice Farman were performing like evolutions until it was too dark to see.

Speed Handicap. Final Heat (6 laps).

		Handicap.	Handicap Time.
		m. s.	m. s.
1.	R. H. Carr (50 h.p. G.-W. biplane) ...	4 23	11 47
2.	W. L. Brock (80 h.p. Blériot monoplane)...	0 40	11 59
3.	Philippe Marty (80 h.p. Morane-Saulnier monoplane)	scratch	12 11
4.	Marcus D. Manton (50 h.p. G.-W. biplane)	3 48	12 33

On the next day, Sunday, most of the Hendon pilots were out, and numerous exhibition and passenger flights were made. The principal events on this day, however, were some wonderful exhibitions by Verrier on the Henry Farman, Brock on the Blériot, and Hamel on his Morane-Saulnier. In addition to performing his usual upside-down stunts by himself, Hamel repeated these with Lady Victoria Pery as passenger. He also flew his machine in company with Claude Grahame-White, who was piloting the Maurice Farman, with Mrs. Hall Walker as passenger, to Kenwood (adjoining Hampstead Heath), the residence of the Grand Duke Michael of Russia. Grahame-White landed in the grounds, but Hamel returned, looping the loop before doing so. Brock made a fine altitude flight, attaining a height of 7,000 ft., and finishing up with a splendid *vol plané* from over North Finchley.

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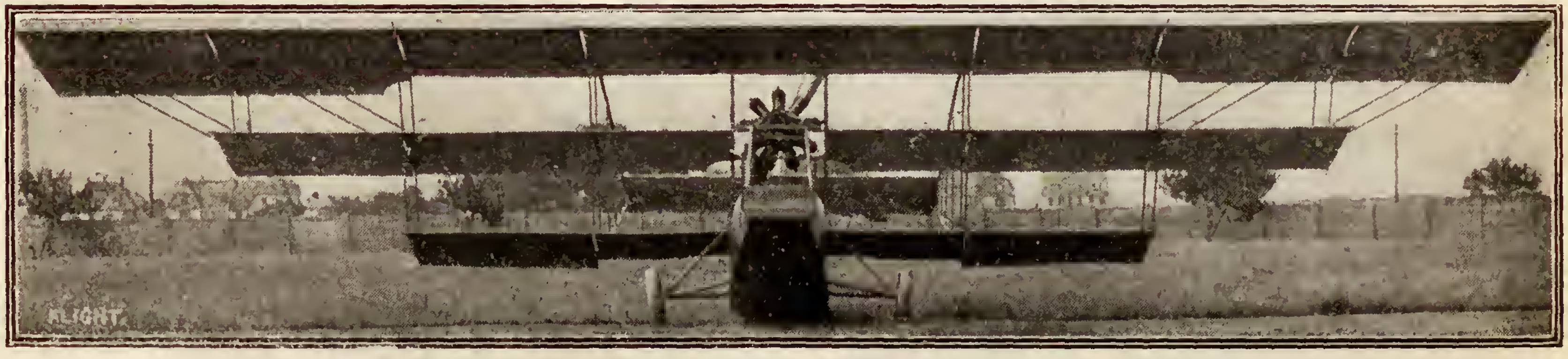
THE EULER HYDRO-TRIPLANE.

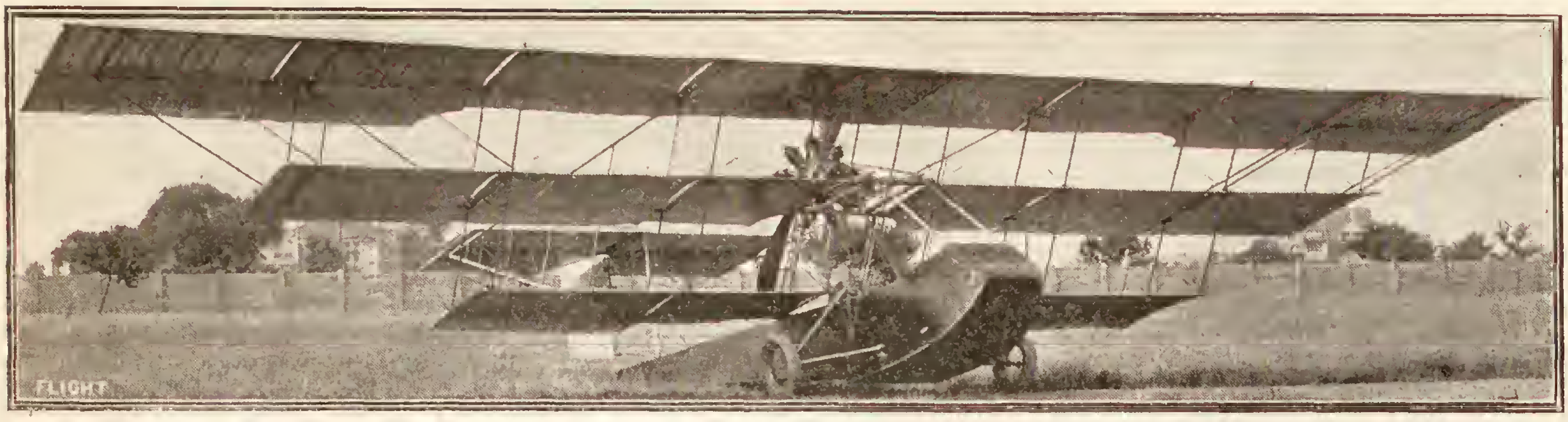
Since Mr. A. V. Roe's experiments with a triplane which was later discarded for machines of the biplane type no successful triplane has, so far as we know, been constructed in this country. It is quite conceivable, however, that in time to come, when greater loads will have to be carried than is the case at present, the triplane type of machine will be revived, for constructional difficulties must of necessity put a limit to the span it is technically advisable to give a machine, and the triplane construction seems to be the easiest solution of the problem of obtaining the required larger lifting surface.

It is no doubt with this end in view, that the Euler hydro-triplane has been designed, and incidentally it is, to the best of our knowledge, the first successful hydro-triplane constructed.

From the accompanying photographs, it will be seen that the three main planes have an increasing span, that of the bottom plane being 8 m., that of the middle plane 10 m., whilst the top plane spans 14 m. The extensions of the uppermost planes can be folded down, thereby reducing the overall span by about 4 m. In order to diminish the interference of the planes without



THE EULER HYDRO-TRIPLANE.—View from the front.

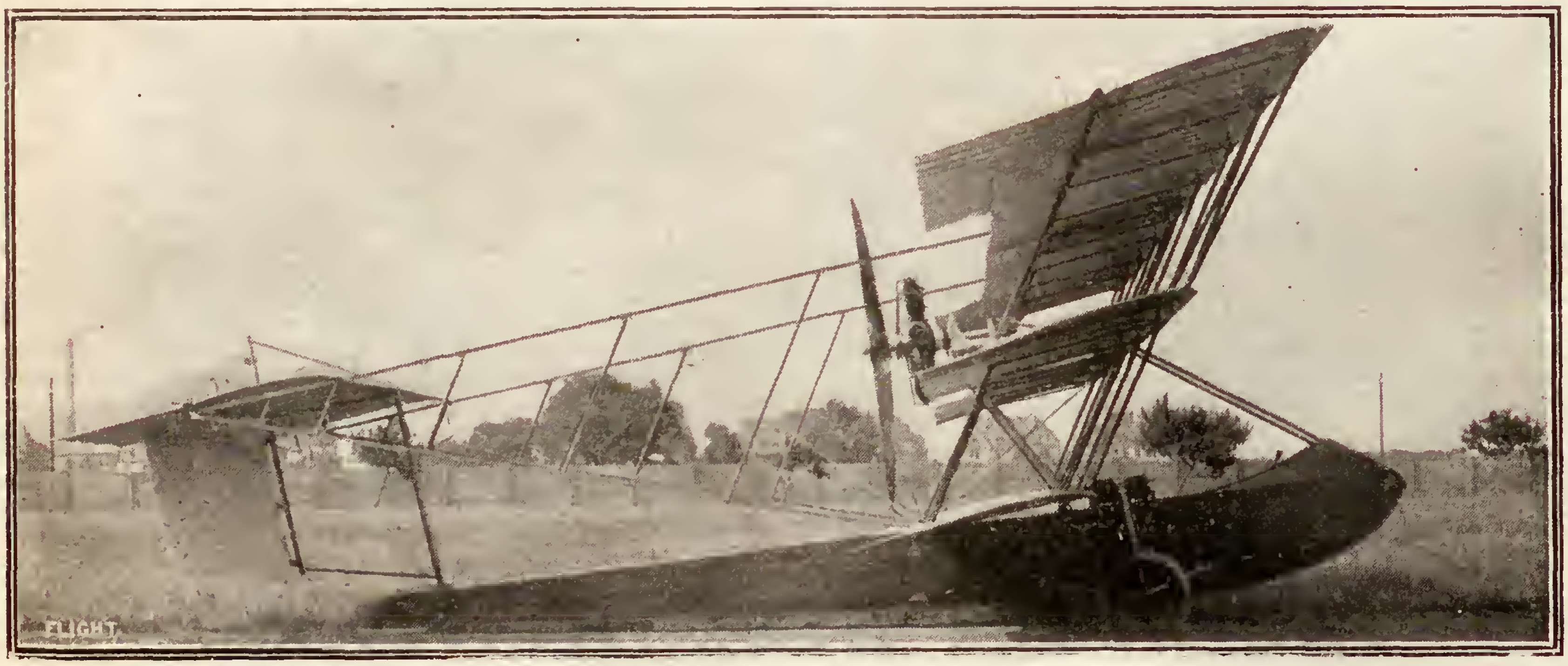


THE EULER HYDRO-TRIPLANE.—Three-quarter front view.

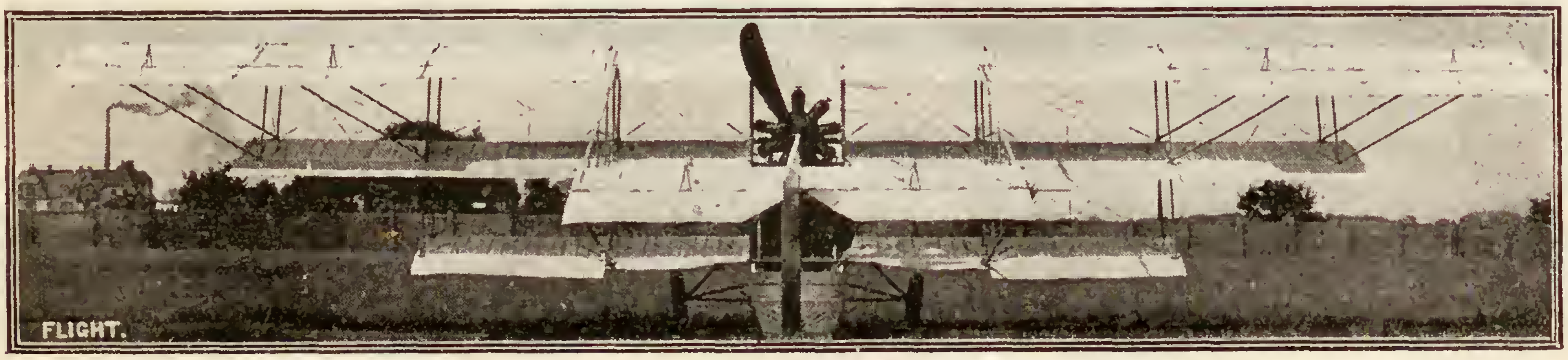
making the gap between them of excessive proportions the planes have been given a very pronounced stagger forward, a system which is finding increased favour with aeroplane designers generally.

The 100 h.p. 9-cylinder Gnome engine is mounted immediately above the centre plane, and is protected against the spray of water by the bottom plane. In order to keep the centre of gravity fairly low, the petrol tank has been placed down in the float or boat—for this machine is really a flying boat, having only one central float. Petrol is forced from this main tank to a small service tank near the engine, by means of compressed air contained in a special air reservoir in the rear part of the boat.

Carried on four tail booms attached to the rear spars of the top and bottom main planes respectively are the tail planes, which consist of a fixed tail plane to the trailing edge of which is hinged the elevator, and of a vertical rudder supported on a framework coming up from the rear part of the boat. This latter member is 7 m. long and 1 m. wide, and is of the stepped type. The pilot's and passenger's seats are arranged tandem fashion, the pilot occupying the front seat. It will be noticed that in addition to the boat a landing chassis is fitted. When the machine is used on the water the wheels can be raised by the pilot, and lowered again if he desires to alight on land, so that the machine really belongs to the amphibious class of aeroplanes. The landing chassis is sprung by means of rubber shock-absorbers attached to the gunwales of the boat.



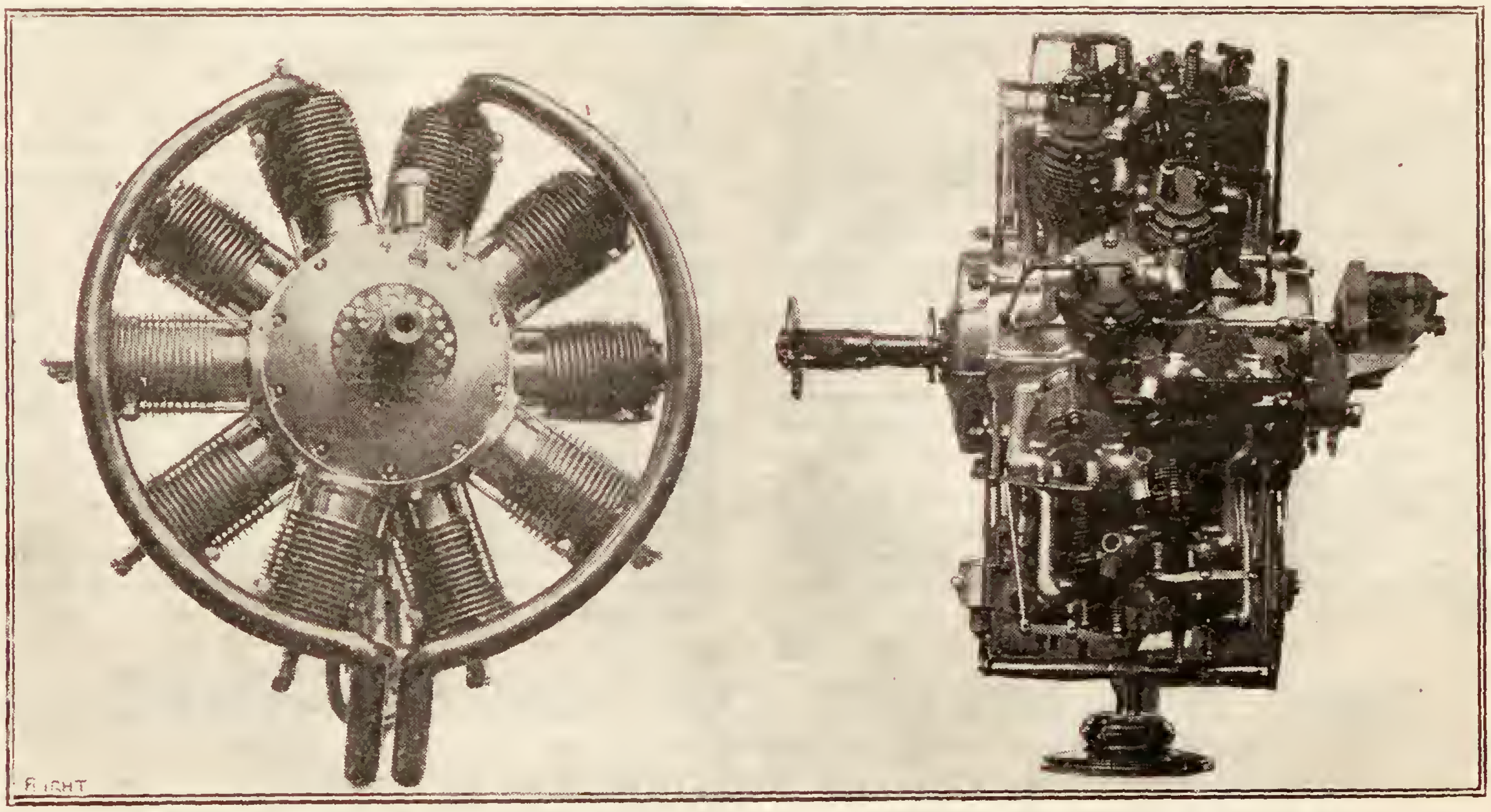
THE EULER HYDRO-TRIPLANE.—Side view.



THE EULER HYDRO-TRIPLANE.—As seen from behind.

AERO ENGINES AT PARIS SHOW, 1913.

THE design of engines of high power-weight ratio still continues to attract the attention of engineers, although the tendency to produce motors embodying some freak construction is not so much in evidence nowadays as formerly. At the Paris Show no fewer than 18 manufacturers exhibited 57 different engines, of which only one—the Austro-Daimler—was of other than French manufacture, and as is perhaps to be expected from the success which has been achieved in the past by air-cooled engines, the majority of makers have adopted this form of cooling. Without exception, this is true of all the engines of recent introduction, and because the disposition of the cylinders in star fashion renders the problem of weight reduction a comparatively simple matter, we find that this arrangement is also employed, whilst all but the Anzani and the Edelweiss engines are of the rotary type. The absence of any British representative is somewhat to be regretted, notwithstanding the proximity of the Aero Exhibition and the Military Aeroplane Engine Competition, since there are several engines produced in this country which have performances to their credit that, to say the least, compare very favourably with those of the best engines manufactured abroad.



100 h.p. 10-cylinder Anzani engine. 200 h.p. 20-cylinder Anzani engine.

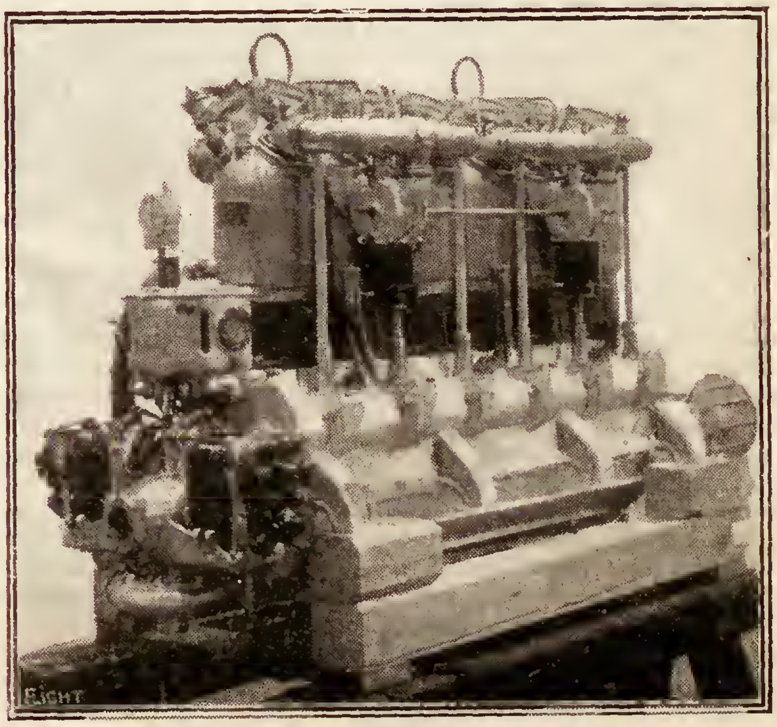
The innovations made by established makers are principally in regard to the details of construction, and as such are less obvious than real. The reciprocating parts have been lightened, valve areas increased, the detail design has been simplified, made more compact, and improved by the natural process of evolution and as the result of experience, whilst a more extensive use has been made of the higher grades of materials now available, all of which should react beneficially by permitting higher powers, increased speeds and greater reliability to be attained. As regards the use of higher engine speeds, and gearing down the propeller (as is done on the Chenu, Renault, Panhard, and De Dion) within certain limits, there would not appear to be any insuperable objection to such a method of obtaining a higher power-weight ratio, providing the engine has been designed for running continually at those speeds. The limit imposed is, however, reached when the loads upon the bearings at the moment of explosion are equal to the maximum inertia loading at the end of the exhaust stroke, which speed is attained when the engine revolutions are somewhere in the vicinity of 1,600 per minute, or, perhaps, slightly higher in modern work. This will also probably approximate to the most economical and reliable speed of the engine, providing that a sufficiently large charge of gas is drawn into the cylinder, since the bearings will, under these conditions, be subjected to the least maximum pressure. In this connection mention may be made of the absence of some form of oil cooler on any of these motors—a very desirable fitting on vertical, or any other type of engine in which a large quantity of oil is carried in the crank-case, in order to keep up the viscosity of the oil on long distance flights and thus render failure through defective lubrication from taking place. Its utility would probably be limited on any engine extravagant on oil, but not where the same lubricant is used over and over again.

The limitations imposed on the bore of the cylinders where air-cooling is used is evident from the large number of cylinders now employed on high power engines of this type; which, whilst diminishing the falling off of power in the event of the failure of any one cylinder, as well as conducing to a greater uniformity of torque, and hence a better propeller efficiency, would appear to introduce increased complication and difficulty in locating defects should they arise.

The problem of valve operation has been attacked in an exceedingly novel manner on the two "monosoupape" Gnomes, whilst on the Esselbé and the S.H.K. motors a piston-sleeve combination has been adopted. The results of tests made with these engines under actual flying conditions are awaited with interest, as valve trouble is a most prolific cause of engine failure, especially in air-cooled engines.

Anzani.

This renowned firm of engine builders made an excellent display on their stand, as in addition to the large range of standard models, the three new engines—70, 125 and 200 h.p.—were exhibited.



120 h.p. Austro-Daimler engine.

The new designs follow the usual Anzani arrangement and construction very closely—the cylinders being arranged in sets of five around the circular aluminium crank-case, which is a single casting in the case of the 10-cylinder engines and in three parts on the 200 h.p. model.

The cylinders, which are of a special grade of cast-iron, are secured in position on the crank-chamber, by long bolts passing up the sides of the cylinders, the exhaust-valves being situated in the heads at the front of the engine, and the inlet-valve at the rear; excepting on the 200 h.p. engine, where, from the arrangement of the cylinders it is more convenient for the inlet-valves (which are connected by piping to two mixing-chambers cast integral with the crank-case, each of which is fed from a separate carburettor) to be placed on the front of the engine for the two forward groups of cylinders, and at the rear for the two back groups. The exhaust pipes, which are clearly shown in the illustration, are formed by short Y pieces on the 200 h.p., and by crescent-shaped piping on the other models, which give a distinctive appearance to the engines.

The pistons are of cast iron fitted with two rings and machined on the interior and exterior, while the crank-shaft and connecting rods are of chrome nickel steel. The method of attaching the connecting rods to the crank-pin originally employed is still retained; namely, by machining helicoidal feet on the ends of the former, which have lateral extensions over which bronze rings in halves are bolted.

The lubrication is under pressure, being forced through the interior of the crank-shaft to the crank-pin, and from thence under centrifugal force to the cylinders and pistons. In the largest engine a double pump is employed with separate leads therefrom to the front and rear sets of the cylinders.

High-tension magneto ignition is provided by a Gibaud magneto running at a speed of 3,000 revs. per min. on the 10 and 20-cylinder engines, but two independent magnetos are fitted on the latter, each of which supplies current to the two sets of ten-cylinders attached to one crank.

Austro-Daimler.

These engines are made in three sizes, a four-cylinder of 65 h.p., and two six-cylinder engines of 90 h.p. and 130 h.p. respectively, all of which are fitted with water cooling and are of the vertical type. The design of these engines has undergone little change during the past year, and hence it is only necessary to append the briefest description of them.

The cylinders are made separately of cast iron with the inlet and exhaust seats and passages formed in the head, over which a copper jacket is electrolytically deposited. The valves are inclined at an angle of about 20° with the vertical, and are operated by a single rocking-lever and push-rod from a cam-shaft fitted in the crank-chamber. The special laminated springs employed for closing the inlet and exhaust-valves render it possible to use a very light yet substantial valve construction.

Ignition is effected by a single Bosch H.T. magneto on the two smaller models, but a supplementary system of accumulator ignition to separate plugs is provided as an auxiliary. The Bosch electrical self-starter is also incorporated in all these engines, which, should there be an explosive mixture in the cylinders, enables the pilot to start his engine up from his seat in the machine. On the 130 h.p. engine, two independent magnetos, one of which is of the dual type, are provided, giving two-point ignition. This engine may, like the 65 h.p. and the 90 h.p., be started from the pilot's seat by the aid of an electrical self-starter, but a starting handle which is geared down $1\frac{1}{2}$ to 1 is also fitted. Two carburettors are used on the two six-cylinder engines, and thrust bearings are fitted in a special housing on all models at the propeller end of the crank-shaft.

The whole of the ignition, lubricating and cooling mechanism is fitted at one end of the two larger engines, and gives them a very neat, compact appearance.

A special lightweight radiator is manufactured by this firm, and weighs 40, 53 and 62 lbs. for the 65, 90 and 130 h.p. engines respectively. *(To be continued.)*

THE STABILITY OF AEROPLANES.*

ILLUSTRATED BY EXPERIMENTS WITH MODEL GLIDERS.

By LEONARD BAIRSTOW, A.R.C.Sc.

The problems which arise in the course of a study of aeroplane stability are of considerable complexity as compared with those confronting engineers in other branches of locomotion. In marine engineering probably the motion of a submarine, when submerged, presents problems most nearly approaching those of aeronautics, but the approximation is rather to the dirigible than to the aeroplane. The aeroplane is the only man-carrying apparatus which must be in rapid motion before it can fulfil its function as a weight carrier. In the first place, then, it is obviously necessary to maintain its speed of flight, but this is not a sufficient condition of safety. An aeroplane may fail in other ways than by failing to maintain its speed, for it may roll over, turn tail foremost, or pitch completely over. Various combinations of these motions may occur, and the nature of the failure to maintain a steady motion then becomes somewhat complicated.

In all probability difficulties in respect to stability limited the duration of the early flights of Santos Dumont, Farman, Blériot, &c. It may be said that the controls were imperfect before the Wright Bros. introduced their system of wing-warping in conjunction with rudder action, and that this deficiency in control would be sufficient to account for the partial failures of the early aviators. Although this objection may hold good, it will surely not be contended that a machine which is totally dependent on the skill of the pilot for its safety is as good as one which can right itself without the pilot's assistance.

The following definition of a stable aeroplane is proposed as embodying the above expression of opinion:—

"A stable aeroplane may be defined as one which, from any position in the air into which it may have got either as the result of gusts or the pilot's use of the controls, shall recover its correct flying position and speed when the pilot leaves the machine to choose its own course, with fixed or free controls, according to the character of the stability."

Sufficient height above the ground is presumed to allow an aeroplane to reach a steady flying state if it is able to do so. The more rapidly the aeroplane recovers its flying position the more stable it may be said to be. If a pilot is necessary in order that an aeroplane may return to its normal flight position, then the aeroplane itself cannot be said to be stable, although the term may be applied to the combination of aeroplane and pilot.

Inherent and Automatic Stability.—A sub-division of stability is useful, the terms "inherent" and "automatic" being already in use. An aeroplane is said to be "inherently stable" if, when the controls are fixed in their normal flying position whilst the aeroplane is in any position and flying at any speed, the result is to bring the machine to its normal flying position and speed. "Automatic stability" should be used only to describe stability obtained by a mechanical device which operates the controls when the aeroplane is not in its correct flying attitude and so rights the flying machine.

Although the subject of stability may be thus sub-divided, it does not necessarily follow that the methods used for producing inherent stability do not throw light on the requirements for automatic stability devices. It can be seen axiomatically that before a designer is in a completely satisfactory position he must have information which will enable him to find the motion of an aeroplane under any conceivable set of circumstances. The same information which enables him to calculate the inherent stability of an aeroplane is also that which he uses to design effective controls and the same as that required for any effective development of automatic stability devices.

It may be said that a designer can never tell the nature of the gusts which his aeroplane will have to encounter and therefore cannot anticipate the consequences to the flying machine. In this respect he is only in the usual position of the engineer who uses his knowledge to the best of his ability and admitting his limitations provides for unforeseen contingencies by using a factor of safety.

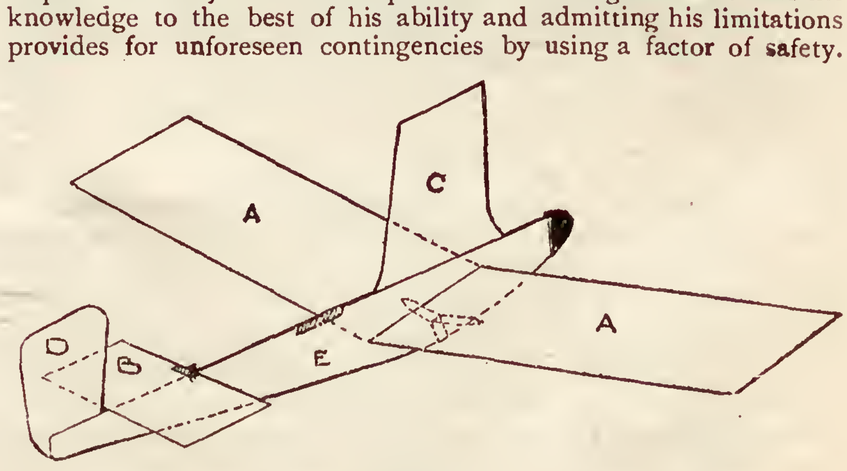


Fig. 1.

Nevertheless, in spite of such limitations the mathematics is not, as is often supposed, unable to deal with the problems arising from flight in a gusty wind.

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* Abstracts from a paper read before the Aeronautical Society of Great Britain at the Royal United Service Institution, Whitehall, S.W., on January 21st, 1914.

Having defined inherent stability, an attempt will be made to show, by means of a model, that it is possible to design a flying machine, not carrying a pilot, which will take up a correct flying attitude and speed, no matter what its original attitude and speed may be, *i.e.*, no matter how it is launched or thrown into the air.

The model shown in Fig. 1 may be thrown into the air in any way whatever, and provided only that no object is struck in the meantime, will soon be flying correctly. To show the effects without danger of collision with objects in the room a clear drop of 15 to 20 ft. is required with about 30 ft. clear in every direction. The flights which will be attempted are :—

(*a*) Simple launching in approximately the correct attitude and at the proper speed.

(*b*) Dropping with the model right side up.

(*c*) Dropping with the model inverted.

(*d*) Dropping with the wings vertical.

The latter is the most likely to end in collision with objects in the room and more than one attempt may be necessary before an uninterrupted flight is obtained.

Effect of Gusts.—The model which has been flown as an indication of what may be expected of an inherently stable machine has had the advantage of flying in comparatively still air. The objection is often raised that the calculations presume still air and neglect the existence of gusts. The objection is plausible and yet quite untenable when examined carefully. For instance, the mathematics includes a term for the effects of side-slipping of the aeroplane. Exactly the same term applies if the aeroplane continues on its course but receives a gust from the side. A head gust and an upward wind are similarly contemplated by the mathematics, and it is impossible to conceive a gust of such a complicated nature that the mathematics does not provide the mechanism for examining the effects on the motion of an aeroplane.

Given sufficient head room, an inherently stable aeroplane will weather any gust it may receive. In doing this, it will roll, pitch, change its course and speed, &c., so that any disturbance will die out in a time of, say, 20 to 30 secs. Successive gusts simply add their effects and no matter what the aeroplane has been doing previously its motion at any instant will not depend appreciably on anything but the gusts encountered in the last half minute of its flight. In this time an aeroplane would have travelled half a mile or more and it may be contended that much may happen in this time that is undesirable. The rate of reduction of the disturbance might be increased if desired, but a problem of an entirely different kind then becomes important.

"Weathercock" Stability.—A stable machine, whether the stability be inherent or automatic, must turn into the relative wind more and more rapidly as the stability is increased and therefore a very stable machine will be tossed about in a wind more than a less stable machine. If the stability is too great the result will be discomfort to the pilot.

A distinction is here of importance ; existing machines turn into the relative wind with great rapidity. The slow motions tending to restore the machine to its correct attitude arise from the inclinations of the machine relative to the earth, and it appears probable that these slow motions may be made quicker without at the same time increasing the rapidity of the already existing rapid motions. In other words, it appears that the stability of modern aeroplanes might be greatly increased without introducing any further discomfort to the aviator.

It follows from these remarks that a useful automatic stability device should be gravity controlled, either directly or indirectly. Any device which does not satisfy this condition can only be expected to regulate the motion of the aeroplane relative to the air, and as this is not in itself a difficult stability problem, its use will be confined to securing greater comfort for pilot and passengers.

An attempt will now be made to indicate experimentally some of the consequences of failure to obtain stability, and then to draw attention to those features of an aeroplane which are of primary importance in their effects on its stability.

Longitudinal Stability.—In connection with the disturbances which give rise to the problems of longitudinal stability, broad distinctions have been made by Mr. Lanchester, and the subject is thus divided into three sections, which may be briefly referred to under the heads :—(*a*) Catastrophic instability ; (*b*) rapid oscillations ; and (*c*) phugoid oscillations.

Catastrophic Instability is concerned particularly with the effects on an aeroplane of upward or downward gusts. In certain cases the altitude of the machine in steady flight may be completely altered by a sudden vertical air-current. The new flight position is usually upside down, and should it occur without the pilot being strapped to his seat he would inevitably be thrown out. If strapped in, the pilot may recover his alternative position of steady flight by the use of the controls.

Catastrophic instability may be illustrated by a model similar to that of Fig. 2. Launched in one way the model flies quite well as an ordinary glider. A different setting of the launching apparatus produces a quite different result ; the model dips suddenly, turns over, and continues its flight in the direction opposite to that in which it was launched. Catastrophic instability is not very difficult to avoid, the sole condition to be satisfied being, "that for any one setting of the elevator there shall not be more than one position for which the pitching moment about the centre of gravity shall be zero."

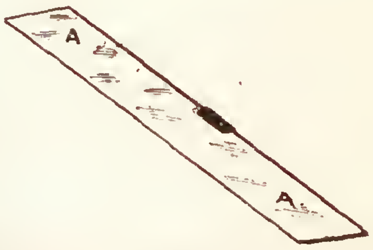


Fig. 2.

Rapid Oscillations.—The rapid oscillations of an aeroplane depend almost entirely on the forces and couples arising from an inclination of the relative wind to the direction of flight and are scarcely affected by the earth's attraction. The rapid oscillations almost always die down, but a flight will be shown in which it appears that they develop into a steady rotation of the model. In certain cases the rapid oscillations change into a dead beat motion which cannot give rise to a dangerous motion of the aeroplane.

Phugoid Oscillations.—For actual aeroplanes the phugoid oscillations are comparatively slow, the period being about 20 secs. The aeroplane is stable if the amplitude of any oscillation decreases, and this effect can always be produced by using a sufficiently large tail plane and elevator. If the moment of inertia of the aeroplane is large, and the tail not quite great enough, the phugoid oscillation increases its amplitude, and the aeroplane will rise and fall in a wave of increasing height, ultimately striking the ground awkwardly. It has been contended in France that this motion is so slow that the pilot is not troubled by it, but it cannot be too strongly insisted upon that phugoid instability is undesirable as throwing a quite needless strain upon the pilot.

Figs. 3 and 4 give a general idea of the models which will be used to illustrate longitudinal stability calculations.

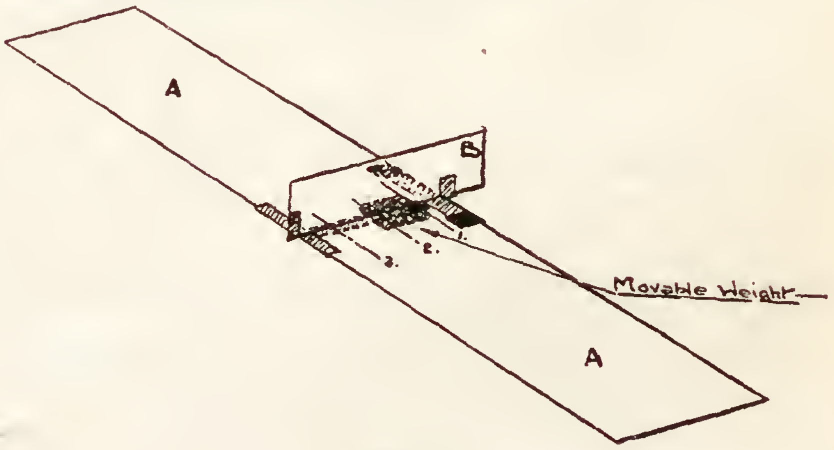


Fig. 3.

The first model is only a little different from that used to illustrate catastrophic instability, and consists essentially of a loaded mica plane. A movable weight allows a certain amount of adjustment of the position of the centre of gravity.

With the centre of gravity well forward, *i.e.*, one-third of the chord from the front, the flight of the model is stable, and only a damped phugoid can be detected in the motion. With the centre of gravity a little further back, the rapid oscillation can be seen to be superposed on the slower phugoid. This rapid oscillation is not readily seen from all positions. If the centre of gravity is moved still further back until it is in the centre of the chord, the model turns over and over backwards and glides down at a steep angle.

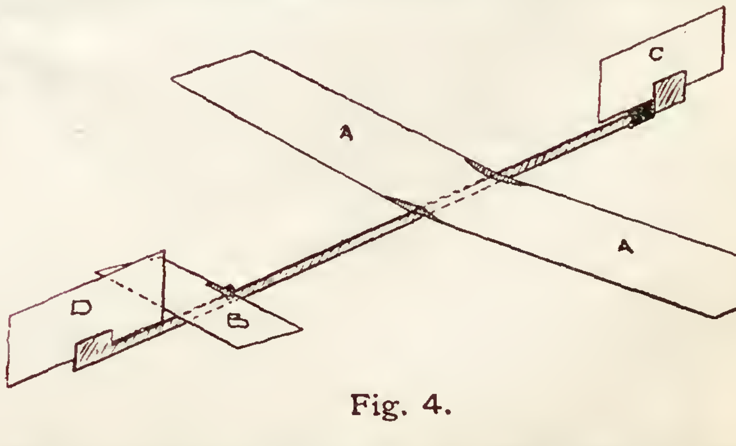


Fig. 4.

To show the unstable phugoid oscillation the model illustrated in Fig. 4 will be used. It differs from the weighted mica plane in its greater moment of inertia, and an elevator plane is necessary to produce stability. At a certain inclination of the elevator plane the model becomes unstable, and the model shows the increasing wave, which is the first indication of longitudinal instability. A further decrease in the inclination of the elevator plane would produce a steady nose dive.

Longitudinal stability is not difficult to secure, and is generally identified with the principle of the upward Vee. Only one organ, the tail plane, need be altered to produce stability, and the principle of the upward Vee is expressed by the statement that (independently of their relative size) the forward plane shall be more heavily loaded per square foot than the rear plane.

Inherent longitudinal stability tends to maintenance of speed, and a stable machine must settle down to a definite speed for each setting of the elevator. Shutting off the engine without adjustment of controls has little effect on the steady speed, the additional power being obtained from a fall under the influence of gravity. The change from horizontal to gliding flight with the engine stopped usually only involves a speed variation of about 1 per cent. when the resulting phugoid has been damped out.

Lateral Stability.—Lateral stability appears to be more difficult to obtain than longitudinal stability, and the disturbed motions are of a different character. One of the motions is essentially dead-beat in any heavier than air machine. The motion is so rapid and transient that a model in actual flight cannot be used for a demonstration. The salient features can, however, be easily understood without such assistance. If we imagine that this model of an aeroplane is given a rolling motion when in flight by a quick outward and return motion of a miniature warp lever, then the subsequent motion will be as follows:—The right wing is rising and consequently the air strikes it at a reduced angle of incidence and the lift on it is reduced. Conversely the lift on the left and downward moving wing is increased, and the combined effect of the two forces is to introduce a powerful couple tending to stop the rolling. The rolling ceases with enormous rapidity, and is practically over in a fraction of a second. The rolling motion, however, simply stops, and the couple described does not restore the machine to an even keel. This restoration takes place in consequence of secondary actions introduced by side-slipping under the influence of gravity.

Motion which becomes a Spiral Glide when Unstable (Spiral Instability).—This motion can be illustrated by a model, and is one of the motions which may be dead-beat. Unlike the rolling described above, the disturbance may increase progressively instead of decreasing, and is dependent on, and controlled by, the earth's attraction. Spiral instability arises from the use of too large a rudder, and it is the proportioning of the rudder and vertical fin system generally which presents the most difficult of stability problems. If the machine is unstable, then on taking a turn to the right, side-slipping occurs inwards to the right after a preliminary outward movement under the action of centrifugal force. The machine then overbanks, and the rate of turning is increased. This goes on with increasing rapidity unless checked by the pilot. There exists a limit to the rate at which an aeroplane may increase its banking, but as this only means a period of 15 secs. before the machine becomes uncontrollable, the limit is higher than practical considerations would show to be desirable.

The spirally unstable motion will be shown with a model of the type illustrated in Fig. 4. The elevator will be put in a position which ensures longitudinal stability. The removal of the front pin is usually sufficient to produce the instability.

Oscillation.—The lateral oscillations of an aeroplane are of peculiar importance, as it follows from a study of them that "the most stable aeroplane is one which has for one of its types of lateral motion an oscillation." The statement does not go so far as to say that a machine which oscillates is stable, and a model will be flown which will show that such a statement would be wrong; it does, however, mean that a machine which does not oscillate has one of its stability factors small.

The oscillation becomes unstable when the rudder is not large enough, and thus a limit is obtained opposite to that of spiral instability, which arises from the use of too large a rudder. Starting with a stable aeroplane and reducing the rudder more and more has the effect of making the oscillations more and more apparent, until finally they tend to increase in size from one wave to the next. The model slide-slips and turns, keeping on an averagely straight course, but with increasing banking until it either loses speed and falls or overturns. With sufficient room beneath it an aeroplane would recover, but only to begin again an increasing oscillation. The model used to illustrate this type of instability has two fins of approximately equal areas.

If the rudder is still further reduced, the front fin becomes the larger and the unstable oscillation gives place to an instability of a very different kind. The model spins round about a vertical axis with great rapidity, loses all its forward speed and falls. From the inversion arising from this type of instability it is unlikely that a model would ever recover, no matter what the height of fall.

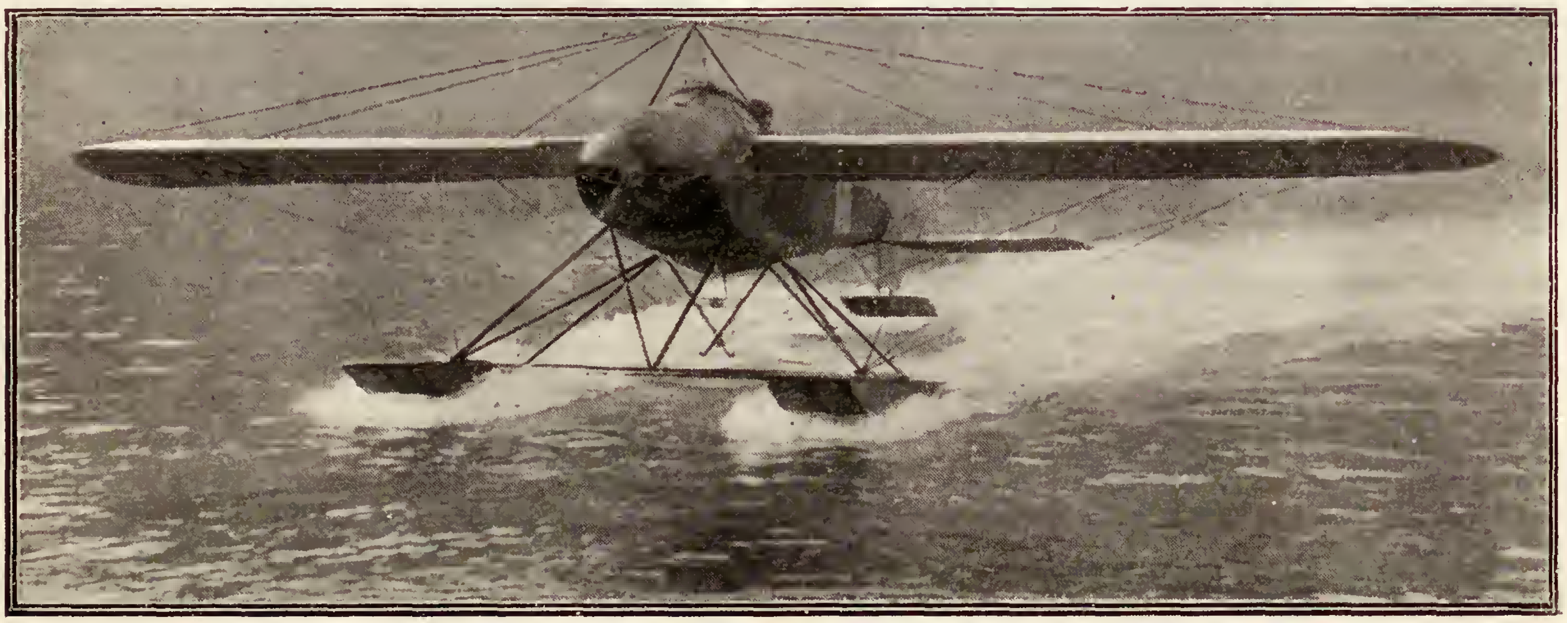
Other types of lateral instability are known, but the more important types have now been described.

The Important Features of an Aeroplane with respect to Lateral Stability.—The vertical fin system on which lateral stability depends is provided by the side surface of the body, the rudder and the dihedral angle or equivalent vertical fin above the centre of gravity. If a machine is spirally unstable the instability may be removed by deepening the body forward of the centre of gravity, or by increasing the dihedral angle. If the unstable oscillation appears the rudder area should be increased.

All full-scale experiments should, however, be carried out tentatively, as the inter-relation between the effect of the rudder and the dihedral angle, in order to produce stability, are not very simple. An aeroplane may be made unstable by increasing the dihedral angle unless the other factors in the stability equations are correspondingly changed.

If carried out with the necessary care (and there is no obvious royal road to success), it is quite certain that any aeroplane whatever which is capable of lifting its load, with some reserve of engine power, can be made laterally stable by attention to this vertical fin system. The details of the resulting motion will depend on the particular way in which the aeroplane is made, but stability in itself does not impose conditions so rigorous that a designer has not ample room for the exercise of his ingenuity for the improvement of efficiency, comfort, &c.

No attempt has been made to discuss the relative merits or demerits of "inherent" as against "automatic" stability. The reasons for this are twofold. In the first place automatic stability is not yet sufficiently developed either practically or theoretically; and secondly, there appears to be room for the development of both systems for use in the same aeroplane but for producing complementary effects. The only reason for the greater attention given to "inherent" stability is that the subject is better known to the author, and it appears to him that the mathematical analysis offers suggestions for immediate improvement in the stability of aeroplanes.



A Borel hydro-aeroplane getting under way.

FOREIGN AIRCRAFT NEWS.

The Michelin Target Prizes.

AT a meeting of the judges of the Michelin Target Contest, held at the Aero Club of France last week, it was decided to award the first prize of 15,000 francs to Fcurny and the second prize of 5,000 francs to Gaubert. The third and fourth prizes were not awarded.

Ae.C.F. Prizes Awarded.

AT a meeting of the Aviation Committee of the Aero Club of France last week, the Criterium d'Aviation was definitely awarded to Seguin for his non-stop flight of 1,021·2 kiloms. from Paris to Bordeaux and back, while the Coupe Femina was definitely awarded to Madame de Laroche for her flight of 323 kiloms.

Another Prize Offered by the Seine General Council.

FOLLOWING on the offer to the L.N.A. of a prize of £400 for a race between Paris and some other European capital, the Paris General Council has offered another prize of £200 for a flight over one of "great aerial routes of the world," starting from Paris.

A New Military Nieuport.

ON Saturday last, at Villacoublay, Dr. Espanet was testing a new military Nieuport monoplane, which is not only fitted with a quick-firing gun, but is also armoured and designed specially for fighting airships.

Testing a Voisin Biplane.

AT Mourmelon on Saturday morning, Rugere was testing a Voisin biplane fitted with a Rhone motor, and climbed 500 metres in 5 min. 20 secs., while 1,000 metres were attained in 12 min. 30 secs.

A Security Competition.

THE competition for safety devices for flying machines, organised by the Union pour la Securite en Aeroplane has drawn 56 entries, and included among them are the de Beer monoplane, Blériot monoplane, Caudron biplane, Doutre stabiliser, R.E.P. machine (automatically stable longitudinally), Eteve stabiliser, Etrich monoplane, Dunne biplane, Moreau monoplane, Robiola machine, Schmidt biplane.

Looping with the "Parasol."

ON the Morane-Saulnier Parasol, with Rhone engine and Integral propeller, on which he had flown on the previous day from Villacoublay, Gilbert on the 14th made several flights at Mourmelon. In one he went up to a thousand metres in five minutes, and then made several loops.

M. Saulnier Loops the Loop.

M. SAULNIER, the designer of the Morane-Saulnier machine, on Saturday enjoyed the experience of looping the loop as a passenger with Gilbert on the Morane-Saulnier Parasol at Villacoublay.

Fast Flying on the Parasol.

AFTER his flight from Paris to Mourmelon on the Morane-Saulnier Parasol in an hour and five minutes, Gilbert returned to Villacoublay in an hour and a quarter on the following day. He flew on the 13th inst. from Villacoublay to Epernay and Mourmelon in two hours.

A Cold Trip to Bordeaux.

ON Saturday, Guillaux, on a Morane-Saulnier, started from Villacoublay at 3.30 p.m. with a view to making a non-stop flight to Bordeaux. He, however, had to come down owing to the cold at Chatellerault. On Sunday morning he made an attempt to get on, but was compelled to descend again owing to the mist at Montlieu, just before reaching Bordeaux.

New Loopers.

A NEW exponent of looping the loop appeared at Buc on the 15th, Montmain carrying out the manœuvre on a Blériot. After practising for some time he intends to attempt to loop the loop on his old love—a biplane. On Monday Deroye and Bidot carried out the manœuvres at the Blériot School, while Pecquet did it on a Morane at Villacoublay.

Naming Streets After Aviators.

THE Paris Municipal Council has decided to perpetuate the names of several more men who have given their lives in connection with aeronautics by giving their names to certain streets. Capt. Ferber, Capt. Marchal, and Adjt. Reaux (the last two being the officers who met their death in the "Republique" disaster), and Geo. Chavez are among the names it is proposed to honour in this way.

M. Blériot After Municipal Honours.

IT is not unlikely that M. Blériot will shortly seek election to the Seine General Council to represent the Southern Ward of Versailles.

A Challenge by Hamel Accepted.

THE challenge issued by Hamel to any aviator in the world to reproduce his flights has drawn replies from Galtier, one of the Caudron pilots, Garros, Audemars and Friedrich, all of whom have expressed their readiness to meet Hamel. It is stated that arrangements will probably be made for Garros to fly against Hamel in a match for £500 a-side, the match to consist of two speed tests and one of speed and landing combined.

Aeroplanes for Music Hall Artists.

MR. T. ELDER HEARN, who commenced to learn to fly at the Blériot School, Hendon, is now finishing off his education at Buc. It is announced that it is his intention in future, whenever possible, to fly from place to place to fulfil his engagements.

Testing the New F.B.A. Flying Boat.

IN Vernon Bay on the 16th inst., Burri made several tests with the new F.B.A. flying boat which was shown at the last Paris Show, the machine leaving the water in less than 30 metres. Afterwards Lieut. Hoeck of the Danish Navy flew the machine for a short trial.

Vedrines as a Jockey.

ON Sunday last Vedrines flew from the Pyramids to Heliopolis, where horse-racing was in progress. He then won a three furlong horse-race against Digby, a prominent Egyptian jockey, and flew back on his aeroplane to his quarters at the Pyramids.

Seaplanes for Norway.

INCLUDED in the Norwegian naval estimates is the sum of 80,000 kroner for the purchase of two hydro-aeroplanes.

Servian Army and Aviation.

IT is announced from Belgrade that the Servian Government has nominated ten officers and non-commissioned officers of the army to proceed to France to be trained as pilots and then return to Servia to form a flying school.

Long Cruises by "Sachsen."

THE Zeppelin "Sachsen," now stationed at Fuhlsbuttel, has made several long cruises recently. On the 14th during a 6-hour voyage, she went to the Danish border, then over the Baltic, and returned via Fehmarn and Kiel. The next day a 7-hour voyage was made by Wismar, Rostock, Giedser, Travsmunde and Lubeck.

MM. Vedrines and Marc Pourpe at Heliopolis about five minutes before Pourpe (on right in his flying kit) left there for Khartoum.

Models

Edited by V. E. JOHNSON, M.A.

The Collins-Hancock Monoplane.

THIS machine was designed especially as a military scout.

It can be easily dissembled for road transport, the wings folding against the front skids, thus making the overall dimensions 20 ft. by 7 ft.

If necessary, the *fuselage* and *nacelle*, which are built up together, can be detached and fitted *nacelle* first in between the front skids, the tail plane and elevator being hung under the front elevator, thus reducing the length to approximately 15 ft.

The only controls which would need attention are the front elevator and *ailerons*.

The *ailerons* are controlled by rods and links, being absolutely rigid.

Referring to the drawing, the *ailerons* are hinged on to rods, B and B^1, which are fixed inside the planes, so that they can revolve freely. These rods have links, A and A^1, attached at their inside ends, which are connected to a rocking bar inside the *nacelle*, which rocks up or down according to the movement of the control lever.

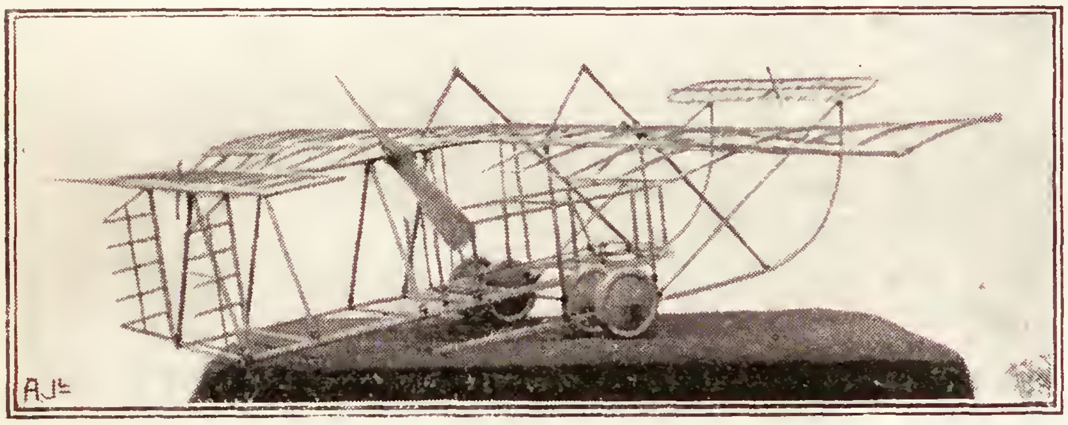
When the rocking bar is working, it pushes link A up and pulls link A^1 down, or *vice versa*, thus revolving the rods B and B^1 in opposite directions, so that one *aileron* attains a positive and the other a negative angle of incidence.

The propeller revolves on the top member of the triangular *fuselage*, and is driven by bevel gears.

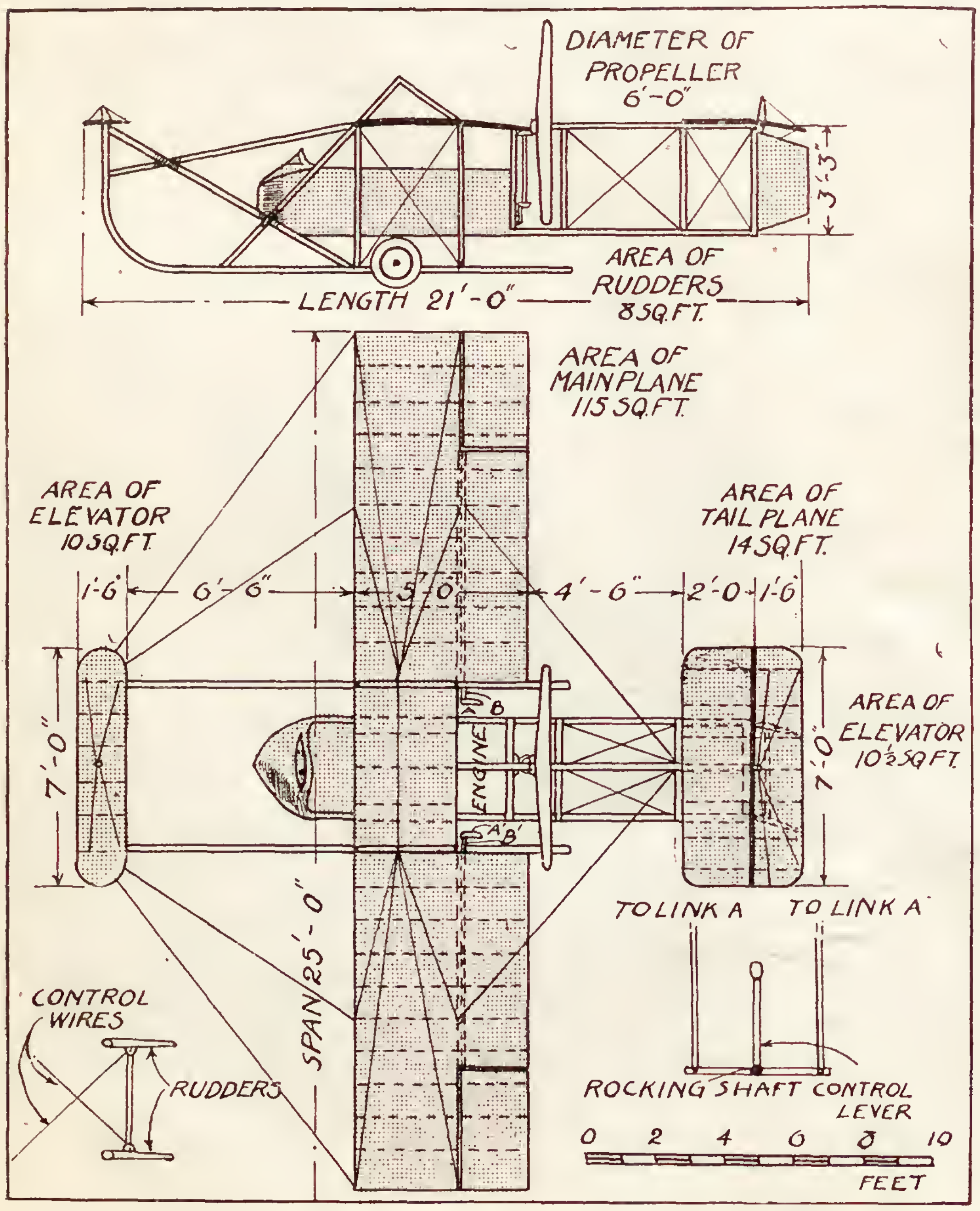
The twin rudders are connected together by a rod, the control wires being taken from the ends of the rod.

The pilot has a clear view below.

It is essentially a speed machine, and will land at high speeds, but the landing chassis is one which has been proved satisfactory for large and heavy machines, so should be amply strong for this machine. —A.L.C.



The Collins-Hancock monoplane.



DIAMETER OF PROPELLER 6'-0"
3'-3"
AREA OF RUDDERS 8 SQ. FT.
LENGTH 21'-0"
AREA OF MAIN PLANE 115 SQ. FT.
AREA OF ELEVATOR 10 SQ. FT.
AREA OF TAIL PLANE 14 SQ. FT.
1'-6
6'-6"
5'-0
4'-6"
2'-0
1'-6
7'-0"
B
ENGINE
A' B'
AREA OF ELEVATOR 10½ SQ. FT.
7'-0"
SPAN 25'-0"
TO LINK A
TO LINK A'
CONTROL WIRES
RUDDERS
ROCKING SHAFT CONTROL LEVER
0 2 4 6 8 10
FEET

An Electrically-Driven Model.

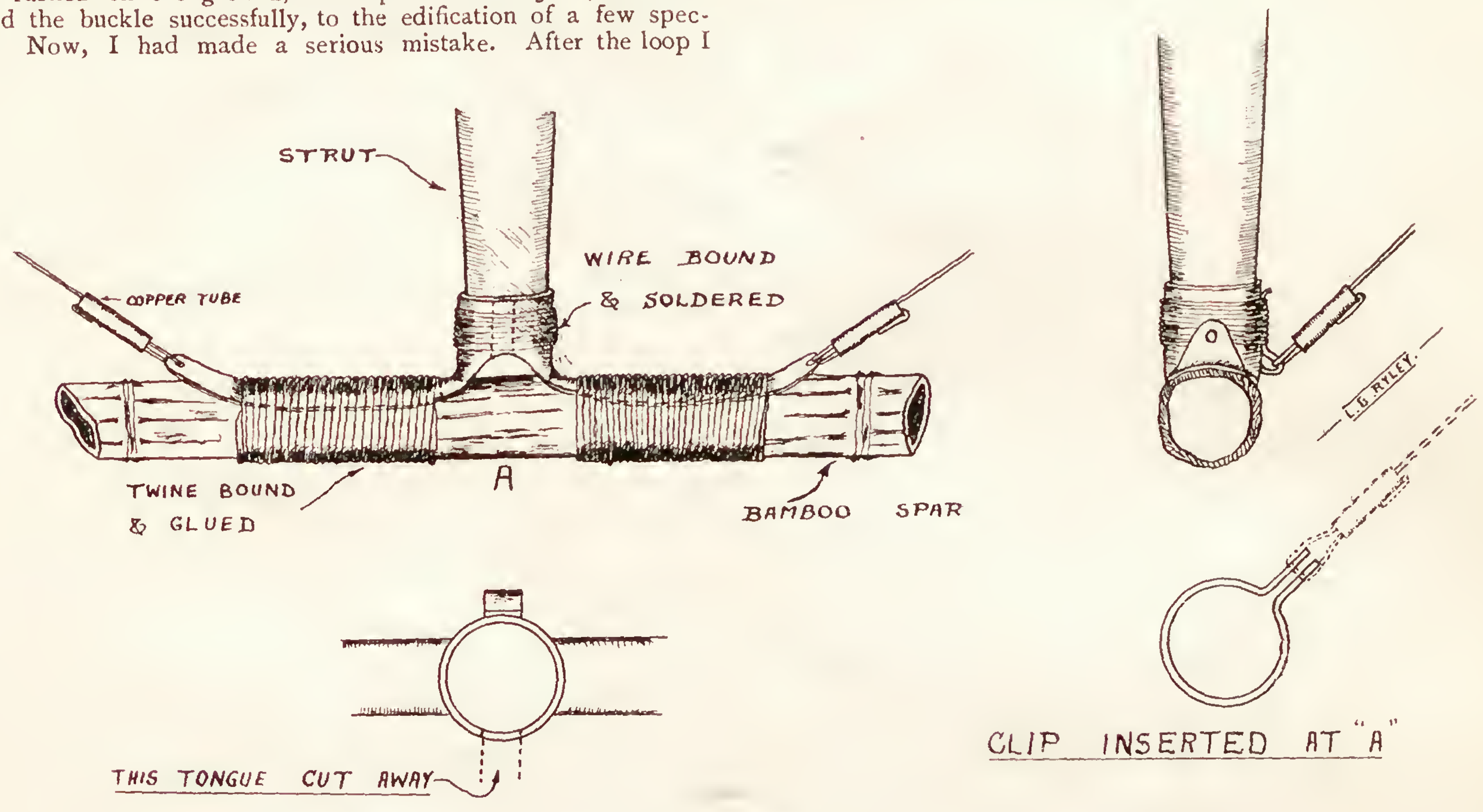
By H. RAMSEY KERRUISH.

I have lately been experimenting with a model driven by an electric motor and carrying its own batteries. It weighs inclusive 9½ ozs. It has an area of 3½ sq. ft. The thrust (static) given is 2 oz., which is just sufficient to fly it, leaving hardly any reserve of power. The chief dimensions are: Span, 4 ft. 6 ins., chord, 9 ins., overall length, 2 ft. 11 ins. Elevator, span 18 ins., chord 4 ins. The propeller, 14 ins. in diameter and 10 ins. pitch. The complete weight of the plant is 5·5 ozs., and of the model, 4 ozs. It is very lightly built, but nevertheless it is quite strong. It flies at 7·5 m.p.h. in a dead calm, but will not fly in any wind. The power plant is made up of a common tri-motor [tripolar-motor?] specially wound and carefully lightened, driven by six small cells constructed somewhat on the lines of the Delarue silver chloride cell, but embodying certain alterations which I do not wish to make public at present. The thrust of 2 oz. mentioned above is given off by the plant for a period of about one and a half minutes. I have cut down weight in every possible way, using carpet thread soaked in glue for bracing [Japanese silk gut would have been preferable.—V.E.J.] instead of wire, and covering the planes with the lightest chiffon doped with the thinnest solution sufficient for coherency. The model has flown quite well in suitable weather. The only place I have actually flown it in has been in the road opposite my house after dark, when little traffic is about, enough light to do so being afforded by the gas lamps. I start it off in the middle of the road and keep up with it by running, which is possible owing to its slow speed. As it has such a small reserve of power, it only rises about 4 ft. high, but keeps fairly consistently at that height, so that I am able to keep it going in the direction I wish by lightly pushing the front to one side or the other. On one occasion, the only one on which I made any measurements, I steered it down the road in this manner for a distance of 152 yards, the flight then only finishing owing to a connection working loose.

The general length of flight is considerably more than this, about 250 yards or so. It does a fairly good duration owing to its slow speed, but I have never actually timed it. It finished its career in a rather remarkable manner. I determined to be up-to-date, and make it loop the loop. I therefore fitted a 10 in. screw of 6 in. pitch, which ran at a tremendous speed when the cells were fully charged, but only lasted a short time. I then fitted a large vertical fin under the main planes, to prevent the unbalanced torque of the rotary propeller turning the machine over when at the top of the loop, and over-elevated. I placed the model on the ground, switched on and let go. The result was instructive. As the *Petit Journal* said of Chanteloup, "vehemently he buckles the buckle, and then flies, his head *en bas*." The model rushed off the ground, flew up to about 15 ft., and then buckled the buckle successfully, to the edification of a few spectators. Now, I had made a serious mistake. After the loop I should have caught it, since there was no pilot on board to flatten out. But I left it alone, with the result that it made a second loop at a much lower altitude, and then, diving for a third, encountered Mother Earth, and alas, unlike Antæus, did *not* arise refreshed. I told the model my opinion of it, likening it unto off-scourings and such-like evil things, and then proceeded to pick up the bits. The motor and cells, most fortunately, had escaped injury; but the propeller was smashed, but not the main planes, since the bracing had snapped, letting them down gently. I have gained most valuable experience and data from this model, and am about to utilise the planes and power plant in the construction of a tractor monoplane.

Some Remarks on Gliders. By L. G. RYLEY (Coventry Aero Club.)

The various drawings and descriptions of man-carrying gliders which have appeared in the last few issues of FLIGHT are distinctly interesting, and I am pleased to see that several model clubs are thinking of including a full-sized gliding plane on their programme. Before writing further, allow me to thank the Editor, Mr. H. F. McManus and Mr. S. Camm for their businesslike replies to my query regarding the doping of unbleached calico. Returning to the subject, I notice Mr. W. Davies advises the use of bamboo for the spars, ribs and outrigger owing to the springiness of this ready-grown spar. Commenting on the above, this is rather encouraging, as the writer's biplane complies with the above specification, and he was anxious to know how this material would "stand up to its work." With regard to the lug used by the Birmingham Aero Club (FLIGHT, December 13th, 1913), the writer uses one similar to this, but with three "ears" instead of two as shown in the sketch. Whether this extra "ear" will stand the strain imposed upon it is a matter which can only be decided by the actual trial, but a number of clips are being made which can easily be inserted at A (*see* sketch), should the lug not "hold up."



THE AUTHOR'S LUG

It is easy to see, therefore, that even if a considerable number of lugs snapped, the time occupied in connecting several wires need not be more than 20 mins. at the very most. Mr. G. Haddon Wood remarks that the price paid for the covering was 3*d.* per yard, but the writer paid just double this price; the width was 40 ins. My machine (1-2-0 type) is more fortunate than some gliders, as it is at present stored (dismantled) in a conservatory attached to the house. Several "glidists" (I don't like that word much, do you?). [No, I don't.—V.E.J.] appear to have experienced some difficulty in the launching of a glider, *i.e.* the machine has to be hauled, tipped, &c., until the planes catch the wind, and then before the towers have realised what has happened, the machine has shot about 30 ft. into the air, as per "Haddon I." No doubt the pilot is anxious to "get aloft," and in his eagerness pulls excitedly at the control lever, with the above result.

With a view to overcoming (to some extent) the above difficulty, the writer has arranged on his glider for the control to be geared down. This might make the machine rather sluggish "on controls," but I think it will save a few of those dives and stalls that Mr. G. Haddon Wood speaks about.

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver...	85 secs.
Twin screw, do. ...	Distance	R. Lucas ...	590 yards.
	Duration	G. Hayden	137 secs.
Single screw, rise off ground	Distance	W. E. Evans	290 yards.
	Duration	W. E. Evans	64 secs.
Twin screw, do. ...	Distance	L. H. Slatter	365 yards.
	Duration	J. E. Louch	2 mins. 49 secs.
Single-tractor screw, hand-launched ...	Distance	C. C. Dutton	266 yards.
	Duration	J. E. Louch	91 secs.
Do., off-ground ...	Distance	C. C. Dutton	190 yards.
	Duration	J. E. Louch	94 secs.
Single screw hydro., off-water ...	Duration	L. H. Slatter	35 secs.
Single-tractor, do., do. ...	Duration	C. C. Dutton	29 secs.
Twin screw, do., do. ...	Duration	L. H. Slatter	60 secs.

Greeting.—The Toronto Model Aero Association, of Toronto, Canada, have sent warmest greetings to the Kite and Model Aeroplane Association and its affiliated clubs for 1914, trusting that the year will be rich in prosperity, progress and contentment in all aeronautical matters. A suitable greeting has been sent to our Canadian friends in reply.

Aero Show, Olympia.—The Wimbledon and District Model Aero Club have reserved a stand, increasing the clubs' stands to seven.

Gifts of Prizes.—The "Gnat" Aero-Models Co. of Hampton Wick and the Winithson Model Co. of Teddington have kindly offered prizes for competitions during 1914. The hon. sec. will be pleased to hear from any others interested in models who would like to offer prizes during the coming season.

International Kite and Model Aeroplane Meeting.—The proposed meeting not having met with the necessary support, will some gentleman who is interested in seeing England first in aviation and mistress of the air, come forward and subscribe the sum needed to hold this meeting during the coming season. Lord Montagu of Beaulieu has offered one trophy, four others are needed, besides £200 for cash prizes. The council therefore hope that some patriots will come forward and subscribe before the Aero Exhibition.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

JAN. 25TH, model flying, 10 a.m., Wanstead Flats. If wet, meet at clubroom.

Sheffield Ae.C. (50, SPRINGHOUSE RD., WALKLEY, SHEFFIELD).

JAN. 24TH, tractor contest postponed until further notice. Important announcement shortly.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

JAN. 24TH, flying at Sudbury.

Wimbledon and District (165, HOLLAND ROAD, W.).

JAN. 24TH and 25th, flying as usual.

UNAFFILIATED CLUB.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

JAN. 24TH, Woolwich Common, 3.30 p.m. until dusk. Jan. 25th, Blackheath, 7.30 to 10 a.m.; Lee Aerodrome, 10.30 a.m. to 12.30 p.m. The club's first indoor exhibition, to be held at the Central Hall, High Street, Peckham, next Thursday (Jan. 29th), will open at 7.30 p.m. Admission free. Members can gain admittance at 6 p.m. The promised exhibits include scale models of some of the most famous aeroplanes, also internal-combustion motors, a power model, several very interesting relicts of historic aircraft and numerous flying models and photographs. On Thursday, Feb. 5th, this exhibition will be re-opened at Ripon Road, Herbert Road, Woolwich. Visitors will be entitled to cast a vote for the most interesting exhibit, which will hold the "South Eastern Trophy" for the present quarter. Aeromodellists and their friends are heartily invited to attend. Trams and 'buses pass the Central Hall, which is near the junction of High Street, Peckham, with Rye Lane. "South Eastern Trophy" Competition.—Rules for third quarter (January–March), 1914: 1. This competition shall be open to members of the S.E.M.Ae.C. only, and is for 2. Models of either the tractor or propeller type capable of rising from the ground entirely under their own power, and of 3. Carrying a "dead" weight of not less than one ounce. 4. Models must not weigh more than eight ounces in complete flying order (excluding the "dead" weight carried). 5. The motive power may be elastic, clockwork or any other suitable means devised by the competitor. 6. The whole of the model, except wheels and propellers, must be constructed by the competitor. 7. The official flights will be timed on Saturdays, February 28th and March 28th. Competitors flying on the first mentioned date will be given an allowance of five per cent. on their marks. 8. Models will be required to start from *very short grass*, artificial surface will not be provided. 9. Models must alight on the chassis at the termination of one official flight and remain in a proper attitude for a minimum period of five minutes. 10. At the completion of their official flights models must be in an undamaged condition, unless the judges decide that such damage was caused by unfavourable weather conditions. 11. Competitors may change, repair or add to their motive power as often as necessary. 12. Models must be fitted with effective protectors. 13. Competitors pushing or otherwise assisting their models to rise will be disqualified. 14. The winner shall be the competitor who obtains the greatest number of marks, which will be awarded in the following manner: The duration of flight (in seconds) multiplied by the weight carried (in ounces). 15. If time permits three official flights will be allowed to each competitor on each or both of the dates. 16. Competitors must be responsible for all damage done by or to their models. 17. The judging committee shall consist of three non-competitors. 18. Each competitor may enter any number of models. 19. These rules may be amended or otherwise added to at the discretion of the judges. Entry forms must be sent to the hon. sec. at least three days previous to the official flying dates.

* * * *

CORRESPONDENCE.

Aircraft and the Government.

[1826] May I suggest that, in pursuance of the policy of strengthening the hands of the First Lord of the Admiralty put forward in your excellent leading article of January 10th, you publish as soon as possible the latest information available as to the relative strength in the air services of France, Germany, and ourselves, and the amount of money spent on these services during the last few years?

I see to-day, that a gentleman of the un-English name of Molteno has gravely asserted that we are three times as strong as Germany at sea! This person is surely the limit, and I will not insult the intelligence of your readers by correcting him. The fact that we have given up the command of the Mediterranean, to say nothing of the Pacific Ocean, shows how serious the position really is.

As one of your contributors hints in the same number, it would be a good deal better if our flying men turned their attention to long-distance flights and reconnaissance instead of amusing an idle populace, but as they get no inducement to do so, it is hardly to be expected that they should.

Would it not be possible to induce some of our wealthy men to finance a line of passenger airships which would be available in time of war?

Referring to your article, as to the aggressive use of aircraft, there can be little doubt that, even at the present moment, they would do their best to destroy, or at least disorganise, some of our dockyards, by night attacks of airships, and how they are to be warded off no one knows. However, that is too big a subject to go into here. I may remind you, too, that the French are openly organising their larger 'planes for "special missions," which is understood to mean the destruction of railway stations, and so on.

January 14th. R.A. (Retired).

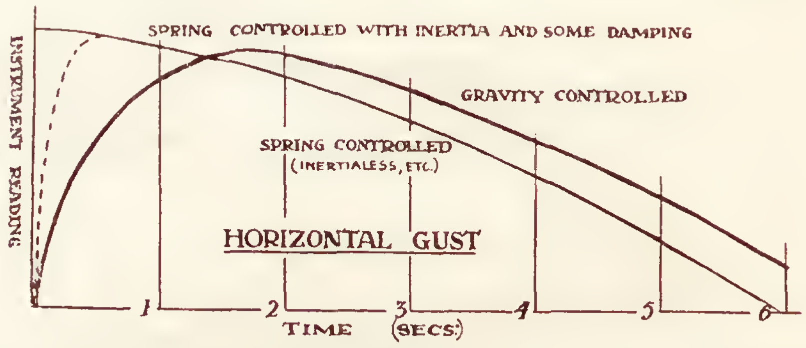
Speed Indicators.

[1827] Mr. Booth's article in your issue of January 3rd relating to gravity-controlled speed indicators raises several points of interest, and up to the present no one has attempted to defend the type. It would have been of still greater interest had pilots given their impressions of the behaviour of spring-controlled *versus* gravity-controlled speed indicators.

In the absence of such information, the discussion can only be continued on the lines indicated by Mr. Booth. It is common ground for advocates of either type of instrument that in steady flight each reads correctly the speed of the aeroplane through the air. Divergence of opinion begins when the behaviour of aeroplane instruments exposed to gusts is observed, and it is possible to agree with Mr. Booth's calculations and yet to totally disagree with his conclusions. Had the behaviour of the instruments been examined for vertical gusts instead of those in the direction of flight, it is probable that the gravity instrument would not have been looked upon with such suspicion.

Take, for example, the case of an aeroplane entering a downward air current. The speed through the air is not altered to an appreciable extent, and as a consequence the spring-controlled speed-indicator, which reads only the speed through the air, makes only a feeble and insignificant response to a vertical gust. The aeroplane, however, immediately gets a downward acceleration and gives a reading.

If the argument were left at this point it might be concluded that a spring-controlled air speed indicator gives warning of horizontal gusts and not of vertical gusts, and that a gravity-controlled instrument gives warning of vertical gusts and ignores changes of forward speed relative to the wind.



The arguments as given above are incomplete, because, as in Mr. Booth's case, the behaviour of the instruments is only considered for the instant at which the aeroplane receives the gust. It is an essential part of the assumptions underlying such calculations that the aeroplane shall not have had time to respond to the gusts.

The writer has had occasion, in connection with calculations relating to the stability of aeroplanes, to consider the response of a flying machine to gusts, and it is easy to estimate from these calculations the general nature of the readings of the instruments for a few seconds after the aeroplane has encountered the gust. The curves in the figure illustrate the conclusions.

An instantaneous reading such as was indicated by the incomplete calculations could only be obtained on a weightless and frictionless apparatus. The dotted curve probably most nearly represents the general curve.

For a vertical gust the curves would be interchanged. After a period which may be from half to one second, both instruments would be indicating substantially the same thing, but the spring-controlled instrument will be rather quicker than a gravity controlled indicator in its response to a horizontal gust and slower in response to a vertical gust.

There does not appear to be anything in principle which favours one instrument more than the other, and for this reason the writer is unable to appreciate the necessity for "A Warning to Pilots" on the basis of Mr. Booth's calculations.

LEONARD BAIRSTOW.

The National Physical Laboratory, Teddington.

* * * *

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FLIGHT

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CONTENTS.

	PAGE
Editorial Comment:	
The Royal Aircraft Factory and the Industry	105
Men of Moment in the World of Flight: Mr. Dukinfield Jones	107
Some Experiments with Different Systems of Lateral Control	108
Chart of the World's Aviation Progress, as shown by the Best Records	110
"A Warning to Pilots"	111
The Royal Aircraft Factory and the Industry	112
From the British Flying Grounds	114
Royal Aero Club. Official Notices	117
Eddies. By "Will o' the Wisp"	118
Discussion on "The Stability of Aeroplanes"	120
Aero Engines at the Paris Show	121
British Notes of the Week	122
Foreign Aircraft News	124
Correspondence	125
Models. Edited by V. E. Johnson, M.A.	127
Model Clubs Diary and Reports	129

EDITORIAL COMMENT.

The Royal Aircraft Factory and the Industry.

For many months past a campaign of criticism has been directed from certain quarters against the Royal Aircraft Factory, alleging that the policy of the Factory is one deliberately calculated to undermine the private constructor and to ruin an industry which, it must be frankly confessed, is by no means through the trials of its infancy. We have received from Messrs. Hewlett and Blondeau a letter, published elsewhere in our correspondence columns, which appears to us to open up the whole question of the charges which have been made against the R.A.F., and to present the matter in a most serious light. We will not reiterate at the moment the charges that have been made—we shall deal with them later in some detail—but this must be said at once, that if those charges can be proved to be true, then the future of the industry is utterly hopeless and the sooner it is realised by the private constructors as a body the better, and the sooner they abandon a futile enterprise the less money they will lose. Always provided, of course, that these charges are proved.

The reason is not far to seek. Apart from the hopelessness of any attempt by existing firms to continue, it is obviously futile to expect that capitalists will come forward with money to invest in aviation if it is only to provide ideas to be filched by the R.A.F. But is this so, and can the charges be substantiated? Let us see.

The matter is so serious a one that we have thought it worth while to investigate the facts as far as they are available, and as to whether we have met with any measure of success, we will leave our readers to judge. The gravest allegation made against the Factory is, as we have indicated, that it is an open and unashamed pirate of other people's ideas, and that the machines of the B.E. type, which have emanated from Farnborough, consist in great part of the embodiment of that which is best in a number of privately designed machines. We are entirely without bias or prejudice in the matter of the R.A.F., unless it be prejudice to hold the belief, expressed by us in FLIGHT over and over again, that the Factory ought by no means to be in any way a competitor of the private constructor, and that its efforts should be strictly confined to the work it was officially stated was to be its particular province—mainly experimental. We will go further than this and say that we are most strongly of opinion that the R.A.F. ought not to build machines at all for the Army or the Navy, save and except under pressure of unavoidable causes, such as the inability of private firms to deliver in sufficient numbers, or time, the machines *which are essential to the scheme of national defence.* This last is a very necessary reservation, because while we are all for the fostering of the private industry, it would be blind foolishness to stand still in the matter of our equipment if we can get the machines that are *necessary* from any source at all, public or private. With this preliminary and necessary statement of our attitude in the matter, we will endeavour now to get down to bed-rock facts, with a view to finding out just what justification there is for the statements which have been made with regard to the policy of the R.A.F.

First, as to the charge that the Factory is a copyist and nothing else. Supposing that the charge were true—which is not admitted at the moment—we should not be inclined to attach too much blame to the officials for that, so long as the work they were carrying out was of an experimental nature. Until the perfect aeroplane is evolved, it is beyond question that one of the most open lines of progress lies along that of taking the best features of the best designs and embodying them in new machines of a modified type. This, however, is not the charge which is laid at the door of the R.A.F. The allegation is a more serious one than that, and amounts to the statement that the best features of privately designed machines have been stolen—it is a strong word, but justifiable under the circumstances—and embodied in machines being built for the Services, to the vast detriment of the private industry which has thereby been robbed of the orders which were due to it. This subject is one that is more of a technical than an editorial one, and we have therefore thought it best to treat it separately in an article which appears on another page of this issue of Flight. In the compilation of this article we have approached the subject entirely from an uncritical standpoint, and without any attempt to prove or disprove that the design of the B.E. machines is either good, indifferent, or frankly bad. It does not concern us in the least, for the purposes of this article, under which category the design falls—the main thing is to deal with the question of whether or not the charge of picking the brains of others, in connection with the B.E., has a solid foundation of fact, or is merely the creation of irresponsible critics. With that we will leave it for the student to examine the facts set out in the article referred to, except that we have this to say in addition, that we will welcome from any of our readers anything in the shape of reasoned criticism which will throw proper light on this important matter. It must be understood, however, that all criticism must be of fact and be of an absolutely definite nature giving the dates and data on which it is founded, and not in general terms. Such legitimate criticism as falls within the lines we have indicated, we undertake shall find a place in the columns of Flight. We feel very strongly that this is a matter that must be definitely cleared up, once and for all, as irrespective of justice to the R.A.F., a principle is involved which is striking direct at the heart of encouragement for the industry.

We would ask our readers to give careful study to the article on the technical aspects of this copying side of the issue, which, unless we are totally wrong in our facts—which we submit is not the case, since they have been most carefully and independently collated—constitutes a refutation of the charges to which reference has already been made.

It further emerges from the letter of Messrs. Hewlett and Blondeau that there is apparently something gravely wrong with the inner working of the firms which constitute the aviation industry of this country. One of the main charges against the R.A.F. is that it is building in direct opposition to all statements that have been made as to its real functions, and is working untold harm to the private constructor, who cannot obtain orders in consequence of the direct breach of faith and understanding involved. How much truth is there in these assertions?

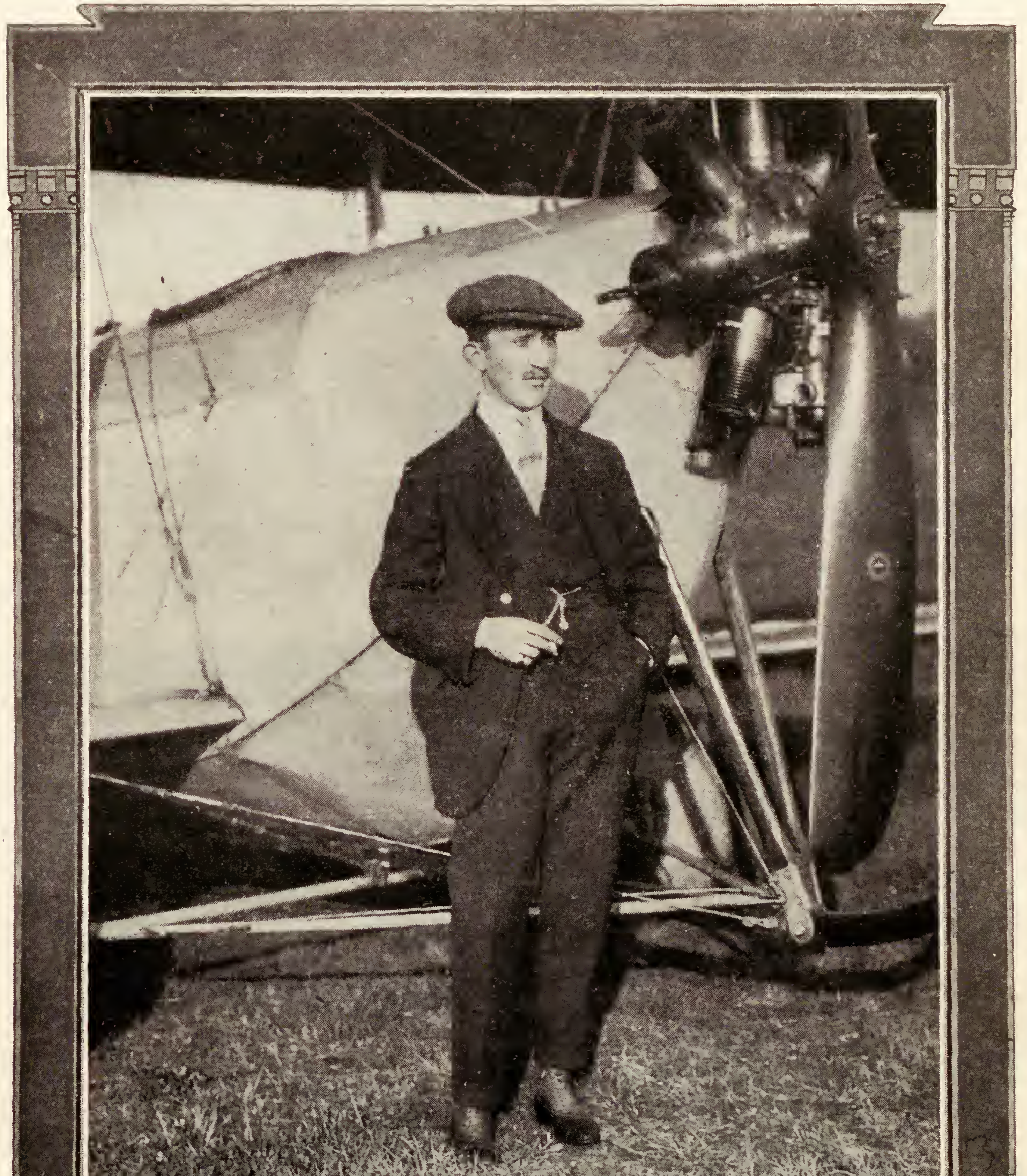
The experience of our correspondents, at any rate, seems to imply that the R.A.F. is only too willing to encourage the private constructor. The question then arises, if that is so, why is the Factory at present engaged on the construction of a larger number of B.E. machines than has yet been given out on any one tender? Why is it that the Factory is working day and night shifts, and that no expense is being spared to deliver these machines by March. That, on the face of it, would almost seem to confirm the allegations that the Factory is, in fact, building against the private firms. We have reason to believe that the Factory has been forced into doing this, because of the impossibility of obtaining a sufficient number of machines from private firms. We are informed, altogether independent of official sources, that the machines tendered for and ordered from private firms have been delivered reasonably to time, but that an extraordinary number have been rejected either for failing to comply with the specification, or for not reaching the necessary standard of constructional excellence. There might conceivably be an answer to this, which would be to the effect that the R.A.F. officials, in order to serve their own ends, set up a fictitious standard of their own in order deliberately to reject machines which are up to all reasonable requirements of the Service. But in the light of the statements made in Messrs. Hewlett and Blondeau's letter, which are to the effect that they at least have no complaint in this respect, such an answer cannot be entertained for a moment. Thus we are driven back upon the explanation that, for one reason and another, the needs of the Services cannot be met by the private firms, and the factory is *compelled* to fill the *hiatus*. On this point again we shall welcome any authenticated facts and criticisms which our readers may have to offer, with the same reservation as we have insisted upon in the matter of the technical side of the question—that what we require are facts and their foundations, not general statements of the loosest possible nature, such as have been flying about for too long.

Now we come to another most serious aspect of this serious question. In their letter to us, Messrs. Hewlett and Blondeau say that the larger firms are accepting Government orders at a price which must entail a dead loss, with the apparent object of killing the smaller concerns out of hand. We frankly confess that we do not know exactly how much there is in this assertion, which is an entirely *ex parte* one, as our readers can see for themselves. But, assuming that Messrs. Hewlett and Blondeau know whereof they are talking, can it be that there is any connection between this and the high percentage of rejections which take place, and which, according to our information, has forced the R.A.F. into a building policy which is foreign to its real functions? On the face of it, there would seem to be something in this theory.

Now, if that is so, then it is certainly time for the trade to set its house in order on the lines indicated by the letter to which we have referred. The point which seems to emerge is that our fighting Services must have the best machines and nothing but the best. We cannot afford to give them anything less and that for very manifest reasons. It is one of the functions of the R.A.F. to see that nothing but the best in design, in material, and in construction is passed into the Service and we would rather see error on the side of too stringent an interpretation of the essentials than the slightest leaning towards laxity of inspection. Then comes the point that if the private constructor cannot afford to give of his best for the price he quotes, he must quote higher and abandon the policy which is alleged against him, that he is engaged in a game of "cut-throat" with his competitors. Let it be clear that the allegation is not of ours, but is made by a firm of constructors who should know their facts, and thus, until their statements have been disproved by facts and figures, we are bound to accept them as being a fair index to the state of things existing. In such a case as this the country not only can and should pay, and we are quite satisfied that they will be prepared to pay a reasonable price. We earnestly trust that, for the future good of the industry and of the whole aviation movement, an effort will be made to assist us in the clearing up of a situation which, from all and every point of view, has reached a stage at which it is well-nigh intolerable.

We have no desire in the world to accept the rôle of apologists for the R.A.F. Indeed, beyond so far as they are a Government Experimental Department, our sympathies are all the other way, but it does seem to us that in the interests of all parties, and in order that casual and irresponsible criticism may be silenced, the whole tangled skein should be unravelled without a moment's more delay than is necessary.

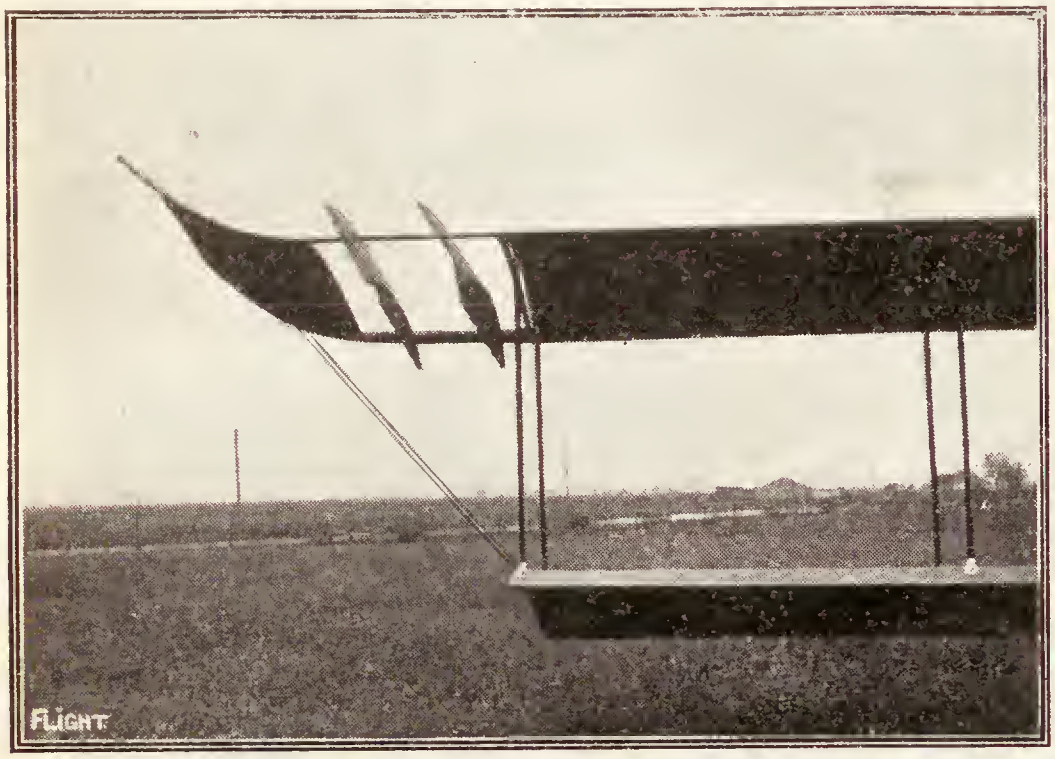
MEN OF MOMENT IN THE WORLD OF FLIGHT.



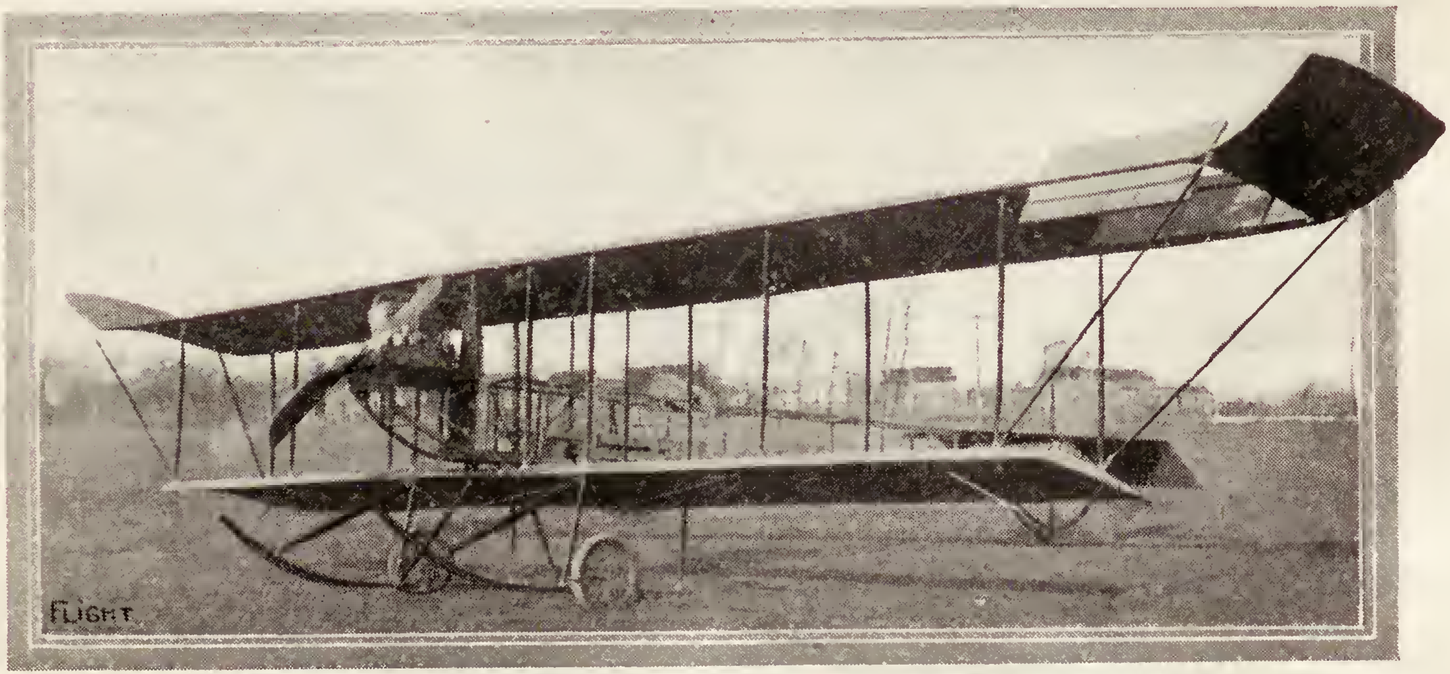
MR. DUKINFIELD JONES.

SOME EXPERIMENTS WITH DIFFERENT SYSTEMS OF LATERAL CONTROL.

Mr. W. E. SOMERVILLE, of Coal City, Illinois, U.S.A., sends us the following interesting account of some experiments with different systems of lateral control, which he has carried out during the years 1910, 1911, 1912 and 1913, in order to determine the best form of *ailerons* :—


THE SOMERVILLE BIPLANE.—Type 1 Aileron fitted on 1910 experimental biplane, and also used in 1911.

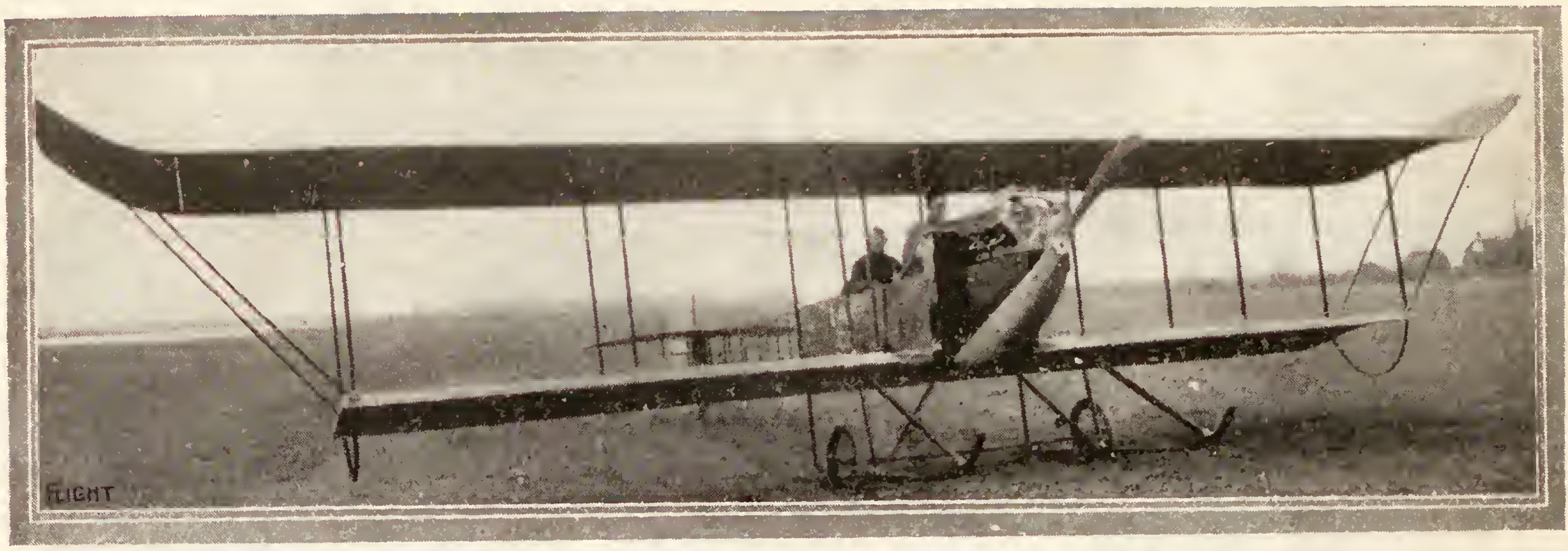
"Machines Nos. 1, 2 and 3, as shown in the accompanying photographs, all had shutters, which were not interconnected, and which were operated by opening the shutters on the higher wing, thereby partly reducing the area and consequently the lift, whilst the added resistance caused a drag, which retarded the speed of the higher wing tip.


THE SOMERVILLE BIPLANE.—Type 2 Aileron used in 1910 experimental biplane.

"System No. 1 was found to be inefficient when the machine was near the ground, and so was discarded in favour of No. 2. This was quite good, and the machine would right itself almost immediately, while this form of *ailerons* also proved to be quite good as a rudder, in fact while the experiments were being carried out the rudder was very seldom used. However, as the shutters were kept closed by means of a heavy spring the action of opening them against the pull of the spring entailed some rather hard work, so this system was discarded.

"System No. 3 was fairly good, but not so effective as No. 2. It was used, however, on the 1912 machines by the aviators E. Korn and E. S. Daugherty. On my 1913 biplane a new design (No. 4) was tried. This system is practically the same as the Farman, but operates exactly the opposite way.

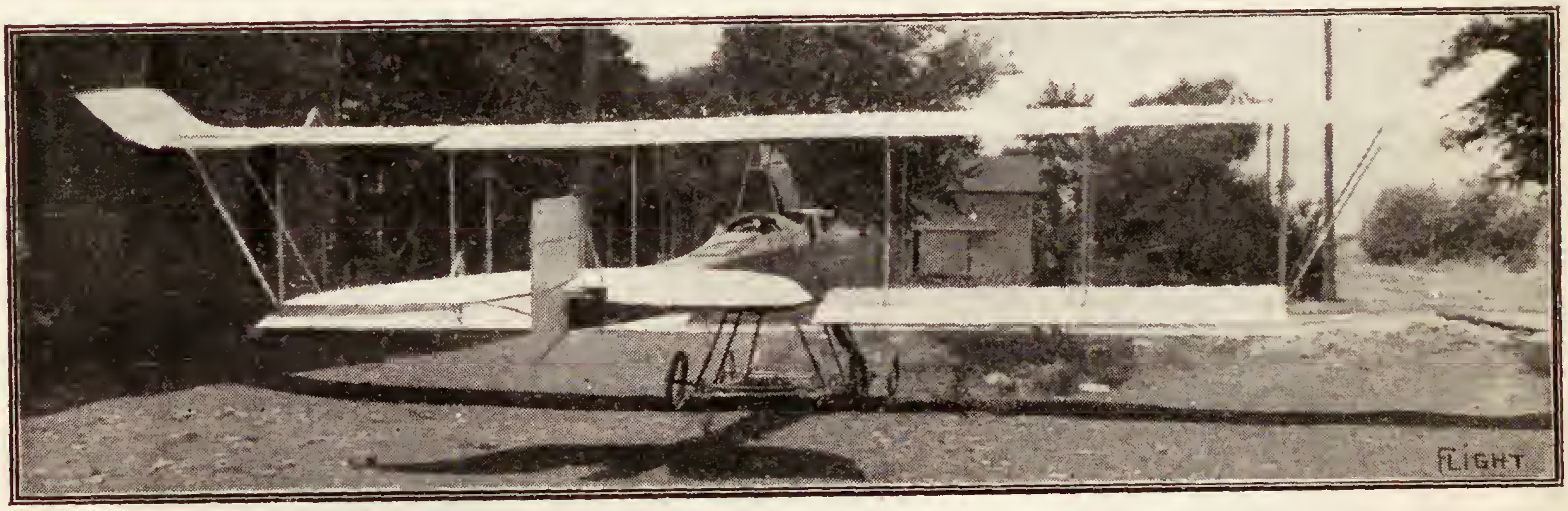
In order to correct a bank the *aileron* on the higher side is raised, thus causing a downward pressure as well as a drag on the higher wing. This, of course, accelerates the speed of the lower wing, and consequently increases the lift so that the machine rights itself without the use of the rudder. Then another system was tried in which the *ailerons* were interconnected, as in the modern Farman and Curtiss machines, but with the exception that when in their normal position the *ailerons* presented a negative angle of incidence to the line of flight. The *ailerons* were so adjusted that when the controls were moved to their full limit the *aileron* on the lower wing was in line with the trailing edge, whilst that on the higher wing presented the necessary resistance and downward pressure to right the machine. I consider this system the best because it is easy to operate, and produces practically no resistance on the lower side. It also appears to add considerably to the general stability of the machine. My object in testing so many systems was to produce a design which would be effective, efficient and safe, without causing any drag on the lower wing, and one which would at the same time work independently of the rudder. Nos. 2 and 4 are particularly suitable, since either *ailerons* or rudder may be used for both purposes.



THE SOMERVILLE BIPLANE.—Type 3 Aileron used on 1912 biplane.

"Although my machine has been flown repeatedly by M. Daugherty without *ailerons* and with only the rudder to maintain lateral stability, it is my opinion that *ailerons* are necessary if only to make one feel secure. The upturned wing tips assist greatly in giving one this confidence, as it prevents that sideslip which has proved fatal to many an aviator. Not only that, but they practically maintain lateral stability. This may seem a very strong claim, but it is a fact which has been proved on numerous occasions.

"I engaged a supposed aviator to fly my machine (later he informed me that he had never been in an aëroplane before). However, the 80 h.p. H. Scott was started, and away he went, climbing at a terrible angle. It was evident from the start that he knew nothing whatever about flying. When he had reached an altitude of about 250 ft. he did a banked turn, climbing all the while, and in this critical position he stopped the engine! The machine of course lost all headway and began to drop vertically. Gradually the lower wing and the tail rose to a level, and the machine commenced to glide forward and landed heavily, smashing two wheels and the skids, but suffering no further damage. The 'pilot' escaped without a scratch, but was half dead from fright!



THE SOMERVILLE BIPLANE.—Type 4 Ailerons on 1913 machine.

"The upturned wing tips have saved my life on more than one occasion, for in my early experiments my machine was underpowered and very unreliable. I unfortunately, one day in June, 1910, gave a private exhibition to my family and a few friends in order to demonstrate my ability as an aviator. Well, the flight terminated with half of the machine in some trees, and the other half, with myself, piled on the ground. The engine being in front I was not much hurt, but the same cannot be said about my feelings, seeing that my family and friends had witnessed the performance. This finished my ambition to become a great aviator, and later, when I have occasionally tried my machines I have always taken good care to do so when my friends were not in sight."

* * * *

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

Meetings.—The sixth meeting of the present session will be held on Wednesday, February 4th, at 8.30 p.m., when The Rt. Hon. The Lord Sydenham, G.C.M.G., K.C.M.G., &c., will preside. Lieut.-Col. F. H. Sykes, A.F.Ae.S., Royal Flying Corps, will read a paper, to be followed by a discussion, on "Further Developments of Military Aviation."

Members are reminded that, under the rules, they may introduce visitors to general meetings.

Tickets for visitors, not introduced, may be obtained from the Secretary, 11, Adam Street, Adelphi, W.C.

Light refreshments will be provided after the lecture.

The lecture previously announced for February 18th will not be read. In its place a paper on "Airscrews" will be read by Mr. F. H. Bramwell, B.Sc., A.F.Ae.S., of the National Physical Laboratory.

Finance Committee.—Dr. A. P. Thurston has been appointed to serve on the above committee in the place of Mr. Griffith Brewer, resigned.

B. G. COOPER, Secretary.

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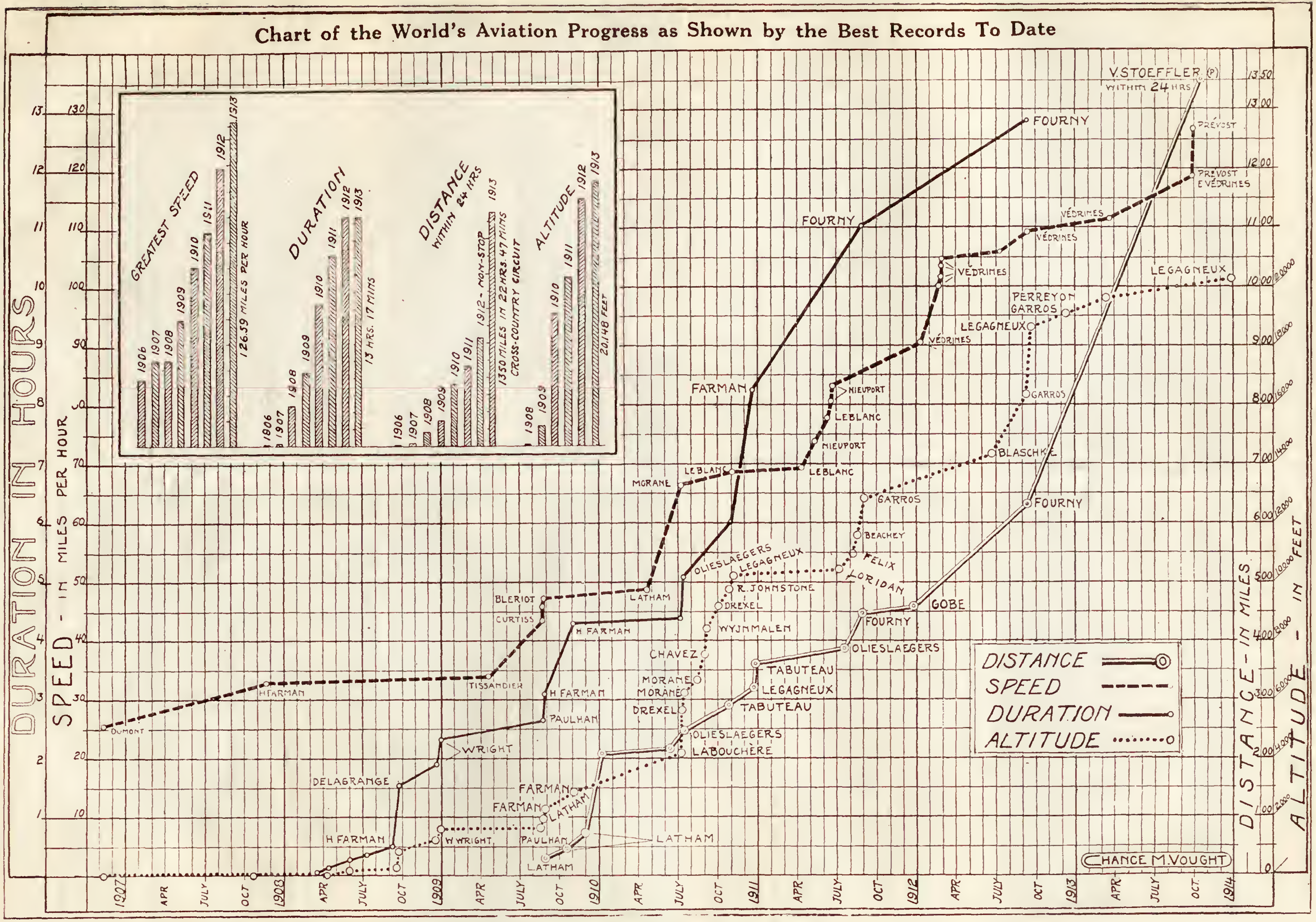

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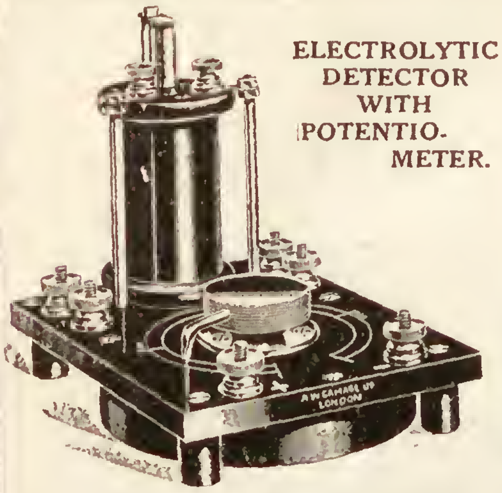

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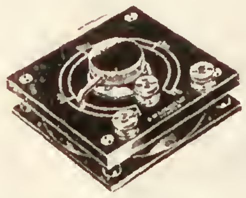

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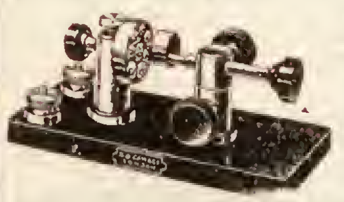

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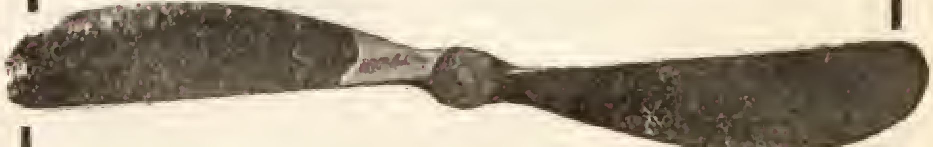

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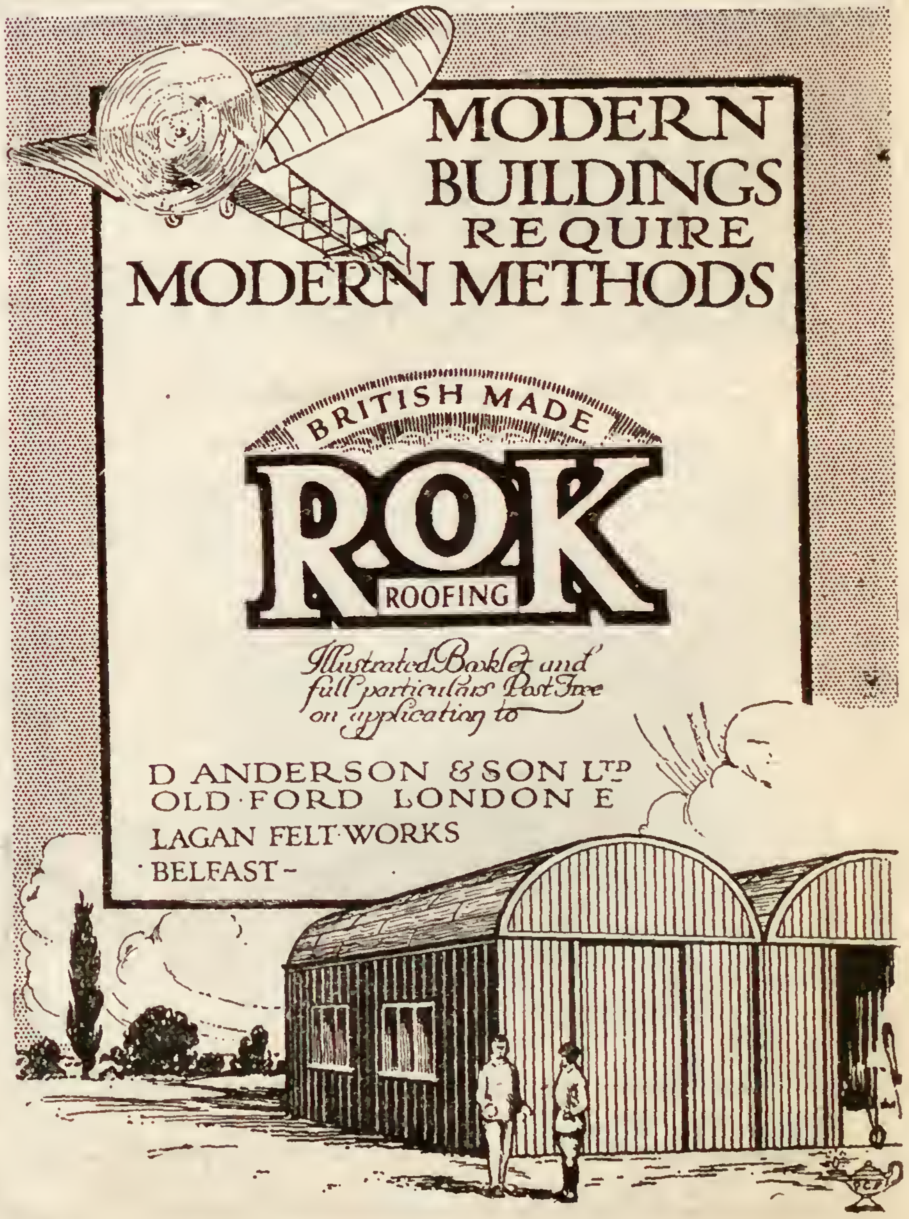

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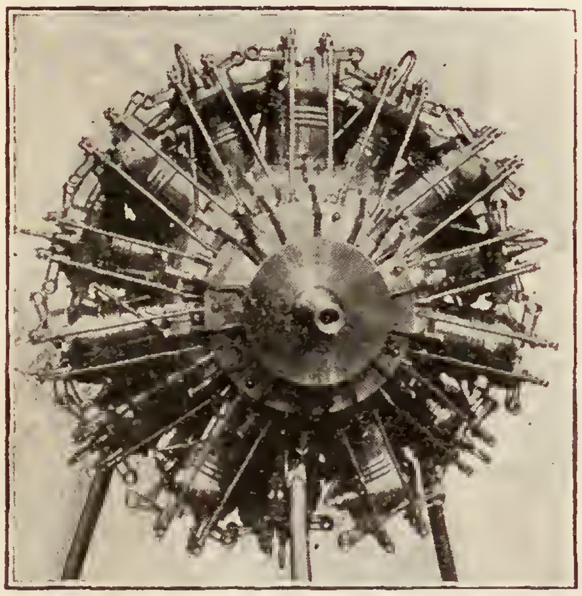

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Volume IV of

JANUARY TO DECEMBER, 1912.

FLIGHT

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Publishers: 44, St. Martin's Lane, W.C.

"A WARNING TO PILOTS."

A REPLY TO MR. BUSK AND MR. BAIRSTOW.

By HARRIS BOOTH, A.M.Inst.C.E., A.F.Ae.S.

WHEN I wrote my article, "A Warning to Pilots," I never supposed that a serious defender of the gravity-type of air-speed indicator would arise. Since, however, Mr. Busk has published an article intended to prove that the speedometer is wrong and the velometer is right, it is incumbent upon me to deal with his ideas rather fully.

Mr. Busk is really only actually wrong in one point; but when this is corrected, the consequent modifications in his proof bring it entirely into line with mine. This point is as follows:—

After correctly pointing out that the lift is equal to the apparent weight under all conditions, stalling and falling included, he goes on to say that the "maximum lift is equal to (maximum lift coefficient) × (area of planes) × ρ × (speed)^2": that is correct also.

Then he says that it follows that "for safety it is necessary that (apparent weight of aeroplane) $<$ (α constant) × ρ × (speed)^2": this is wrong; he should have said "for safety it is necessary that (*weight* of aeroplane) $<$ (α constant) × ρ × (speed)^2."

From this one error Mr. Busk naturally goes on by steps which are right in themselves, to a false conclusion.

If Mr. Busk will try the effect of correcting this one slip in his proof, and the errors which follow from it, he will find that his calculations lead him exactly where mine led me.

Of course, I do not know for certain whether Mr. Busk's error proceeds from a slip or from an incorrect opinion. If he really is of opinion (which I do not for a moment believe) that the safety condition is, as he says, "(apparent weight) $<$ (α constant) × ρ × (speed)^2," the following *reductio ad absurdum* will immediately convince him. Substitute in the alleged safety condition the equation "(lift) = (apparent weight)" and you arrive at the statement "for safety the condition is (lift) $<$ (α constant) × ρ × (speed)^2." Now, looking back to see exactly what is meant by this "constant," we see that this statement is equivalent to "for safety the condition is (lift) $<$ (maximum lift)"—a condition which is *always fulfilled.*

Are aeroplanes then *always safe?*

There is one other point in Mr. Busk's article on the velometer about which I want to make some remarks.

It appears that he takes more interest in the *critical angle of attack* than in the *critical speed.* Now, as a matter of fact, the reaching of the critical angle causes failure of control, while the passing of the critical speed causes actual falling.

As a personal preference, being a passenger, instead of a pilot like Mr. Busk, I would rather be out of control than falling—but I don't want to start a discussion on the relative demerits of the Devil and the Deep Sea.

* * *

Mr. Bairstow has entirely misunderstood the question. What I said in my article, "A Warning to Pilots," applied, of course, to machines which are unstable longitudinally. Such machines require a speed indicator, and the attention of the pilot to form what Mr. Bairstow has aptly called a "stable combination."

Mr. Bairstow has apparently considered the case of a stable aeroplane, and, of course, there is no need to fit a speed indicator in this class at all.

If Mr. Bairstow's letter really applies, as I imagine, to a stable machine, let him work out the corresponding case for a machine which is just neutral—I suppose that is possible—in the longitudinal sense.

Mr. Bairstow further says that my calculations refer only to the instantaneous motion. This is incorrect. The next number of the *Aeronautical Journal* will contain an article in which I give a complete proof of the theory of the gravity-controlled air-speed indicator. When Mr. Bairstow has seen this he will, I think, admit that my statement of the condition of affairs applies *for the whole motion*, and not only *for the instantaneous* or *initial motion.*

* * * *

THREE HISTORIC MACHINES IN LINE AT HELIOPOLIS.—In the centre is Marc Pourpe's 60 h.p. Gnome-Morane-Saulnier, which he flew from Cairo to Khartoum and is now flying back—this is the identical machine on which Garros crossed the Mediterranean on the left is Vedrines' 80 h.p. Gnome Blériot which was flown from Paris to Cairo; while on the right is Bonnier's 80 h.p. Gnome-Nieuport, which has also been flown from Paris to Cairo.

THE ROYAL AIRCRAFT FACTORY AND THE INDUSTRY.

Elsewhere in this issue we deal editorially with the serious harm which is being done, in certain directions, by the ill-informed and wildly irresponsible criticism, in more or less general terms, directed against everything and everybody associated with the Royal Aircraft Factory. One great crime that looms more largely than anything else appears to be the alleged copying of the good features of machines turned out either here or abroad, the Avro, Nieuport, Blériot, and Breguet being specifically mentioned. Without wishing to detract in any way from the splendid work put into and done by these machines, and for reasons set out in our editorial comment, we have thought it high time that some protest should be raised against this extraordinary series of attacks which can only lead to one certain end, namely, the crippling, not to say annihilation, of the financial possibilities of the industry; and without any bias one way or the other, we have deemed it worth while to investigate in detail some of the so-called "facts" to see if they will stand up to the light of day. From various sources we have gleaned some interesting data, which speak for themselves, and we give the result of our enquiries below, which should be read in conjunction with, and, as it were, as an appendix to, our editorial comment already referred to.

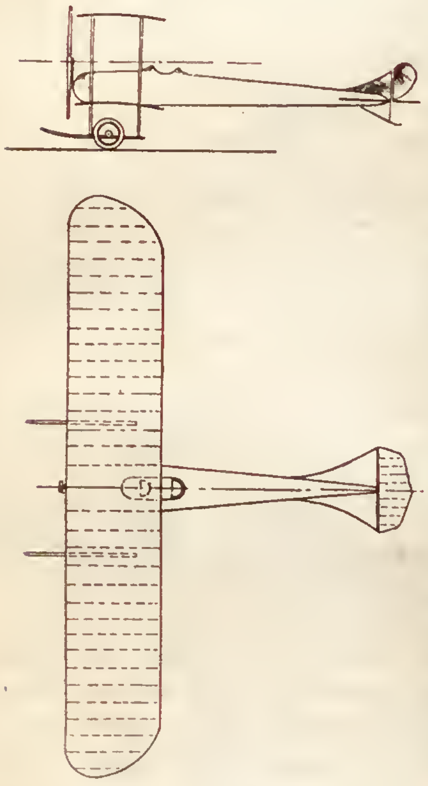

Fig. 1.—Class "B" machine.

The first design of aeroplane built at the R.A.F. was known as the F., or the Farman type; the second, the S.E., was illustrated in FLIGHT for July 15th, 1911, and was so named because it belonged to the class originally introduced by Santos Dumont. It was characterised by the placing of the propeller behind the main planes, which were preceded by a more intensely-loaded smaller plane. The third class of machine (*see* Fig. 1) was commenced at the end of 1911, and was flown early in 1912, the letters B.E. (Blériot Experimental) being assigned to it as a compliment to Mons. Blériot, whose monoplanes had the propeller placed in front of the main supporting surfaces, and a tail. It is really difficult to see in what manner the suggestion of copying has arisen in the case of this machine, unless it be from the complimentary title, as in no part is any similarity observable. All these machines were biplanes, and were clearly indicated and illustrated by Mr. Mervyn O'Gorman, in a paper entitled, "Problems Relating to Aircraft," which was read before the Institution of Automobile Engineers on March 8th, 1911. As included in the B class, he instanced the Antoinette, R.E.P., Blériot, Breguet, and the Avro. The three first-mentioned being monoplanes, the last a triplane, and the Breguet a biplane, the classification being governed by the position of the propeller relative to the main planes and the location of the smaller plane, which, in this class, is more lightly loaded than the main planes. The B.E. class were, therefore, clearly foreshadowed as early as March 8th, 1911, and must have received serious consideration long prior to that date, most probably in 1910, although the tail ultimately adopted was somewhat modified from that shown in the illustrations given in the paper. Furthermore, an examination of the drawings of the S.E. machine already referred to will elicit a very interesting fact, if the rudders are removed and the wings, tail skid and landing chassis are reversed, namely, that this machine is to all appearances similar in construction to the B.E. design.

At that time the only biplane in any way resembling this class of machine was the Breguet (*see* FLIGHT for December 17th, 1910, and July 22nd, 1911), but the construction of the wings, landing gear, *fuselage*, and tail planes were so radically different as to leave no opening for a valid suggestion that any part had been copied in the B.E. machines. There was but one row of struts between the main planes, which were formed by ribs hinged upon a steel spar; the steel landing gear was, and still is, of a special and peculiar type, and no rear skid was employed; the front portion of the *fuselage* was built up of pressed steel members, joining into a circular tube which continued to and supported the tail, which was mounted upon a universal-joint and had no fixed planes. Since that time, Mr. De Havilland designed a form of buffer gear for the landing chassis, which operated on the gun-recoil principle, but the only likeness to the Breguet construction was in its external appearance. The use of this particular form of gear has, however, since then been discontinued.

Early in 1911 Mr. A. V. Roe was principally engaged on his triplane, and had not then commenced to achieve those successes that have since been attained by his biplane. His triplane had a *fuselage* of triangular section, and only the part in the vicinity of the wings was covered in, whilst the tail planes were of flat section and formed by trapezium-shaped planes. The tail planes of the Avro biplane were also of flat section, but of rectangular form with corners removed (*see* FLIGHT for November 4th, 1911). The tail planes of the Nieuport monoplane (*see* FLIGHT for December 17th, 1910 and October 7th, 1911) were also of flat section (*see* Fig. 2). On the other hand, the tail plane (*see* Fig. 2*c*) for the B.E. machine, was designed by Mr. G. J. Watts, (then of the Royal Aircraft Factory and now of the staff of Messrs. Vickers), the design being most elaborate, and based upon curves of righting moments. It has since been superseded by the section shown in Fig. 2*d*, the reasons for so doing being given in the Advisory Committee's Report.

The differences in the shape of the wings and tail in plan is, however, of little consequence, and the particular manner of rounding off the planes is not significant compared with the enormous importance of a section. In the design of the early wings of the B.E. machines the results of Eiffel's experiments were consulted (*see* Advisory Committee's Reports for 1911–12) as is also done by the designers of many other machines, and in accordance with that writer's recommendations a section intermediate between Blériot XII *bis* and another form was tried, although this particular section was abandoned later on the strength of model experiments carried out in an air channel at the National Physical Laboratory at the request of the Royal Aircraft Factory.

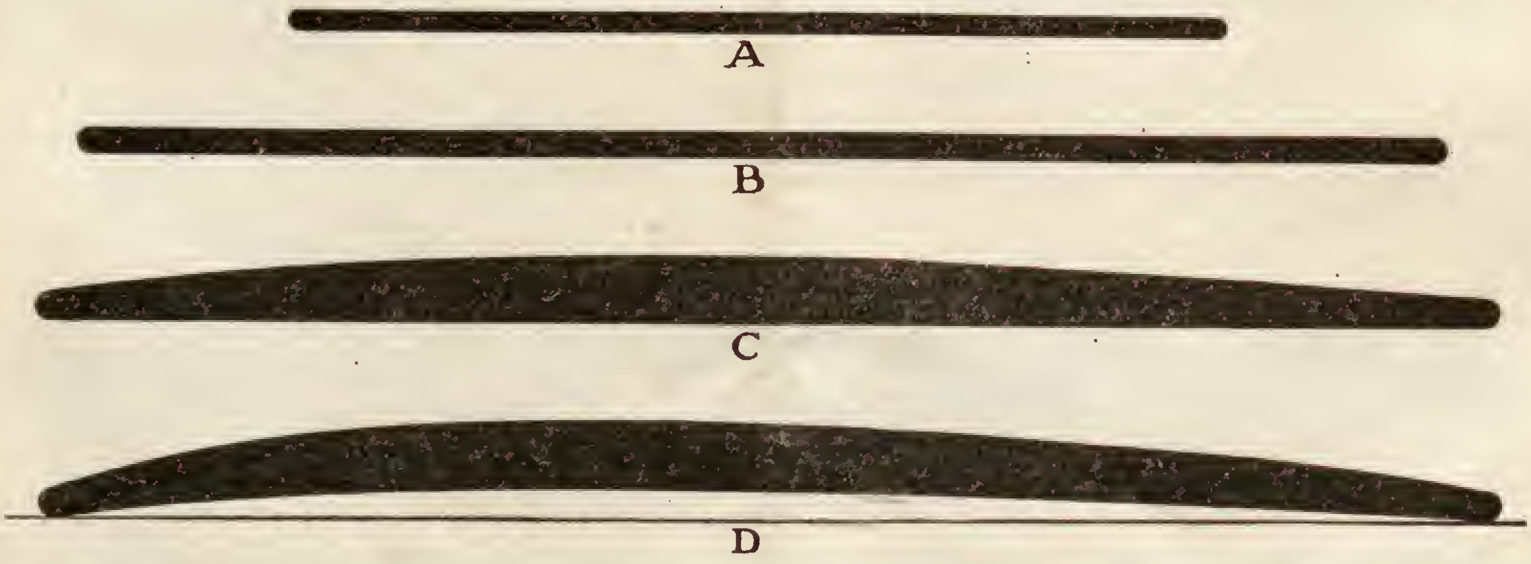

Fig. 2.—Sections of tail planes: A, Avro tail, 1910–11. B, Nieuport tail, 1910–11. C, B.E. tail, 1911. D, B.E. tail, 1912.

The construction of the supporting surfaces on the Breguet biplane, which are quite a special feature of this machine, have already been discussed; and as regards the Avro biplane there are differences in the plan form, internal construction, and the method of assembling, which are readily observable from a comparison between Figs. 1 and 4 and the scale drawing of B.E. 2*a*, given on page 1062 of FLIGHT for November 16, 1912, whilst the strut section and arrangement are dissimilar. The Nieuport monoplane also embodied an entirely different form of wing surface.

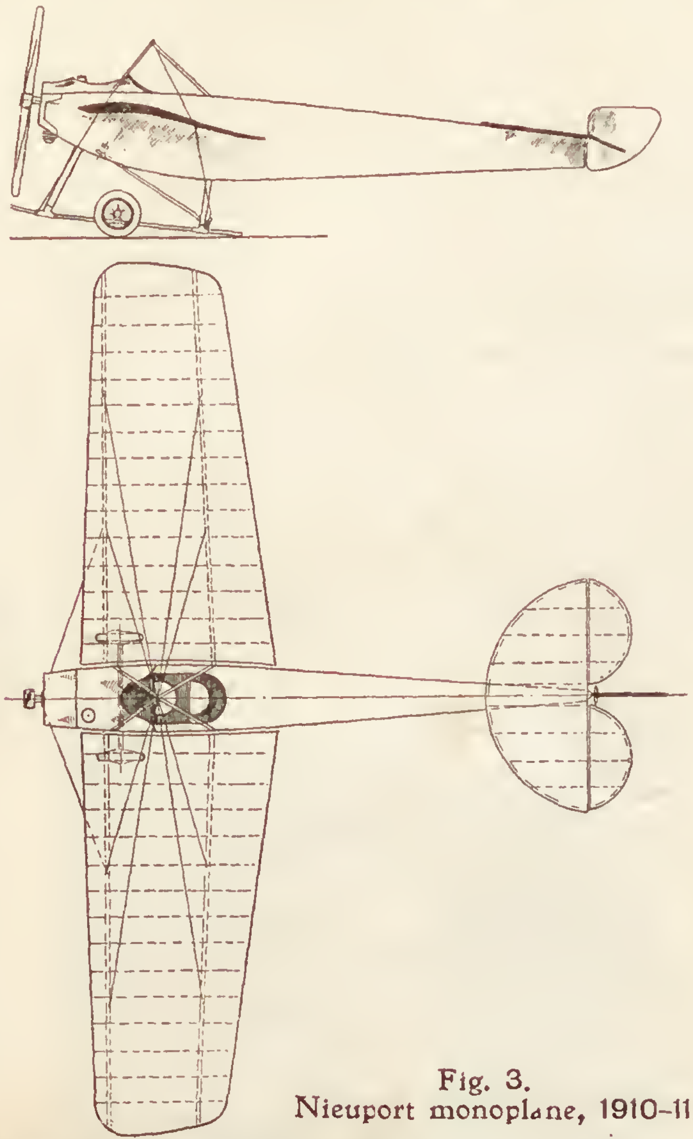

Fig. 3.
Nieuport monoplane, 1910-11.

The *fuselage* of the 1911 Avro biplane was of triangular section, whereas that of the S.E. class had a rectangular section, and the B.E.'s were, and still are, of rectangular form with a rounded upper surface for a short distance behind the pilot's seat. Further, the open bodywork and section of the Blériot cannot be regarded as in any way similar to the Army machines, which are canvas-covered. The body of the Nieuport also, although covered in, was dissimilar from the B.E. in regard to the shape of the nose and its proportions, the *fuselage* having exceptional depth at the front end.

In the landing gear similar differences occur, as references to the drawings and illustration already mentioned will show, the Avro having a chassis of the Farman type, supported on four wheels, on the triplane; and the arrangement seen in Fig. 4 on their biplane, the construction used on the Nieuport being illustrated in Fig. 3; whilst the special designs of chassis, employed on the Breguet and the Blériot, are already too well known to need further demonstration as to their absolute dissimilarity. As regards the tail skid, this was, and still is, to a large extent, of a design peculiar to the B.E.'s, and was evolved for the purpose of rendering the machines manageable on the ground at low speeds, when machines controlled solely by the air rudder are out of hand; whilst it also enables a machine to be turned in a very short radius (*see* Advisory Committee's Report for 1911 and 1912).

Coming to more recent times, it will be found that the special form of wing surface construction, under-carriage, fuselage, and tail of the Breguet machines remain, and have undergone little fundamental change, except that the wings are now mounted rigidly upon the steel spar, *ailerons* are fitted, and the whole machine has been made more robust (*see* FLIGHT for February 22nd, June 14th and December 27th, 1913). On the Avro (*see* FLIGHT for March 30th and August 31st, 1912, and December 6th, 1913), the triangular-shaped *fuselage* has given place to one of rectangular section, which tapers to a knife edge at the rear, the upper surfaces being horizontal in straight flight; whilst ample depth of section has been given to the fore part, primarily in order to afford greater comfort for the pilot. The landing chassis has also been changed, for, instead of the double skids used on the earlier machines, a construction somewhat, though not exactly, similar to that used on the Nieuport (*see* FLIGHT or October 7th, 1911) is embodied, where a single skid supported on a spring axle, carries the machine on V-struts, the latest machine having shock absorbers fitted to these struts. On the latest model the main planes are staggered, the upper plane being slightly in front of the lower, a construction which was first employed, at all events in this country, on B.E. 3 (*see* Advisory Committee's Report, 1911 and 1912) as the result of research at the National Physical Laboratory, and because they permitted a larger field of vision. *Ailerons* were first fitted to the Avro hydroplane (*see* FLIGHT for June 14th, 1913), and have also been used on the machine subsequently developed.

On the Nieuport machines, minor alterations have been made, such as affect the shape and dimensions of the planes, *fuselage*, &c.—the body, for example, has been tapered to a vertical knife edge at the rear (*see* FLIGHT for March 22nd and April 19th, 1913); but the general design employed on the earlier machines is still continued.

With regard to the B.E. machines, many changes have been made in the course of the last three years, but these have been principally in regard to the wing section, and as such no suggestion of copying can be seriously entertained. Different methods of wing fixing, various forms of control mechanism, and other minor variations in design have been tested with the object of finding that which is the most effective for military purposes; but the essential features that have characterised the B.E.'s from their inception are in the main still retained on the latest types. Among the alterations which may be mentioned as having been made are the staggering of the planes previously referred to, the hinging of the rear spars of the main planes, and the equalising of the span of the upper and lower wings for the purpose of interchangeability; whilst the tail area has also been varied, its construction, however, remaining practically the same as in the earlier machine.

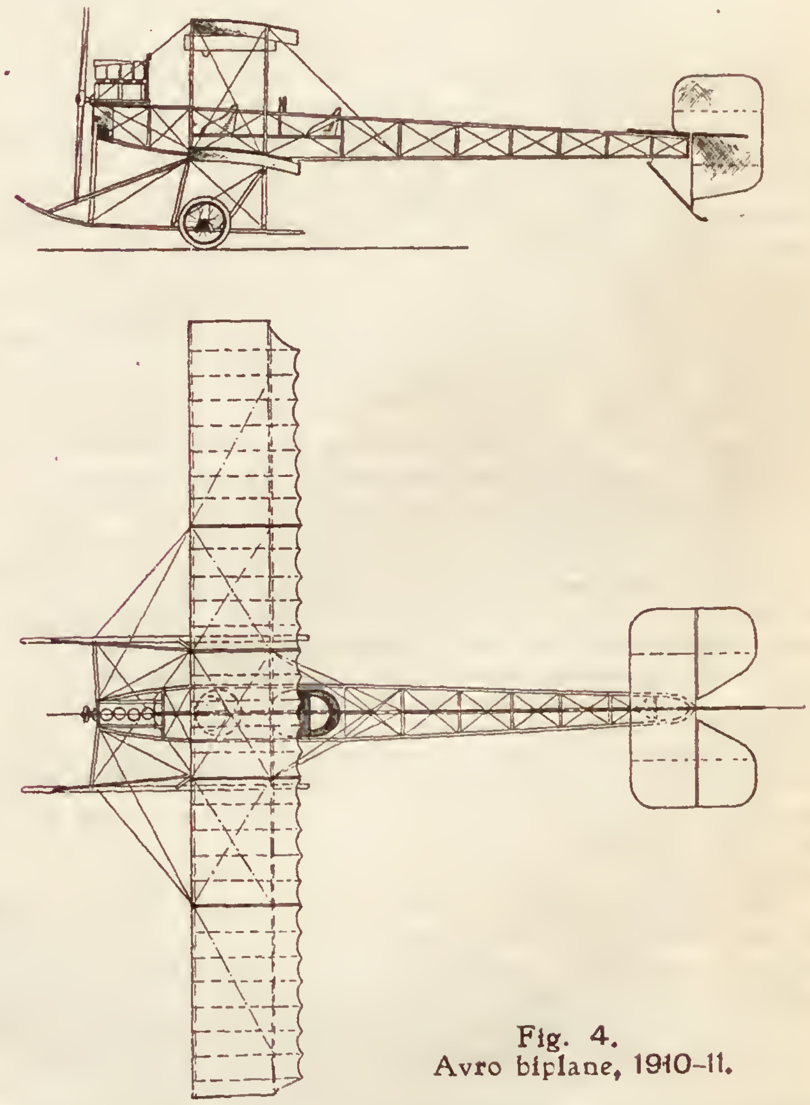

Fig. 4.
Avro biplane, 1910-11.

In conclusion, we may observe that similarities in some respects must necessarily exist between one machine and another, as is clearly evident from an inspection of current types of aeroplanes, for in the endeavour to obtain the highest efficiency, surfaces are smoothed off so as to obtain a streamline form, and thus become more and more like one another in appearance, especially as the same authorities are consulted in their design, and the purposes for which the completed machines are intended to be used, are very similar. But these points of resemblance are common to other machines than those referred to, and we therefore say it is evident that the individual characteristics of the original B.E. class of machine are still retained, and have not been modified by the introduction of fresh features copied from other machines.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Monday last week was a busy day at Eastchurch. First thing Capt. Kilburn was up on Short 65, making a high flight. Later he flew on the same machine to the Isle of Grain, returning later with Mr. Gordon Bell as passenger. Capt. Courtney took up Sopwith 27, Lieut. Marix Bristol tractor 43, and Lieut. Pierce Dep. 36. Lieut. Marix made a fine flight on the Bristol tractor 43, making nicely banked turns and flying at low speed. Lieut. Pierce also made a good long flight on Sopwith 27. Lieut. Littleton also flying well on Dep. 36. Capt. Courtney took up the Dep. 36 just before dusk.

Com. Samson was making numerous flights Tuesday on S 10 100 h.p. tractor, taking Mr. C. R. Fairey as passenger. Capt. Kilburn was up on S 65, making two long and high flights. Capt. Kilburn also made a nice flight on Avro 41. Later Com. Samson took up S 3 for a long cross-country flight, taking Fairey as passenger as before.

All the pilots and machines were hard at work all day Wednesday. Lieut. Marix made a fine flight on S 65. Then Lieut. Collet and Capt. Kilburn had the same machine up in turn. Lieut. Pierce flying well on S 64. Lieut. Pierce, with Lieut. Clarke Hall as gunner on the gun (Maxim) machine No. 66, Lieut. Marix flying well on S 65. Lieut. Collett made an extensive flight on S 64. Telegraphist Sparks made a good show on the M. Farman. P.O. Andrew on Avro 41. Leading Seaman Bateman on the M. Farman with a passenger. Lieut. Marix made a long and high flight on Dep. 36, finishing with a fine spiral descent. Lieut. Collett was up for a long turn on S 65 making fine banked turns. Capt. Courtney instructing on S 2.

Thursday again saw all pilots up. Com. Samson, with Lieut. Clarke Hall as passenger, left for Farnborough in morning on S 3. Lieut. Collett flying well on S 65. Lieut. Davis making a fine long flight on Sopwith 27; Lieut. Marix also putting up a good show on same machine. Lieut. Pierce on S 65, Capt. Kilburn on S 64. Capt. Courtney instructing on S 2, later pupil doing straights with Capt. Courtney in passenger's seat. Asst.-Paymaster Finch Noyes on H. Farman 31. Eng.-Lieut. Briggs up nearly all afternoon on Blériot 39. P.O. Andrews on Avro 41, and Leading Seaman Bateman on same machine. Lieut. Osmond making long flights on S 64 and 65.

Friday was rather slack. Capt. Courtney instructing on No. 2. Lieut. Osmond made two circuits on No. 2. Later the pupil flying straights and making some good circuits. Com. Samson returned, with Lieut. Clarke Hall as passenger, from Farnborough on S 3.

Although there was a heavy mist Saturday and it was freezing hard, Capt. Courtney had his officer pupil. After one short straight the pupil made some fine circuits and landing, doing his circuits from a good height, keeping this up till lunch time. Mist coming on thicker prevented him going out again.

Civilian Flying.—Monday morning, last week, Mr. Bell was up on the Short 100 h.p. Gnome tractor. After a short preliminary flight he headed straight for the Isle of Grain Hydro Station, where he made a safe landing, Mr. C. Fairey accompanying him. This machine is intended for the Grain Station. On Thursday, Mr. Gordon Bell was up again on the new Short tractor. After a few staid circuits he put up a fine show of fancy flying. On Saturday, Mr. Bell was again flying the machine, making some good high and cross-country flights, but owing to mist and extreme cold he could not get very far away.

Brooklands Aerodrome.

On Monday last week, the Vickers and Bristol Schools were at work both morning and afternoon. Mr. Barnwell with a passenger was further testing the 100 h.p. Vickers gun-carrying biplane.

Mr. Pixton with a mechanic as passenger started for Farnborough on Tuesday in a gusty wind, but finding the weather conditions too bad, returned to Brooklands, and went over to Farnborough in the afternoon.

Mr. Barnwell flew to Farnborough on the Vickers gun-carrying biplane, on Wednesday. Messrs. Merriam and Halford were busy at the Bristol School with pupils. Mr. Raynham made several good flights on the 80 h.p. Avro, afterwards testing the new 50 h.p. Avro, and flying to Farnborough on the 80 h.p. Avro. Mr. Alcock was testing the Maurice Farman with its 100 h.p. Sunbeam engine.

On Thursday, Herr Roempler was out on the D.F.W. all-steel biplane. The Martinsyde monoplane made a number of flights. The Bristol and Vickers Schools were busy with pupils. Mr. Alcock was out on the Maurice Farman (100 h.p. Sunbeam) biplane. Mr. Raynham flew to Hendon to deliver the new 50 h.p. Avro ordered by Mr. Hall. Mr. Barnwell was testing the Vickers gun-carrying 'bus. Mr. Crawshay flew over from Hendon on a 50 h.p. Blériot monoplane, which he left at Brooklands for overhaul at the new Blériot works. Lieuts. Adams (50 h.p. Avro, No. 289), Hordern (50 h.p. Avro, No. 291), and Wilson (50 h.p. Avro, No. 288) arrived from Farnborough within a few minutes of each other, returning thence after a short stay.

The Bristol and Vickers Schools were engaged all day with their respective pupils on Friday. On Saturday Mr. Raynham gave some excellent exhibition flights on the 80 h.p. Avro biplane, and Messrs. Barnwell and Waterfall made a number of circuits on the Martinsyde monoplane, Mr. Waterfall being in the air for some time and finishing with an extremely well-judged landing.

On Sunday the weather conditions were by no means ideal, and only two machines ventured up in the gusty wind which was blowing—the Martinsyde monoplane and the 80 h.p. Avro biplane. Mr. Raynham took up the winner of the ballot for the free passenger flight, Mr. N. Huggins, of Cherry Orchard, Staines, on the Avro biplane, the machine making a perfect landing in the gusty wind. Mr. Pixton had one of the Sopwith (Green) biplanes out for testing.

Next week an 80 h.p. Avro (propeller) biplane, suitable for gun carrying, is expected.

Bristol School.—The high wind prevented any tuition in the early morning of Monday, last week, but towards mid-day it became calmer, and Merriam and Halford took Air-Mechanic Locker and Lieut. Binney on several long flights, the latter pupil having complete control. Mr. Racine Jacques made two straights but found it too bumpy to continue. Merriam took Lieut. Lawrence, in the afternoon, for his first flight, Halford following with Lieut. Ames, and later Lieut. Lawrence. Merriam sitting behind Lieut. Binney (twice) on straights and circuits, also behind Lieut. Ames.

Mr. Thomas Hinshelwood, who passed the necessary tests for his *brevet* at the Vickers School, Brooklands, on November 25th last.

Tuesday, too windy for school work. Wednesday, after testing, Halford took Lieut. Lawrence and Lieut. Fraser on straights and landings, Merriam following shortly afterwards with Lieut. Binney and Lieut. Lawrence. Halford giving tuition to Lieuts. Fraser and Lawrence and Air-Mechanic Locker, during which Mr. Racine Jacques made two solos. Merriam then in the passenger seat with Lieut. Binney (twice), Lieut. Fraser and Air-Mechanic Locker. The strong wind in the afternoon prevented any tuition.

Halford gave tuition to Lieut. Binney, and afterwards to Lieuts. Fraser and Lawrence, Thursday. Merriam then took Lieut. Binney on straights, and with Lieuts. Lawrence and Fraser and Air-Mechanic Locker, the three latter having complete control. Lieut. Fraser then made his first solo, which he accomplished splendidly. After breakfast Merriam made a solo test flight over Weybridge, and then took Lieut. Binney for tuition. Halford went out with Lieut. Lawrence on straights and circuits. Lieut. Fraser afterwards made a short solo, but found the weather was too bumpy to continue.

AT BROOKLANDS.—Mr. Hawker in flight on the Sopwith Tractor during the past season.

The weather all day Friday was very foggy, but, clearing for a short time, Halford took Lieut. Fraser for tuition, then gave a long flight each to Lieut. Lawrence and Air-Mechanic Locker, afterwards sitting behind Lieut. Fraser.

Saturday, no tuition was possible all day on account of the fog in the morning, followed by a strong wind during the afternoon.

Vickers School.—Wednesday, last week, Elsdon and Knight on biplanes with Lieuts. Crosbie, Monckton and Prichard.

Thursday, Knight and Elsdon on biplanes with Lieuts. Crosbie, Monckton and Prichard, and Mr. Creagh. Mr. Hinshelwood straights on No. 3 Mono. Barnwell on biplane with Lieuts. Crosbie, Monckton and Prichard and Mr. Hurst. Barnwell testing new gun-carrying biplane.

Friday, Knight and Elsdon with Lieuts. Crosbie, Monckton and Prichard, and Mr. Creagh on biplane. Barnwell with Mr. Hurst and Lieuts. Monckton and Crosbie.

Sunbeam Activity.—On Wednesday, January 21st, Jack Alcock was flying the 100 h.p. Sunbeam-engined M. Farman, carrying a passenger, for one hour. Several exhibition and passenger flights were made on the following day, while on Friday passenger flights, aggregating two hours, were made.

Eastbourne Aerodrome.

FRIDAY was the first possible day for school work during last week. Gassler was out early on the E.A.C. biplane, and later took Mrs. Salmon up for four lessons. Fowler was up on the Bristol, passenger carrying, and Hunt was also out on the Bristol. In the afternoon Mrs. Salmon had two more stunts, and Hunt was out again.

Saturday, Gassler was up, with Mrs. Salmon driving, for four trips. Mrs. Salmon is now handling the controls very well, and will soon be able to do a solo. Hunt was again up in the afternoon.

Monday afternoon Mrs. Salmon was out three times with Gassler, and Hunt had three stunts over the surrounding country.

Mr. F. G. Dunn, who has secured his *brevet* at the Blériot school at Hendon.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Wednesday, last week, weather very bad, but Messrs. Lillywhite and Cripps circuits and spirals, &c.

Messrs. Parker, Cowley straights Thursday, with Instructor Strange in passenger seat. Messrs. Bjorkland, Cripps, Norris, Lillywhite solo circuits, spirals, &c.

Friday, Messrs. Piercy, Parker, Cowley, Lindop straights with Instructors Manton and Strange in passenger seats. Messrs. Barrs and J. B. Fraham (new pupils) rolling and straights with Instructor Manton or Strange. Messrs. Carr, Bjorkland, Norris, Cripps, solo circuits, figures of eight, &c.

Blériot School.—On Thursday and Friday last week, Jules Teulade, Chief Instructor, made several flights in *brevet* monoplane. Mr. E. Gower, certificated pilot, made several flights for practice. Mr. Dunn made all his trial flights for the certificate, with complete success.

Mr. R. O. Crawshay flew on 50 h.p. Gnome-Blériot from Hendon to Brooklands, leaving the machine there in the new Blériot sheds.

W. H. Ewen School.—At the beginning of last week it was too windy for pupils. M. Baumann was out for a short time on the *brevet* machine on Wednesday morning, but found it too bumpy for school work.

On Thursday, the pupils were out at 8.10 a.m. After a test flight by M. Baumann on the *brevet* machine, Mr. Murray did circuits and landing practice with the engine shut off, and Mr. Cooper was doing circuits and making nice landings. On the 35 h.p. Caudron No. 1, Mr. F. W. Goodden made a test flight, after which Lieut. Kinnear and Mr. Bankes-Price did straights, Mr. Freshney short flights, and Mr. R. G. Garvin, a new pupil, was rolling.

The School was out at 9 a.m. on Friday, when, after test flight by M. Baumann on *brevet* machine, Messrs. Cooper and Murray did some good circuits. On 35 h.p. Caudron No. 1 Mr. Goodden was instructing Lieut. Kinnear, who was doing straights and half-circuits, Mr. Price straights, and Messrs. Busk, Carruthers and Garvin rolling. At 3 p.m. the pupils were again out under the instruction of M. Baumann and Mr. F. W. Goodden. On *brevet* machine Mr. Cooper doing circuits, figures of eight and *vol plané* without engine, and Mr. Murray doing circuits. On 35 h.p. Caudron No. 1 Lieut. Kinnear half-circuits, Mr. Price straights, and Messrs. Busk, Carruthers and Garvin rolling.

Hall School.—Sunday week, J. W. Hall flying Caudron at 1,000 ft.

Monday and Tuesday, a gale. Wednesday, No. 2 Caudron adjusted for pupils, and Thursday, 50 two-seater (dual control) arrived from Brooklands, piloted by P. Raynham. J. W. Hall took delivery and put machine through climbing tests. Two passengers carried, and Mr. Russell, of Ewen School. W. A. Burn received instruction, Friday, on dual control Avro biplane, No. 1 Caudron meanwhile being fitted with 50 Gnome. Too foggy, Saturday, for practice. In afternoon J. W. Hall managed to give a short exhibition of flying on 50 Avro, and afterwards took out double-surfaced Caudron for tests.

Sunday, Mr. Allen received instruction on Avro in 30 m.p.h. wind.

Salisbury Plain.

Bristol School.—Monday, last week, Jullerot first made a trial flight, afterwards taking Capt. Walcott for two flights, Mr. Gipps in the meantime having tuition on the tractor biplane. Voigt took up Mr. Stutt for a long flight, and later, while Jullerot was flying solo on the tractor, gave tuition to Capt. Walcott (three trips) and Mr. Stutt (two trips).

Tuesday, weather unfit for tuition.

Voigt, after making a trial flight, Wednesday, gave landing practice to Mr. Stutt and took Capt. Walcott for a flight. In the afternoon Voigt gave tuition to Mr. Stutt twice and also to Capt. Walcott twice. Jullerot also made a solo on the tractor biplane, taking a lady passenger.

Voigt out for test, Thursday, then with Mr. Stutt and Capt. Walcott for tuition. Jullerot made a flight on the tractor, afterwards taking Mr. Tod on the same machine, Sippe then going up for a solo.

Friday, Mr. Stutt was taken for two flights by Voigt, after which Jullerot took out the staggered plane tractor biplane, taking in turn as passengers, Capt. Walcott, Mr. Gipps and Lieut. Huish. Voigt with Mr. Stutt and Capt. Walcott for two flights each, the latter pupil then going with Merriam for spirals and banked turns. Merriam made a solo on the tractor biplane.

Jullerot and Voigt gave tuition to Mr. Stutt (three flights) and Lieut. Binney on Saturday, after which the former instructor made a solo in the tractor, then taking Lieut. Binney as passenger. Sippe and Merriam each made good solos on the tractor, the latter then taking Mr. Stutt for tuition on the school biplane. In the afternoon Merriam went out for 20 mins. on the tractor, rising to 2,000 ft., landing with spirals. Jullerot gave tuition to Mr. Stutt, but the weather prevented any further flying.

Shoreham Aerodrome.

A CONSIDERABLE amount of school work has been done during the past week, the weather having been much more favourable for practice than it has been for a considerable time. Every day has seen quite a lot of good work, and Mr. R. P. Cannon and Lieut. Clemson, R.N.R., have done good circuits on the 45 h.p. Green-Avro.

The pupils doing "straights" during the week were Messrs. A. Maskall, F. Maskall, Purnell and Hayland-Wilson, and the last named shows great promise, handling the 45 h.p. machine exceptionally well. Mr. Arkman (new pupil) has done his rolling practice, and is now promoted to the more powerful machine. Mr. William H. Elliott has acted as instructor during the week, and has also put up some particularly good flights.

A Henry Farman type machine, fitted with a 50 h.p. Gnome engine, will be added to the school machines in a week or so.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

International Races.

THE attention of Aviators and Manufacturers is particularly drawn to the following notices regarding International Races:—

THE JACQUES SCHNEIDER MARITIME AVIATION CUP AND PRIZE, 25,000 FRS.

Mr. Jacques Schneider has given a trophy of the value of 25,000 francs and a cash prize of 25,000 francs for three years for international maritime aviation competition.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Regulations for 1914.

(Translation from the French.)

The distance to be accomplished for the Jacques Schneider Maritime Aviation Competition in 1914 is 150 nautical miles.

The Competition will take place exclusively at sea on a closed circuit having a minimum course of 5 nautical miles and situated outside any port or closed harbour. Alightings are permitted.

Competitors may start at any time they wish between 8 a.m. and the official hour of sunset. Only one attempt is allowed, and before starting a competitor must notify the officials of his intention to take part in the Race. Two copies of the final regulations will be handed to all contestants, and one copy of these regulations, signed as approved, must be handed by the competitor to the official before starting in the competition.

The competitor will then navigate his machine over the line of departure, rise, and make a tour of the course with at least two alightings on the water at points indicated by the officials. This having been accomplished, he must proceed without alighting to make the first lap of the circuit, clearing the line of departure in full flight. He must then continue the course until the whole distance has been completed, when the arriving line must be passed in full flight and the alighting made on the course.

The Race will take place at Monaco on April 20th, 1914.

GORDON-BENNETT AVIATION CUP.

Rules for 1914.

The Race for the Gordon-Bennett Aviation Cup will take place in France this year.

The Race will be over a distance of 200 kilometres on a course having a minimum distance of 5 kilometres.

Competing aircraft, before taking part in the Race, will have to pass the following preliminary test:—

A flight in a straight line out and back of about 2 kilometres, without touching the ground, at a constant height of not more than 30 metres. The speed of the test shall be the mean of the speeds of the flights out and back, which must not exceed 70 kilometres per hour. In this test the aircraft must carry sufficient petrol and oil to cover the whole course of 200 kilometres. Three attempts will be allowed to each competitor.

After the qualifying tests have been passed, no modifications may be made to the aircraft. Repairs will only be allowed with the permission and under the control of the Officials.

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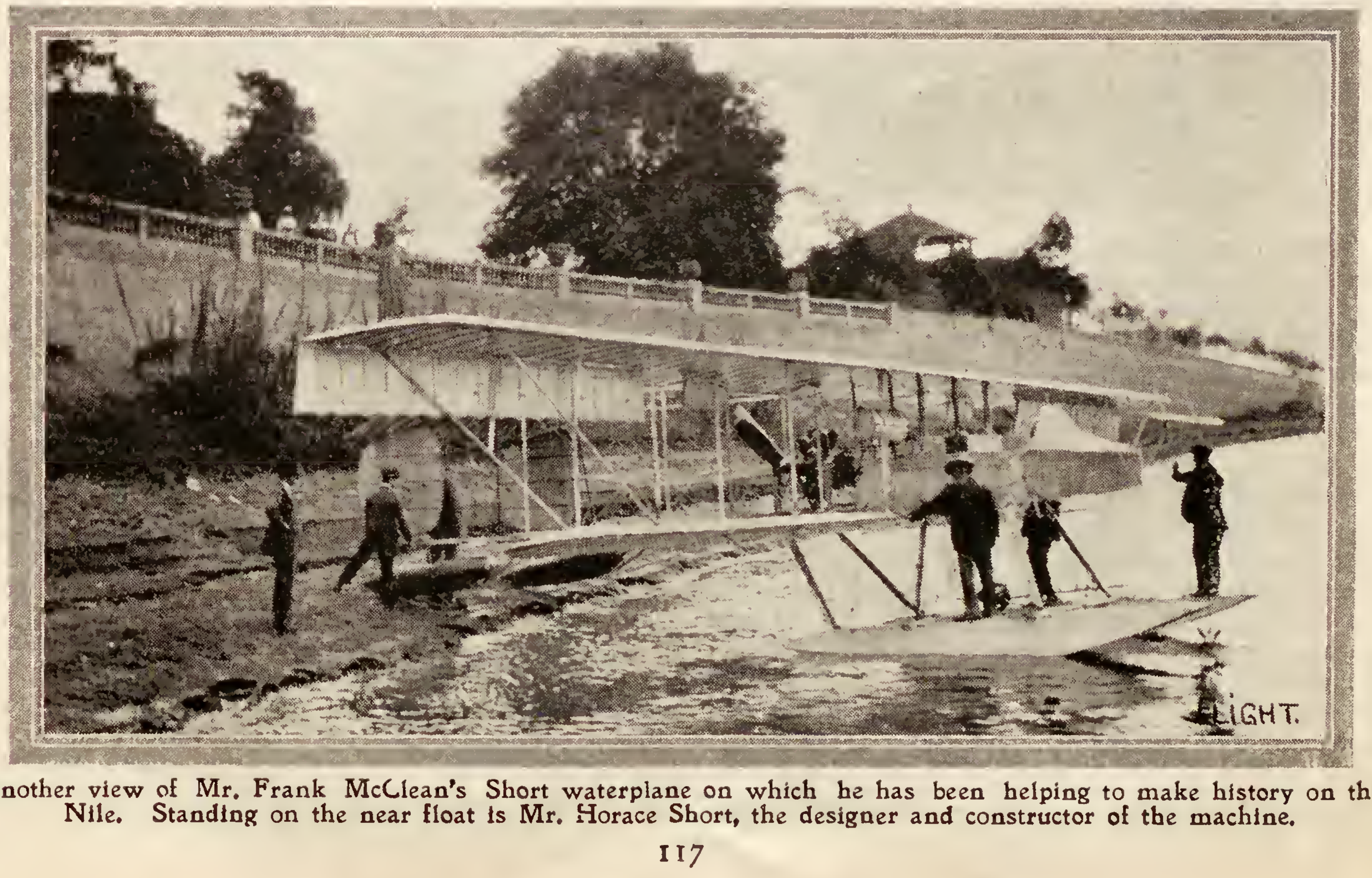
International Hydro-Aeroplane Competition.

The Club has received particulars of an International Hydro-aeroplane Competition to be held on the Rivers Scheldt, Meuse and Rhine, on June 15th–25th, 1914. The contest is over a course of about 1,400 kilometres and the prizes amount to about £5,000. The organisation is in the hands of the Aero Clubs of Belgium, Germany and Holland, and the competition will be held under the rules of the Fédération Aéronautique Internationale. Further particulars may be obtained from the Royal Aero Club.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.



Another view of Mr. Frank McClean's Short waterplane on which he has been helping to make history on the Nile. Standing on the near float is Mr. Horace Short, the designer and constructor of the machine.

EDDIES.

I see the French have started all-night airship flights now. The airship "Adjudant Vincenot" left Issy-les-Moulineaux at six o'clock last Friday evening, and did not return till eleven the next morning. They say it journeyed to Verdun and back: but did it? We don't want any more of the night-scare business that we had a few months ago, and, moreover, a lot of our coastguards are married men, and don't want to be kept out all night walking the cliffs looking for airships, and not seeing them after all their trouble, when there is a nice warm bed waiting at home. I think they ought really to give an undertaking not to come over our side of the streak. I would have them remember also that most parts of our coastline is prohibited area, and they mustn't fly over it at all. If they want to see Dover or Folkestone, they should come over by boat in the orthodox way. If they come by air, we shall signal to them to come down; and if they ignore our signals we shall—well, I am not quite sure what we shall do, but we shall be quite nasty about it.

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Lincoln Beachey has added indoor flying to his other achievements, and is now making flights in the Machinery Hall of the Panama Exhibition at "Frisco." According to reports, he has said that all he now yearns for is to fly underground. If his flight is really a flight, and not a hop, I should say he is doing his best to realise his ambition. I don't know what size this hall may be, but it must beat anything we have on this side if he is really flying in the true sense of the word; but then they DO top us in everything where size is concerned. As to flying indoors, our inimitable Harry Tate has been doing this for quite a while, and is still doing it afternoon and evening at the London Hippodrome. I saw him, only the other day, on his "Very hot potato-plane," when he gave Ethel Levy a fine flight at an altitude of, as he said, about nine miles. He has now added looping the loop to his previous exhibition, and to see him accomplish this feat with Miss Levy is a thing not to be missed. He does it so easily too. To save any risk, the *fuselage*, if it may be called one, stands still whilst the wings turn round. Tate says this is much the better way and saves no end of bother; but Miss Levy seemed disappointed that she had dressed for the part, and was not going to turn upside-down after all.

Flying Underground

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If great events cast their shadows before, it must be their reflections that follow behind. I heard a good deal about the upside-down dinner before the event, but I have heard of some rather curious happenings since which filter out gradually in conversation. Lots of people who were there have asked me if I was. If they were there and did not see me, either—well, never mind. To get on with the story. One and all, before many words of their story had passed, have said, "I got home about two," or "I didn't get home till nearly four"—in fact, I am firmly of belief that such an effect had this topsy-turvy business on some, that they are not quite sure whether they went home at all, and even so, what time they arrived. I believe there were all sorts of minor troubles on the various ways home. I heard of one car-party who had not got so very far when something went wrong with the works, which could not be put right without spare parts. I believe—mind you, this is only what I gather, and I can in no way vouch for the truth of it—that somebody set off to Hendon to bring relief in the shape of another car, and that in going back to search for the wrecked ones, who were presumably somewhere between Hendon and Piccadilly, the districts searched included Hendon, Golders Green, Finchley, Barnet, Potters Bar, Camden Town, and a few other places; meanwhile, the wrecked ones, tired of waiting, walked home.

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The *Daily Citizen* says there is surely a touch of irony in the fact that a model Zeppelin had been placed on view in the cold luncheon-room of the Law Courts. I'm afraid I don't see the joke, but no matter. I see it is the work of one of the chefs employed at the Courts, who has also made a model aeroplane "from unpromising materials he found in the Law Courts' kitchen." I should not have thought they would have had any unpromising material in the kitchen at all; but I suppose trade is so bad in the business of getting briefs just now that the poor barristers have to cut expenses, and cannot afford to pay the price they used to do for their little luncheons. By the way, these same legal luminaries, or others like them—it is hard to tell, they are so much alike—seem to delight in going down to the Embankment every day during the luncheon hour to feed the gulls. This should be one of the sights of London. The Law providing food for the gulls! It is generally the other way about.

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It is with regret that we have to once more place on record the death of a pilot. Mr. G. Lee Temple was killed at Hendon on Sunday last. Flying on his Blériot, it appears that he attempted to land with the wind, in one of the steep dives he has so recently been executing, from an altitude of only about 300 ft., and that a gust of wind under the tail put the machine over the vertical. Being so near the ground he had no room in which to flatten out, and the machine struck the earth almost nose on, killing the pilot on the spot. Temple was a very promising pilot, and was coming on tremendously in his flying. He was very proud of the honour of having been the first Englishman to fly upside down in this country, though he wisely listened to the advice of older pilots that his machine was not quite suited to the strain put upon it, and had decided to give up all thought of looping the loop till he could get a machine from Blériot specially designed for the purpose. He will be missed at Hendon during the coming season, and we beg to offer our sincere condolences to his family.

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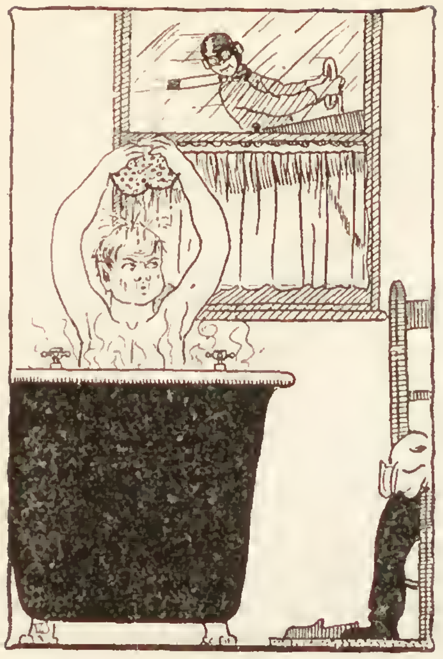
The flying of machines over and about the houses at Hendon and district appears to be causing much dissatisfaction among the residents. A writer to the *Times* complains that the airmen fly right over his house and garden, so low as to sometimes almost touch the conservatory roof. Another complains



that they fly so near his house and so low that he sometimes feels inclined to draw the curtains. It must be very annoying to those residents who wish for a little peace on Sunday, after perhaps a busy week in the City, to have machines constantly buzzing round their houses at low altitudes; and there is not the slightest reason why it should be done. Pilots should have a little thought for the comfort and wishes of others. I should think the aerodrome at Hendon is quite large enough for all ordinary purposes; and even if pilots must go outside, there is plenty of country on the far side, away from the houses, where they can indulge in a little cross-country flying. Personally, I have often thought that I should not care to live in one of the houses in Collindale Avenue, owing to the amount of flying over the house-tops. Sooner or later there will be a repetition of Gibert's exploit, and a machine will sample a roof. Should this happen in the early morning, when people will probably be sleeping in the top rooms, it might mean a loss of life. Hendon is a most popular place at the moment, and it would be a pity to bring it into disrepute through a little want of thought. I hope those in power will do their best to see that the practice is discontinued.

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The peasants of Rambouillet are out to make money where possible. When the guide-rope of Commander Felix's balloon caught in a tree there the other day, and he called on them to send one of their number up the tree to release it, they began to bargain with him as to how much he was prepared to pay for the service, and threatened, in the absence of satisfaction, to leave him and his party there all night. It appears from the report that a great search of pockets only resulted in two shillings, which was thrown down. This was not nearly enough to satisfy the rescuers, and a further search had to be made, when the amount was increased to four. One of the party then climbed up and released the rope. Four shillings between at least three people does not seem to be much cash to carry on a balloon voyage, but I suppose weight has to be taken into consideration. Money is very weighty stuff, I believe, though I have never had enough of it at one time to make much difference. In any case, it carried weight with it in this instance, and one wonders what the result would have been could that last two shillings not have been found.

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When Mr. Hawker returns to this country from Australia, he will have to search out Mr. Rutherford, of Gainsborough, and have a few words with him. Mr. Rutherford rode up to one of the hotels in Lincoln the other day on a motor cycle, and said he was Hawker, come to do some exhibition flying in the neighbourhood. He was of course immediately the hero of the place, and was introduced to all and sundry. He had great tales to tell of his flight round Great Britain, and what he was going to do in the future. So friendly did he become, that he promised to take many of the guests for a joy-ride so soon as his mechanics should arrive with the machine. Of course, there is always somebody who can't leave a poor chap alone, and the kill-joy in this case was a policeman, who turned up and arrested the giddy Rutherford for stealing the motor bike which he had hired at Gainsborough and had forgotten to return. The police found that he was in the possession of ninepence, which goes to prove the old saying, that it is not always necessary to possess money to be happy. Incidentally he said he had had over a thousand offers of marriage. Perhaps, when he has finished his four months' imprisonment, he will consider one of them.

"WILL O' THE WISP."

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FLYING AT HENDON.

THE Second January Meeting at Hendon last Saturday was indeed like a January one, for the ground all round was covered with a white frost and it was bitterly cold. There was in addition a fairly thick fog, which rendered it impossible to hold the 16-mile cross-country handicap, down on the programme. In spite of this, however, a very successful meeting resulted, and the flying itself was rendered extremely interesting and weird by the presence of the fog which hid the aeroplanes from view except when in close proximity with the enclosures.

The fatal accident—the only one that has occurred at these week-end meetings, and the third only that has taken place at the Aerodrome itself—unfortunately marred the flying of Sunday, that extremely plucky young pilot, George Lee Temple, meeting with an untimely end at the termination of a successful exhibition flight. Temple had been away from the aerodrome for a couple of weeks laid up with an attack of influenza, and returned to his Blériot on Saturday, and took part in the day's proceedings, although still feeling far from well. It was toward the end of the afternoon on Sunday that he went up on his 50 h.p. Blériot with the intention of making but a short flight. The wind was blowing in nasty gusts of about 30 m.p.h., that made it rather unpleasant flying. After completing a few circuits of the aerodrome, executing some spirals the meanwhile, he made one of his usual nose dives when over by the railway, and was about to land, when, apparently, a gust of wind struck the tail of the machine and blew it over on its back, in which position it crashed to earth. The unfortunate pilot, who was strapped in his seat, was soon extricated from the wreckage, when it was found that his neck was broken, so that death must have been instantaneous. In G. L. Temple we have undoubtedly lost a pilot who was rapidly making his way to the front rank of aviators.

On Saturday, in place of the cross-country handicap, a speed handicap was flown instead. As usual, before the racing, numerous exhibition and passenger flights were made by the Hendon aviators, amongst whom were Claude Grahame-White on the Maurice Farman, W. L. Brock on the 80 h.p. Blériot, G. L. Temple on his 50 h.p. Blériot, Marcus D. Manton, R. H. Carr, L. Strange, and E. Lillywhite on G.-W. biplanes, G. M. Dyott on the Dyott monoplane, Gustav Hamel on his Morane-Saulnier, and J. L. Hall, who flew his new Avro biplane. The race was flown in two heats of four laps each, and a final heat of six laps. The first heat was made up of the following:—L. Strange on a G.-W. 'bus (3 mins.), Marcus D. Manton on another G.-W. 'bus (2 mins. 15 secs.), Louis Noel, on the Maurice Farman (1 min. 33 secs.), and W. L. Brock on the 80 h.p. Blériot (scratch). Brock very nearly worked his way up to first place from scratch, but failed to pass Manton by 1 sec., the third man coming in 2 secs. after. There were four starters in the second heat, viz., G. L. Temple, on his Blériot (2 mins. 47 secs.), R. H. Carr on a G.-W. 'bus (2 mins. 27 secs.), G. M. Dyott on the Dyott monoplane (27 secs.), and Philippe Marty on the 80 h.p. Morane-Saulnier (scratch). In this heat Carr retained the lead throughout, and the scratch man, Marty, put up a magnificent struggle for second place, which he obtained by a bare one-fifth of a second from Dyott. The final heat resulted in a magnificent finish, all four competitors reaching home within two seconds. Brock was the first to cross the line, Marty following three-fifths of a second after, with Manton one-fifth of a second behind. Carr followed one second after Manton. This heat was extremely exciting, as all four machines loomed out of the fog in a bunch quite suddenly, although one could tell by the roar of the engines that they were close together.

Speed Handicap. Final Heat (6 laps).

		Handicap.	Handicap Time.
		m. s.	m. s.
1.	W. L. Brock (80 h.p. Blériot monoplane)...	0 20	11 40
2.	Philippe Marty (80 h.p. Morane-Saulnier monoplane)	scratch	11 $40\frac{3}{5}$
3.	Marcus D. Manton (50 h.p. G.-W. biplane)	3 42	11 41
4.	R. H. Carr (50 h.p. G.-W. biplane) ...	3 15	11 42

As previously mentioned, Sunday was very gusty, but several exhibition and passenger flights were put up by the Hendon pilots, including Claude Grahame-White and Louis Noel on the Maurice Farman, W. L. Brock on the 80 p.h. Blériot, Marcus D. Manton, L. Strange and A. Lillywhite on G.-W. 'buses, and J. L. Hall on his new Avro biplane. The fatal accident to G. L. Temple occurred at about 4 o'clock, Temple being the last to ascend. At the time of the accident Grahame-White was up in the Maurice Farman.

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DISCUSSION ON "THE STABILITY OF AEROPLANES."

DURING the discussion on Mr. Leonard Bairstow's paper on "The Stability of Aeroplanes," which was read before the Aeronautical Society on the 21st inst., Mr. Harris Booth said he considered that the propeller effect was negligible except so far as side winds were concerned, but the torque of reaction from the engine when switched on and off was a more serious matter. He had made experiments with two of the models given in Professor Bryan's work on stability in aviation, and had found the two-fin model to be unstable, the flight ending in a spiral nose dive, but with the model given in Fig. 34 of that book, having one fin and a tail rudder, he had obtained consistent flights. He thought that if equations could be obtained for stability in curvilinear flight, they would do much to advance the science of aeronautics. Mr. Booth then indicated a method he had employed in launching models by the use of a box kite. The kite was sent up attached to an endless string running on two pulleys, one of which was connected to the bridal on the kite, and the other fixed to the ground. The model was attached to the string by a piece of cotton, so that when it reached the upper pulley a jerk was sufficient to break the cotton and launch the model.

Mr. T. W. K. Clarke suggested that stability might be gained by the use of devices operated by inertia, such as a bar bell set up on the axis of a machine, or by the use of the gyroscope. Mr. Handley Page gave a demonstration with a stable model, which he made to "loop the loop" when he imparted the necessary velocity to the machine: and observed that when the speed is too slow the model rises to its topmost position and then performs a tail slide.

Major Brooke Popham observed that he did not think we should ever dispense with pilot controls even with aeroplanes possessing natural stability, because of the possibility of accident should a machine be struck by a gust when near to the ground.

Mr. A. R. Low said he was very pleased to note the author's remarks on the possibilities of mathematics in the solution of stability problems, especially because of the attitude taken up by many people in regard to the paper which Professor Bryan read on stability before the British Association, and he considered that it would amply repay the Government to employ a mathematician of Professor Bryan's eminence to investigate the cause of accidents to their machines.

Mr. Busk said that he believed it was unlikely that, in the near future, we should be able to fly near to the ground without human control, and he therefore considered it as essential that all controls should be powerful enough to overcome all natural couples, since the manœuvres of landing and starting often necessitate the presence or absence of angular motions contrary to those which occur in uncontrolled flight. The opposition evinced by some pilots to natural stability was, he thought, due to the fact that unstable machines are more difficult to fly, and human nature lends one to like doing more difficult things; or else, that they lack experience of stable aeroplanes. Experiments in longitudinal stability have shown that a slightly stable aeroplane is not only more comfortable to fly but easier to land than one which is unstable. He drew attention to an aspect of this problem of stability which, he said, had not yet been seriously considered—namely, the loss of power involved in the side-slip necessary to right a roll. He also stated that as all stability arrangements, whether inherent or mechanical, depend on gravity for a sense of direction, side-slip was as necessary for mechanical as for inherent lateral stability.

Mr. Mervyn O'Gorman commented upon the number of patentees of various stabilising devices, and suggested that in dealing with such inventions it would be well to get the inventor to explain step by step in what manner he had been able to solve the problems of stability. It was generally thought, he said, that the machine which was the least tossed about in the air was the most stable, whereas the reverse was really the case. He pointed out that many of the difficulties arose from the fact that an aeroplane had to land, not only head to wind, but also in side winds, which placed a vertical fin system and the large dihedral angle machines at a disadvantage.

Mr. Jones observed that he had discussed this matter with a pilot friend, who strongly objected to inherent stability, and on getting at his reasons found that it was due to the fact that such machines are more uncomfortable, because they are more pushed out of their course by gusty winds. The question to be settled, he considered, was how much stability should be allowed in the machine, and he thought that this should be decided by pilots, who would bring their requirements to the aeroplane constructors. It would, he considered, be desirable to have a machine with variable stability—one that would be reasonably stable when high up.

The author, in his reply, said that it was possible to put on as much as 2,000 ft. lbs. by warping the wings, and as the steady torque of the engine generally only amounted to 200 ft. lbs. he saw no difficulty in neutralising the back torque. In regard to Bryan's equations, he mentioned that any alteration in the shape or size of the fins involved five different quantities. Mr. Booth's method of launching models from kites was good, but the study of stability was much complicated by experiments in the open, and he thought that they should first examine the conditions in still air. He said that it was very necessary to give sufficient velocity to a stable machine in order to make it perform the evolutions gone through by Mr. Handley Page's model.

In reply to Major Brooke Popham, he remarked that if a machine was inherently stable it required constant attention to prevent it from being pushed off its course. When landing a pilot had many things to do. The verticle fin system was very uncomfortable, as it was too stable, and he considered that inherent and automatic stability should be complementary, while it should be possible for the pilot to cut out the automatic gear before he lands. The author pointed out that the rudder would require to be four times the size, if they did not warp the wings.

* * * *

THE ROYAL FLYING CORPS.

THE following promotion was announced by the Admiralty on the 22nd inst.:—

Lieut. J. W. Seddon has been advanced to Squadron Commander, Isle of Grain Air Station, with seniority of January 22nd.

The following was notified in the *London Gazette* of the 23rd inst.:

R.F.C.—Military Wing.—*Inspection Department.*—Capt. Ralph K. Bagnall-Wild, retired pay, to be Inspector of Engines. Dated January 6th, 1914.

The following was announced by the Admiralty on the 23rd inst.:

Lieut. R. A. Wilson, graded as Flight Commander, to date October 1st, 1913.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending January 17th:—

Flying Depôt. S. Farnborough.—Repair and experimental work was carried on as usual.

No. 2 Squadron. Montrose.—Three machines were taken to the new aerodrome and the work of transferring the sheds was continued by the squadron.

No. 3 Squadron. Netheravon.—Officer and N.C.O. pilots were out frequently during the week.

No. 4 Squadron. Netheravon.—The squadron pilots of all three flights were out daily, and some reconnaissance work was carried out.

No. 5 Squadron. S. Farnborough.—The pilots of A and B flights carried out a number of instructional flights. During the week repair work and overhauling were continued.

Week ending January 24th:—

Flying Depôt. S. Farnborough.—Experimental and repair work was carried on as usual.

No. 2 Squadron. Montrose.—The move to the new aerodrome was completed during the week—many instructional flights were carried out by the latest joined officers. Observation of submarines was also carried out on one day.

No. 3 Squadron. Netheravon.—The officer and non-commissioned officer pilots were out every day of the week.

No. 4 Squadron. Netheravon.—The officer pilots of the squadron made numerous short reconnaissance flights on B.E.'s and M.F. machines. Two B.E.'s were flown from Farnborough for use with this squadron.

No. 5 Squadron. S. Farnborough. — Many instructional flights were made by the pilots of "A" and "B" flights.

AERO ENGINES AT PARIS SHOW, 1913.

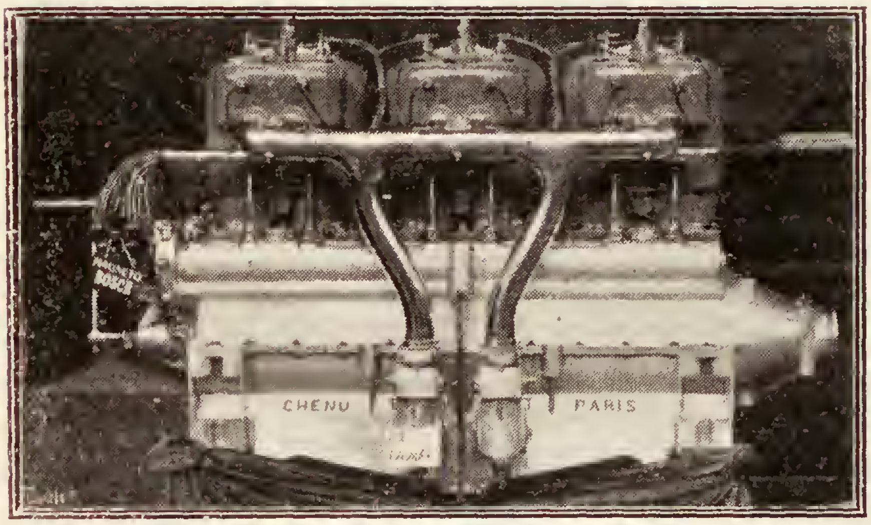
(*Continued from page* 98.)

Chenu Motors.

The models exhibited closely resemble the conventional car-engine. The cylinders, which are in pairs of cast iron, with the jacket cast integral with the body, are placed vertically on an aluminium crank-case. They have exceptionally large inlet and exhaust valves, which are arranged on opposite sides of the engine, while ample water spaces are provided, reaching well down the cylinder barrel. The lubricating pump, driven off the centre of the camshaft, is placed in a sump formed in the base of the crank-chamber, which contains sufficient oil for 10 hours running without replenishing. Bosch double ignition is fitted, one plug in each cylinder being at the side near the inlet valve, and the other over the exhaust valve. This form of ignition would appear to be essential on these engines, which run at extremely high speed, on account of the slow ignition of the charge due to the shape of the combustion chamber.

A double half compression device is fitted to facilitate engine starting, as this is especially necessary where the reducing gear is fitted. The weights of the reducing gears, which are supplied with any of the three smaller engines if desired, are 22 lbs. for the four-cylinder engines, and 31 lbs. for the six-cylinder 100 h.p. engine. Two carburettors are fitted to the two six-cylinder models; whilst the standard thrust bearing provided permits the engine to be used for a tractor screw or a propeller.

This firm have introduced a new model of the same dimensions and general construction as the old four-cylinder 65 h.p. engine which was entered as a 50 h.p. last year, but which, by the use of lighter reciprocating parts, larger valves, &c., is now able to run at a much higher normal speed. The maximum revolutions of the 65 h.p. engine is 1,800 per minute, but the 90 h.p. engine may be run at 2,300 revolutions per minute. The torque curve is the same for both of these models, until after a speed of revolution of about 1,500 per minute is attained. The largest engine, 250 h.p., is intended for use on dirigibles and several have already been fitted to the Astra Torres VI, XIII, XV and XVI, besides other aircraft.



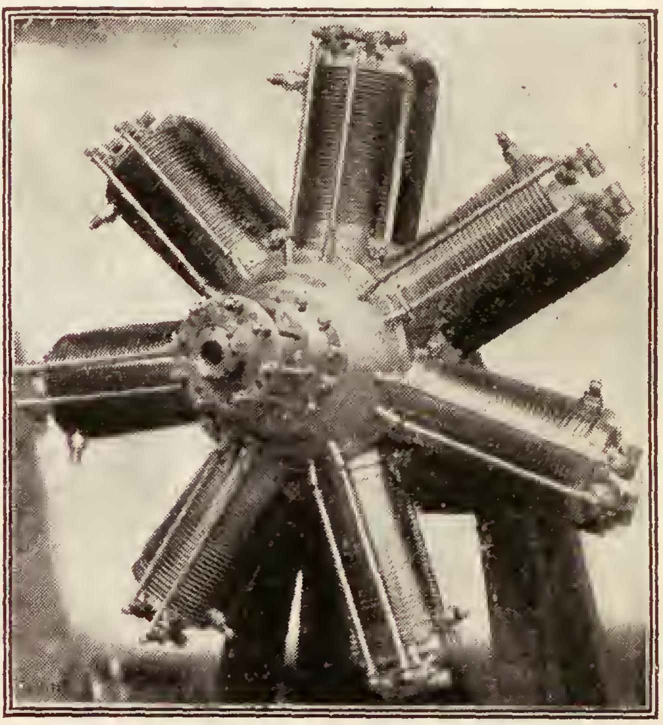
250 h.p. Chenu engine.

Clerget.

The new 7-cylinder 80 h.p. rotary engine was exhibited, in addition to which a 50–60 h.p. rotary engine, two vertical 4-cylinder water-cooled engines of 50 and 100 h.p., and a 200 h.p. engine of similar design to the 100 h.p., but with the cylinders arranged in vee fashion were also shown. Two carburettors and two magnetos are used with the vee engine, and one camshaft situated on the centre line of the engine operates both valves in the two groups of cylinders, as is usual on this type of engine, but the camshaft is so arranged that it may be moved axially for the purpose of varying the period of opening to inlet or exhaust.

On the rotary engines the cylinders are of steel, machined out of the solid billet, and attached to a steel crank-case. Both inlet and exhaust-valves are arranged in the head, and are mechanically-operated by push-rods and rocking-levers suitably balanced for centrifugal force by counter-weights attached to the ends of the rocking levers. The exhaust-valves are placed on the leading side of the cylinders in the direction of rotation, so as to receive the maximum cooling effect, whilst the inlet and exhaust-valves in each cylinder are disposed in such a manner that their centres lie on the helix along which the head of the cylinder moves when the machine is in motion. The valve gear is operated by means of special eccentric discs, which are mounted over the crank-shaft on ball-bearings, and have rounded projections upon their periphery. The inlet pipes are arranged radially on the near side of the engine.

The cylinders of the fixed engines are made separately of steel, and have copper jackets electrolytically deposited on them, which are provided with expansion bellows along the barrel to allow for the differences in the coefficients of expansion of steel and copper. The inlet and exhaust-valves are of the concentric type, and are mechanically operated through rocking-levers, the push-rods actuating the inlet-valve being inside the tubular rod which controls the action of the exhaust-valve. These valves are situated in the centre of the cylinder-head, so that the shape of the combustion-chamber is nearly hemispherical.



80 h.p. 7-cylinder Clerget engine.

Forced lubrication and cooling is provided by pumps placed, as is also the magneto, at the end of the engine.

De Dion Bouton.

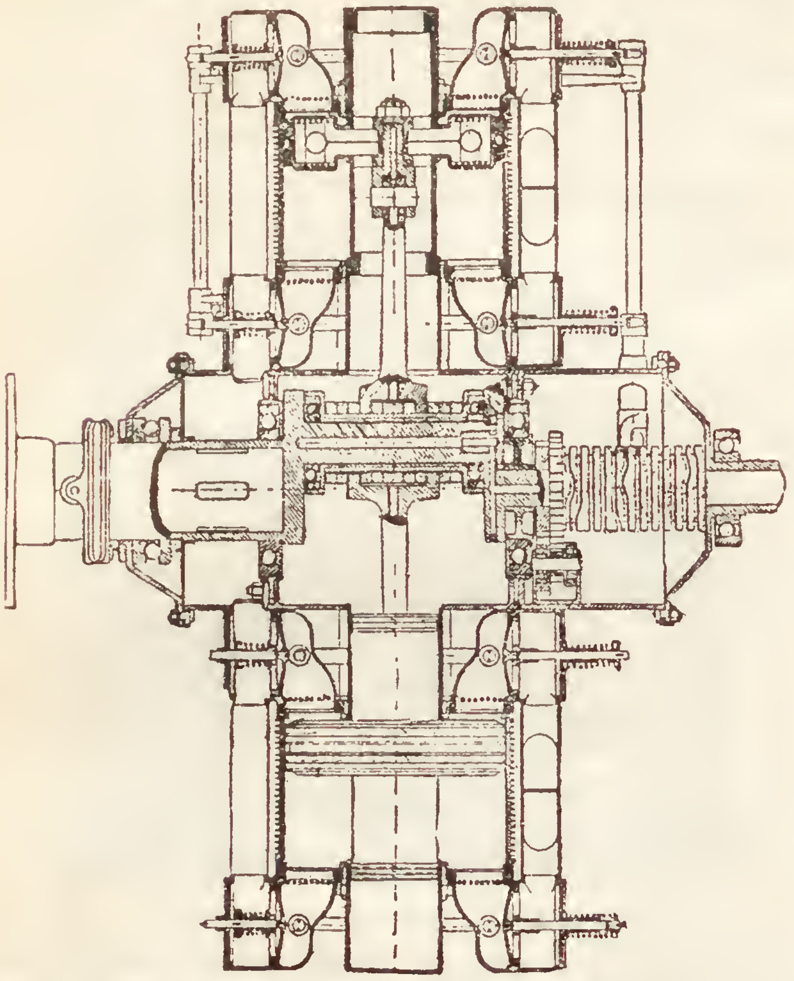
This engine, an 8-cylinder of 80 h.p., still retains the principal features that have always characterised it, and was illustrated in FLIGHT for November 2nd, 1912. It is air-cooled by forced induction from a fan attached to the end of the crankshaft, which draws air around the cylinders through an aluminium casing fitted over the 90° vee between the two groups of cylinders. The cylinders are secured to the aluminium crank-case by long bolts passing through bridge-pieces fixed over the head of the cylinder. The connecting rods, two of which are attached to each crank, and the pistons are of steel, and in order to allow of the corresponding cylinders of opposing groups to be set opposite each other, the feet of the rods for the cylinders on one side of the engine are forked and fitted with bronze bushes on the crank. The big ends of the rods for the opposing cylinders fit over the bushes between the fork, so that whilst the forked set of rods function in the usual manner, the big ends of the other rods work on the exterior of the bush. On account, however, of the extremely small relative motion and the large surface provided, it is stated that very little wear takes place, even after a long period of working.

The propeller is driven off the end of a single camshaft, which operates the inlet valves directly through tappet gear, and the exhaust valves through push rods and rocking levers. The valves are arranged in a pocket in the cylinder on the side nearest the centre of the engine, the exhaust valve being placed over the inlet. The three intermediate bearings of the crankshaft are lined with bronze, but to the extreme ends of the shaft ball-bearings are fitted.

The oil sump is of sufficient capacity to last for 7 hours at full speed, and the weight given in the table includes that of two exhaust collectors.

Demont.

The designer of this engine has for a number of years been engaged in the construction of various rotary motors, one of which was built as far back as 1896. The engine is a six-cylinder 300 h.p. double acting, air-cooled, rotary engine; which has, as is to be expected from such a combination, an extremely low power/weight ratio—0·73 lbs. per horse-power. Double acting engines are not of recent introduction, and many such of the water-cooled type have been extensively employed in the United States; but the difficulty nearly always experienced with them is in the effective cooling of the piston, the leakage of gas at the glands of the piston rod and the liability of the joints in the water piping to derangement. In this engine the absence of water-cooling eliminates the last-mentioned defect, and it remains to be seen whether the construction employed has overcome the other troubles.



300 h.p. double-acting Demont engine.

The adjacent diagram shows the general construction of the engine. It will be seen that the piston is made in two pieces, each of which is similar in shape, and both are held together by a pin bolt, to the lower end of which the connecting rod is attached. Each half of the piston has two diameters, both of which are provided with piston rings, the larger diameter being that of the working cylinder and the smaller that of a trunk or guide; whilst the inner surfaces of the piston are provided with ribs for the better transmission of heat to the air by means of which it is cooled. Between the two halves of the piston is placed a baffle-plate of circular shape and having a bulbed perimeter, the function of which is to direct the air in its passage through the piston. Cooling of the piston is effected by the air, which is caused to pass radially outwards under the action of centrifugal force from the crank-case. It enters the inner end of the trunk, flows out towards the baffle-plate, where it is deflected towards the circumference of the piston, round the bulbed edge of the baffle and finally leaves the cylinder at the heads. It will be observed that the disabilities under which large pistons in high-speed engines usually labour, and which are principally due to inadequate cooling are thereby overcome, or at any rate greatly minimised.

It will be seen that the inlet and exhaust valves are placed on the sides of the cylinders, one inlet and exhaust valve being fitted at each end, as both sides of the piston operate in the usual manner on the four-stroke cycle. The exhaust valves are operated by levers attached to a shaft, at the lower end of which a projection is formed that engages with the face-cams on a sleeve placed over the crank-shaft. The inlet-valves are actuated in a similar manner, but through rods passing between the cylinders. The sleeve is rotated at half the engine speed by means of spur gearing, in which a short lay-shaft is employed to obtain the necessary gear reduction. The cylinders are provided with radiating fins, not only on the parallel part of the body and the head of the cylinder, but also upon the end within the crank-case, and all cylinders lie in a plane at right-angles to the crank-shaft.

The crank-shaft bearings, including the propeller thrust-bearing, are all of the ball type, but the construction employed for the attachment of the connecting-rods to the crank-pin should be particularly noted. Two sets of ball-bearings are fitted—one at each end of the pin—to support the bush upon which the non-adjustable forked ends of the several connecting-rods are threaded. Thus the movement of the bush relative to the crank-pin due to the rotation is entirely taken up by the ball-bearings, and any wear on the bush will be due to the angular motion of the connecting-rods.

The supply of gas to the cylinders is taken through the interior of the crank-shaft (in the circumference of which ports are cut to allow of the egress of the mixture) to a mixing chamber formed in the end of the crank-case from which pipes are led to the separate cylinders. The exhaust is expelled into the atmosphere through orifices in radial passages placed at the sides of the cylinders.

(To be continued.)

BRITISH NOTES OF THE WEEK.

Milltary Aviation.

Lieut.-Col. F. H. Sykes will lecture on "Further Developments of Military Aviation," at a meeting of the Aeronautical Society, to be held on Wednesday next, Feb. 4th, at the Royal United Service Institution, Whitehall. The meeting, which will commence at 8.30 p.m., will be presided over by Lord Sydenham, F.R.S.

Commander Seddon's Flight to Plymouth.

Although Commander Seddon did not arrive at Plymouth before the unfortunate submarine A7 had been located, his flight from the Isle of Grain Naval Air Station to Plymouth was a meritorious one. Upon receiving instructions, he set out from Grain, on a M. Farman biplane, accompanied by Artificer Teasdale, at 9.15 a.m. on the 21st inst. He flew round the coast, and at 11.40 a.m. was seen at Beachy Head, while at 12.30 he was sighted at Southsea. Ten minutes later he landed at Calshot Air Station for lunch. At 2.20 a restart was made; the remainder of the trip to Plymouth occupied a couple of hours. It was stated at Plymouth that although on the following day Commander Seddon several times flew over the spot where the submarine lay he was unable to discern it. On the afternoon of the 23rd inst., Commander Seddon started from Devonport to fly back to his station.

Another Sopwith for the Army.

On the last of a batch of nine 80 h.p. Standard Sopwith biplanes ordered by the War Office, C. H. Pixton on Wednesday week, flew over to Farnborough and put it through the official tests. With the exception of the first, which was piloted by Hawker, Pixton has flown all the machines from Brooklands to Farnborough, and the times for the trip of 16 miles (*via* Guildford) varied between 8½ to 20 mins., according as to whether the wind was ahead or astern. All the machines went through their tests without a hitch, and with a good margin to spare—which is hardly surprising to those who know the quality of the work and workmanship put in by the Sopwith Co.

Two "Wight" Seaplanes for the Navy.

It is gratifying to record that two seaplanes, to be fitted with engines of 200 h.p., are at present being constructed in the aviation department, which is under the direction of Mr. Howard T. Wright, of Messrs. J. Samuel White and Co., of Cowes, to the order of the Admiralty.

Maurice Farman Crosses the Channel.

Having to deliver a seaplane to the Naval Air Station at Felixstowe, Maurice Farman decided to fly it across the Channel himself. Accompanied by Eugene Renaux he left Boulogne at 12.15 p.m. on the 23rd and overtaking the mail boat he struck the English coast at Folkestone, and then following round by Dover, Sheerness and Harwich reached Felixstowe at 2.40 p.m. This makes the third M. Farman to be delivered at Felixstowe. The machine is of 19 metres span, and is fitted with a 100 h.p. 12-cyl. motor.

Mr. Hamel at Eastbourne.

To-day, Saturday, Mr. Gustav Hamel will be giving an exhibition of looping the loop at Eastbourne.

Mr. Hucks to Visit Hull.

Arrangements have been made for Mr. B. C. Hucks to give demonstrations of looping the loop and upside-down flying at Hedon Racecourse, Hull, on Thursday, Friday and Saturday next, February 5th, 6th and 7th, commencing each day at 2.45 p.m., weather permitting.

Mr. Hamel's Match with Garros.

The paragraph, anent a challenge by Mr. Hamel, which appeared in our last issue, came to hand from our French correspondent too late for the information to be checked with Mr. Hamel. We now learn from Mr. W. E. de B. Whittaker, manager for

Mr. Gustav Hamel, that the challenge was not an open one. Mr. Hamel challenged Garros to a match, and has received an acceptance. The match will take place at Juvisy on February 22nd.

The Salisbury Plain Catastrophe.

IT is with the greatest regret that we have to record the catastrophe which occurred on Salisbury Plain on Monday afternoon, by which Mr. G. L. Gipps lost his life, while Mr. F. W. Merriam was seriously injured. It will be recalled that Mr. Merriam was for a long time manager of the Bristol School at Brooklands, and, as we mentioned in our issue of the 17th inst., he has instructed nearly 100 pilots without any serious accident. All our readers will be with us in wishing this popular and clever instructor an early and complete recovery from his injuries, and in our condolences with the relatives of the deceased pilot.

Practically no evidence was given at the inquest, which was opened at Bulford Military Hospital on Wednesday, to show what caused the accident which led to the death of Mr. George Lancelot Gipps and the injury to Mr. F. W. Merriam. Mr. David Tod, a pupil at the Bristol School on Salisbury Plain, stated that he saw the two pilots ascend on a 50 h.p. monoplane fitted with dual control. The machine started in the direction of Fargo Wood, gradually rising to a height of about 100 ft. A lefthand sweeping turn brought it back towards the sheds at a height of 30 or 40 ft., and here there was a very sharp lefthand turn. The machine lost speed, the left wing dropped, and immediately the monoplane dived, nose downwards, to the ground. When the monoplane came to the ground, Mr. Merriam jumped out, ran a few yards, and then fell on his face. Mr. Gipps was huddled up in the machine, groaning. He was removed to the office, and died ten minutes afterwards.

M. Jullerot, who had been flying just before the accident and saw the latter part of the fatal flight, confirmed this, and added that afterwards he asked Mr. Merriam how it had occurred, and he replied, "I can't tell. Everything was going very steadily. It all came of a sudden. I think he must have interfered with my control."

The Coroner pointed out that this statement was not evidence in law, and after medical evidence had been given it was decided to adjourn the inquest for a month so that Mr. Merriam might be able to give evidence.

Edinburgh Aeronautical Society.

DURING January four meetings have been held, two given by Col. Massey of "The Aerial League of the British Empire," on "The Development of National Aviation," at which there were attendances of nearly 600 altogether; Mr. W. H. Ewen also gave two lectures on "Learning to Fly," illustrated by specially taken films; about 500 persons altogether attended these last two lectures. A visit was also paid to the Naval Air Station at North Queensferry.

Anyone wishing to join should apply to the hon. secretary, 41, Drumsheugh Gardens, Edinburgh.

Curtiss Machines in Great Britain.

CAPT. ERNEST C. BASS, who was the first to introduce the Curtiss Flying Boats and Engines to Great Britain, and held the sole concession for them for some time, has now transferred the business to a strong syndicate headed by Messrs. White and Thompson, Ltd. of Middleton, Bognor, Sussex. This firm have greatly improved and added to their works at Bognor, where they will build improved Curtiss flying boats and organise a flying school for tution in their use, and Lieut. J. C. Porte will be in charge of both these departments. Arrangements have also been made with a leading engineering firm in the North of England to construct Curtiss engines in various sizes up to 200 h.p.

Messers. White and Thompson have purchased two of Capt. Bass's flying boats for use at Bognor, while the third and original machine Capt. Bass is taking to the Riviera where he intends to do some flying, from the purely sporting point of view, during the next two months.

An Australian View of Brooklands.

INTERVIEWED after a visit to England, an Australian stated: "Plenty of flying can be seen at Brooklands. They're cool customers nowadays. They bid you good-day, hop on board their machine, there's a whiz and a flutter, and your man is out of sight, all in the space of a minute or two."

A Gnome Stop-Watch.

A STOP-WATCH, specially arranged for easily securing the revolution speed of Gnome motors, has just been introduced by the Hasler Telegraph Works, of 26, Victoria Street, Westminster, S.W. It has a dial similar to the ordinary stop-watch, except that there is a special scale round the outside. All that is necessary to find the speed of a Gnome motor is to start the second-hand and then count, in the case of 7 or 14-cyl. motors, 42 pulsations of the oil-pump; then stop the hand, and its position will indicate the speed of the engine in revs. per min. In the case of 9-cyl. Gnome motors, 54 pulsations of the oil-pump should be counted before stopping the hand. The price of the watch is £3 5s. in steel case, or £3 15s. in silver case.

A Win for Cellon.

THE Britannia Trophy, which has been awarded to Capt. C. A. H. Longcroft for the most meritorious performance during 1913, adds to the list of "Cellon" successes, for this well-known dope was used on his B.E. biplane, built by the British and Colonial Aeroplane Co., Ltd.

Prince Bismarck, a grandson of the first Chancellor of the German Empire, passed the necessary tests for his pilot's certificate under the new regulations on January 17th on a Fokker monoplane at Schwerin in Mecklenburg. Prince Bismarck is only sixteen years of age, but gives promise of becoming a skilful aviator.

FOREIGN AIRCRAFT NEWS.

Gilbert after Height Honours.

On Sunday last, at Mourmelon, Gilbert was practising on his Rhone-engined Morane-Saulnier, in view of his proposal to shortly attack the world's height record, which now stands at 6,150 metres. In this attempt he got up to 6,000 metres in 1 hr. 40 mins.

Guillaux Loops the Loop.

After Deroye had tested a new 60 h.p. Gnome-Blériot at Buc on Sunday, the trial flight including a loop, the machine was handed over to Guillaux, who then took it up and made 15 loops in succession. It is stated that Guillaux is taking the machine to Australia, where he will give a series of exhibitions of looping the loop, &c.

Ae. C. F. Medals Awarded.

At the recent meeting of the Committee of the Aero Club of France, it was decided to award silver-gilt medals to A. Seguin for his flight from Paris to Bordeaux and back, and to M. Prevost for his speed records; silver medals to E. Gilbert, C. Pegoud and Marc Pourpe for meritorious flights during the past year. Silver medals were also awarded to Jacques Schneider for balloon duration record and to Rene Rumpelmayer for balloon distance record.

A New Looper.

At Buc on the 23rd inst., the Italian pilot Maniserro successfully looped the loop on a Blériot, being the fourteenth aviator to carry out this evolution on the Blériot make of machine. He also flew upside down for quite a long period while another manœuvre was the S dive.

Paris to Mourmelon on a Voisin.

Flying when the thermometer indicated 13 degrees of frost, Rugere on the 23rd took his Rhone-engined Voisin biplane from Issy to Mourmelon in 1 hr. 17 mins.

Guillaux's Return from Bordeaux.

On his Morane-Saulnier monoplane, Guillaux on the 22nd inst. set out from Bordeaux to fly to Paris, but he was much troubled by the headwind, and eventually had to land at Ablis about 40 kiloms. short of Paris, owing to his petrol supply giving out. The following morning, when the temperature was 12 degrees below zero, he completed the remaining short distance to Villacoublay.

Looping on a Caudron.

At Le Crotoy, on the 22nd inst., Chanteloup on his Caudron made eleven successive loops, flew upside down and finished with a corkscrew tail slide. Subsequently he watched Poulet, also on a Caudron, loop the loop for the first time.

Champel has a Mishap.

After making 1,872 trips with passengers on his big biplane, which has a 10-cylinder Anzani motor, since making his headquarters at Juvisy, Champel is at present taking an enforced rest owing to an injury received when alighting from a train. It is hoped, however, that it will not be long before he is flying again.

Farmans Land on Ice.

Maurice Farman, accompanied by a passenger, and Fourny, also with a companion, on the 21st inst. made trips along the Versailles canal, and on returning to Buc alighted on the frozen surface of the Trou Sale lake, from which point they taxied their machines to the hangars.

A Blériot Among the Skaters.

On the 23rd inst., Lieut. Quillien, stationed at Epinal, on his Blériot machine paid a visit to Gerardmer, alighting on the frozen lake. The machine naturally attracted a good deal of attention among the skaters, and, after looking at his engine, Lieut. Quillien resumed his flight.

Quick Climbing on a Caudron.

Putting a military Caudron biplane through its official tests before Capt. Destouches, of the French Army, at Crotoy, on the 26th, Gaston Caudron made the machine, when carrying the regulation load of 275 kilogs., climb 1,000 metres in 6 mins. 45 secs.

Another Paris to Cairo Prize.

Baron Empain, having offered a prize of 15,000 francs to the Ligue National Aérienne, the Ligue has decided to use it in connection with events it is proposed to organise this year over the Paris to Cairo route. The other prizes the Ligue propose to use in a similar way are the 10,000 francs offered by the Paris Municipal Council, 10,000 francs from Prince Bibesco, and 5,000 francs from the Seine General Council.

Hanouille in Algeria.

A fine display of looping and upside-down flying was given by Hanouille on his Blériot at Oran in Algeria, last Sunday, the spectators numbering more than 10,000.

A Constantinople–Jerusalem Flight.

In view of the success of the French pilots in flying from Constantinople to Cairo, it is reported from the Turkish capital that the Ottoman Government is organising a competition from Constantinople to Jerusalem. A prize of £T200 will be given to the winner, while there will be several other prizes.

Marc Pourpe in Egypt.

Continuing his flight back to Cairo from Khartoum, Marc Pourpe, on his Morane-Saulnier went from Abu Hamed to Station No. 6 on the 21st inst. The next day he went on to Wady Halfa, and on the 23rd arrived at Berr. During this last stage of his journey the aviator was much trouble by the sand squalls, necessitating the machine being thoroughly overhauled before attempting to go on to Assuan.

Pegoud in Austria.

Last Sunday, despite the snow and 18 degrees of frost, Pegoud gave a fine display of looping, &c., at Bruenn, Moravia, one flight lasting for 32 min., followed by another of 18 min. To-morrow (Sunday) and Monday, Pegoud will give exhibitions at Trieste, and on his application the restrictions against flying over the city have been suspended.

A German Fatality.

While flying at the Schielssheim aerodrome near Munich on the 21st inst. Serjeant Schweizer fell from a height of about 30 metres and was instantly killed. The accident was caused through attempting to make too sharp a turn.

Spanish Military Aviator Killed.

Lieut. Ramos of the Civil Guard met his death on Monday, while flying at the Four Winds aerodrome, Madrid, through his machine from some unaccountable cause falling from a considerable height.

Testing Farmans for Italian Army.

At Turin on the 26th inst., the Marquis de Larienty-Tholozan was testing a new De Dion-engined M. Farman biplane built for the Italian Army. With a full load of 275 kilogs., the machine was timed to attain a speed of 112 kiloms. an hour, and climbed 1,000 metres in 8 mins. 45 sec.

New Aeroplane Factory in Milan.

Mr. D. Lawrence Santoni has now opened and organised a large factory in Milan, principally for the construction of the Farman machines, for which large contracts have been placed by the Italian Government. There are also facilities for the sale from these works of aeroplanes generally in the Orient and South America. The firm would also be pleased to enter into arrangements with British manufacturers to build in Italy or to handle British aviation goods generally. Enquiries should be addressed to Mr. D. L. Santoni, at 9, Via Monte de Pieta, Milan, or at the London office of the General Aviation Contractors, 30, Regent Street, S.W.

The Romanoff Prize.

The Romanoff prize of 10,000 roubles for a flight from St. Petersburg to Moscow and back within 48 hours, not having been won, Prince Abamalek-Lazarieff has announced his intention of adding the amount to the prize he has offered for a flight from St. Petersburg to Sebastopool in 24 hours. In the meantime the Imperial Russian Aero Club has asked the Prince to receive a deputation of aviators, who will suggest that the maximum period for this flight should be raised to 48 hours.

C. K. Hamilton Dead.

One of the first pilots of the Curtiss type of machine was Charles K. Hamilton, who died in New York on Thursday of last week from internal hæmorrhage. It will be remembered that he won a prize for a flight from New York to Philadelphia and back in June, 1910. As recently as the 7th inst. he was testing a flying boat, designed on the lines of the Boland biplane, at Newark, N.J.

"Capitaine Ferber" at Work Again.

During last week the dirigible "Capitaine Ferber" made several long reconnaissances from her headquarters at Epinal. On Wednesday week and Saturday she was cruising over Rheims and the surrounding country.

New "Clement Bayard" on Trial.

The new airship "Clement Bayard VI" made a trial cruise of 2¼ hours with nine persons on board on Saturday, passing during the trip above Compiegne, St. Denis, &c.

Zeppelin Developments.

It is stated that the Zeppelin Co. has decided to set aside £10,000 for the erection alongside the airship works at Friedrichshafen of a works for making hydrogen gas, and the new Zeppelin works at Potsdam, the construction of which has been begun, will also include a plant for making hydrogen gas.

PRINCE HENRY CIRCUIT, 1914.

THE Prince Henry competition will this year take place, between May 17th and 25th, over a course shown in the accompanying sketch map. The first part of the programme will consist of a reliability test. The first section will be over a distance of 775 kiloms. (477 miles), to be carried out between the morning of May 17th and 8.30 p.m. of May 19th.

First Round.—Start from Darmstadt, fly over controls at Mannheim, Pforzheim, Strassburg, Speyer, Mannheim, Worms, and landing at Frankfort. Distance 400 kilom. (250 miles). Duration of stops in the Frankfort control in the discretion of the competitor.

Second Round.—Start from Frankfort, fly over controls at Wiesbaden, Coblenz, Cologne, and back to Frankfort. Distance 375 kilom. (227 miles).

The second section will be over a distance of about 1,000 kilom. (625 miles), to be completed between the morning of May 20th and 8.30 p.m. of May 22nd.

Third Round.—Start from Frankfort, fly over controls at Marburg, Cassel, Brunswick, landing at Hamburg. Distance 440 kiloms. (275 miles). Duration of stop in the Hamburg control is in the discretion of the competitor.

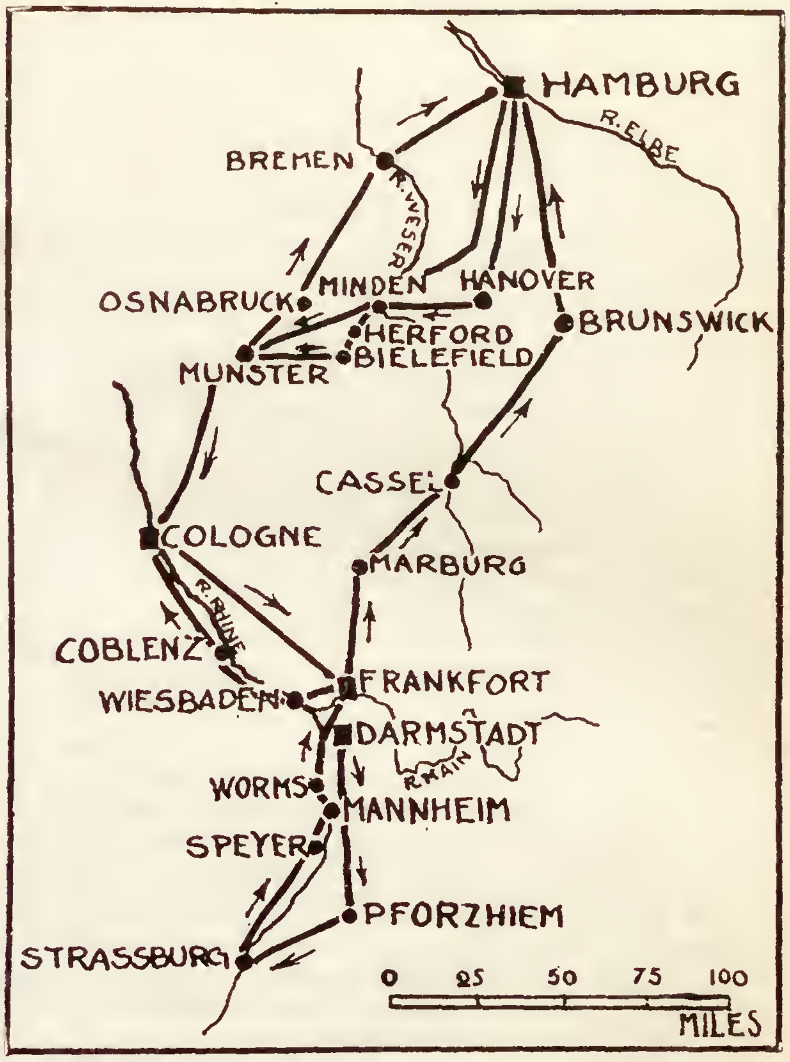
Fourth Round.—Start from Hamburg, fly over the controls at Hanover, Minden, Herford, Münster, Osnabrück, Bremen, and return direct to Hamburg. Distance 565 kiloms (350 miles).

The second part of the programme will include a strategic reconnoitring flight from Hamburg *via* Münster to Cologne on May 23rd, and a military practice flight of a tactical nature near Cologne on May 25th.

Flying after dark will only be permitted in exceptional cases, to enable a flyer to reach the next control or the destination of the day's flying. No machine will be allowed to leave a control before 4 a.m. or after 8 p.m., nor will flying over controls be permitted except between 4.30 a.m. and 8.30 p.m.

Competitors will be divided in two classes, viz., military pilots, *i.e.*, officers (on army machines) and civilians. The Kaiser prize will be awarded to that class of which the highest percentage of competitors has successfully completed both the reliability trial and the military test. The other group will be awarded the Prince Henry prize.

A "Prix d'Honneur" will be awarded to the pilot who has covered the reliability test in the shortest aggregate flying time, and who has successfully passed through the military tests.



Altogether 71,000 mark, *i.e.*, £3,550, will be available for cash prizes. Six prizes, amounting to 56,000 mark, will be awarded to the pilots with the shortest aggregate flying time, and the remaining 15,000 mark will be distributed among the other competitors.

* * *

CORRESPONDENCE.

The R.A.F. and the Industry.

[1828] I read the recent *Times* articles on aviation, and have kept them, and there is a lot of sound common sense in them. I must tell you that we have received every help and attention from the R.A.F., and that they have assisted us in all ways possible to execute our work. Our relations with them have been, and still are, of the most favourable nature. All they demand is that their work is well done, and on that they insist, and we do our best to satisfy them, and I may say, with some pride, that I think we have done so. It is only fair to say this, as it has been implied that all the "trade" constructors dislike the R.A.F. and its ways. What is really wanted to encourage the construction in this country is a friendly relationship between them. At present they are all trying to ruin each other. The rich firms are building machines at a dead loss in order to ultimately get all the orders, so that when they have achieved this they can demand any price they like having once got them. This is, of course, hopeless, as new firms will spring up, and again build for less. If the existing firms would fix a price between them, a fair price that would pay them and pay the Government to get them made out of the factory well and up to the R.A.F. standard, the existing firms would have no reason to grumble. The present state of the aviation trade is for the large and rich firms to try and undersell the small ones, therefore no one is satisfied, the rich firms are losing enormously, at a far greater rate than the poorer ones, and even if they succeed in bringing a few small firms to ruin, they cannot hope to keep the market to themselves long enough to get back all they have spent in reaching this end. For every penny lost by a small firm a big firm must lose ten times more at the very least. Unity means power; if the individuals are so occupied in fighting each other, they cannot have strength to fight for the cause. If they would unite in keeping aviation construction as good as possible, and in asking a reasonable price for good work, their complaint against the R.A.F. would vanish, they would get a return for all they have spent, and have time and money over for new experiments. The War Office want machines as quickly as possible, and they are therefore now building quite a number by day and night shifts at the R.A.F., to be ready by March.

I think all these machines would have been given out to firms if they could have produced them in time, but they could not do so, because they have been so occupied in killing each other. The small firms have lost too much on each small contract to extend, the big firms have been lamenting their excessive expenditure, and the lingering life of their prey.

HEWLETT AND BLONDEAU.
per H. B. Hewlett.

Omnia Works, Vardens Road, Clapham Junction, S.W.

[We deal with this letter editorially elsewhere.—ED.]

Mr. Hucks Raises Points.

[1829] I have read with much interest the remarks of "Will o the Wisp" in last week's "Eddies," in connection with looping-the-loop flights, but there are several points raised that I would like to see thoroughly thrashed out in the columns of your valuable journal.

Point No. 1.—Your contributor says that when Pegoud first looped the loop in this country, he took up the position that it was of the utmost importance to aviation from a scientific point of view, but that as a circus performance there was not much in it.

It has always annoyed me that aeronautical writers should refer, on occasion, to any forms of exhibition flying as "circus performances," for it seems to me, in common with other pilots, that the use of this term casts a slight upon this branch of the profession. Cannot they find some other term which is more in keeping with the prestige of aviation?

In the ordinary way there is nothing degrading in a circus performance, but it is the *manner* in which this term is used in connection with aviation that brings with it a certain discredit. This is all the more annoying in view of the fact that the men who specialise in giving exhibition flights do a very great deal towards popularising aviation in the provinces; and it must be remembered that the general public must be made enthusiastic about aviation before it will become possible to obtain really large grants for the development of the aeronautical departments of our Services.

Point No. 2.—Your contributor says it is a pity I so far forgot myself as to give vent to my feelings as I did, when I saw that quite a large proportion of the public were witnessing my demonstrations from outside the grounds.

Now let it be clearly understood that I should be the very last person on this earth to deny that there is a financial aspect to these demonstrations. To be frank, I am not a man of independent means, and I have to find a method of earning a livelihood. Some people write for a living; I fly for mine. I have certain goods to sell, and naturally I wish to dispose of them in the most profitable manner. Were I not to grumble now and again about the way in which people stay outside, I really believe the general public would begin to regard it as quite the right kind of thing to do, and if everyone watched the demonstrations outside the ground, my revenue would drop to about nothing. This would mean that I should be giving my goods away, and your contributor will not have any difficulty in realising that no business would succeed under such conditions. I therefore find it necessary sometimes to say a few words to the crowd on this subject, and my remarks have invariably a tonic effect upon the attendances.

In the case of my protest at Leeds, it was remarkable how few people stayed outside the ground at the exhibition following the publication of my remarks, and I was simply inundated with sympathetic letters and postal orders, as contributions from those who had seen the flying from the roadway.

In these circumstances, I am sure "Will o' the Wisp" will agree that it was not by any means a pity that I made my protest.

January 21st. B. C. HUCKS.

Automatic Stabilizers.

[1830] I have carefully read the article on "Automatic Stabilizers" in your last issue, and it seems to me that those who, like myself, are believers in mechanical control may well cry "Save me from my friends." I had occasion about three years ago to search through the British patents relating to this matter, and there was not one single invention (among the few which might have been workable) in which one could not almost instantly put one's finger on the weak spot, the trouble being that few of the inventors are practical engineers or mechanics, and fewer still have any practical knowledge either of flying or of aeroplanes. Under such circumstances one cannot wonder at the opposition to the use of mechanical control.

I myself hold patents for a lateral stabilizer (not of the pendulum variety), and cannot refrain from questioning such remarks as—"An automatic stabilizer . . . . does not begin to work until after the disturbance in the path of the aeroplane has existed for some time." This remark is reasonable in so far as machines whose mechanism is brought into play by a variation in the attitude of the aeroplane are concerned, but it obviously does not apply to machines whose mechanism is actuated by the direct action of the air on miniature planes or wind vanes which, moving before the machine is affected (owing to their lightness), bring the mechanism into play before the pilot would have had a chance of observing the change—the matter is analogous to that of the string, the use of which you have advocated.

With all means of stabilizing, whether mechanical or due to the formation of the machine, the first essential (after reliability) is that the pilot shall be able, at his discretion, to control the machine's movement about any axis should necessity arise. So far it would appear that this being so, *inherent* stability is preferable to *mechanical* stability; but now this situation arises: what happens when landing? Inherent stability requires space for its efficient action, as also do all mechanical stabilizers relying on a change of the machine's attitude for action; if now we substitute a mechanism which is brought into play by air pressure variations, the pilot will be able to take charge on landing and bank his machine if necessity arises, being simply guarded against air-pressure variations by his stabilizer, which if properly designed need not be thrown out of action; that is to say, with a well thought out stabilizer, the pilot can give all his attention on landing to the actual business of so doing.

My experience of motor boating suggests to me that the case of the boat is not a convincing analogy, since, except perhaps under special circumstances, the pilot of an aeroplane only detects air variations by their effect upon his machine, so that it would be more correct to compare the control of an aeroplane with that of a boat on a dark night, when (though I do not, of course, suggest fitting it to boats) a mechanical control would be reasonable, the only difficulty being that the pilot of a boat may vary his control, using on a night when the sea is heavy a larger movement than when a lighter sea prevails; but it is an exceedingly simple matter really to arrange an adjustment of mechanical control with the same object.

With reference to the statement that the automatic stabilizer "increases the fatigue of the pilot, by enlarging the disturbances," this appears to apply to a machine whose mechanism is controlled by variations in its position; if it applies to the air-vane control it is merely a sign of maladjustment, and condemns the particular apparatus and not its principle.

Regarding the test at Juvisy, what stabilizer was concerned?

Longitudinal mechanical control adds some further difficulties to lateral, but with care it should, I believe, be possible to obtain it on the lines here suggested, on similar lines indeed to the Wright longitudinal stabilizer, though I do not suggest similar in details.

But experimenters must never overlook the fact that reliability, due to the uttermost care in the design of every detail however minute, is an absolute essential; and also that, at least during the experimental stages, it must be possible for the pilot instantly to disconnect the apparatus and take complete charge should he think it desirable.

For myself, I am prepared to submit any detail of my design to critical examination, and if every detail is reliable, the principle surely is worth at least a trial, since a matter of £40 or £50 would cover the expense of making and fitting the same to a machine, the only stipulation being that the machine shall have a slight dihedral to ensure its lateral stability in calm air; carelessly designed stabilizers produced by dreamy inventors have been in the past the greatest bar to the development of the same, and one cannot wonder that pilots prefer to leave such things alone.

Apologising for the length of this letter.

Southampton, January 19th. NOEL VERNHAM.

The Small Dihedral.

[1831] I beg to make an endeavour to clear up some of the points raised by your correspondent "B 2," in letter 1820.

The dihedral angle may be fitted to any extent, providing that the efficiency of the machine is of no great importance.

The loss of efficiency is easily explained. As "B 2" is no doubt aware, the lift of an aerofoil acts at right angles to the aerofoil (viewed from the front). Suppose that the aerofoil is now inclined as in a dihedral machine. We will consider the change of the forces acting on the machine. The force producing lift is now inclined, and we must now resolve this force into two, one acting vertically and one producing a side thrust, which, in a complete machine, is counteracted by an equal and opposite force on the opposite wing.

Thus the lifting force is diminished, whilst the inward acting thrust represents so much waste work. On the modern aeroplane waste cannot be allowed. Hence the small dihedral.

A further point against the use of a large dihedral is that it promotes end losses and losses due to the sideways motion of the air outwards.

Any machine suitably designed and fitted with a very small dihedral will right itself; it is only a matter of time, no matter how launched.

No well-designed aeroplane will glide upside-down unless held so by the use of the controls by the pilot.

Your correspondent is not very clear in the next paragraph. This depends on the system used to make the machine stable. The latter portion of the paragraph only applies to a machine using the dihedral system. An explanation of the various systems of inherent stability would be out of place here.

With regard to the models, I cannot agree. I think "B 2" has made his mistake in this way. The models being so small the forces at work are small, and as the speeds are relatively high, the effects will be very difficult to detect.

The propeller idea is good, but owing to the twisted slip stream of the leader, the pitch and r.p.m. of the second would have to be modified.

This treatment might impair the efficiency as well as requiring special designing and research.

The last suggestion (regarding the motors), I assume, refers to motors of the Gnome type. There appears to be no difficulty in doing this. There is one point needing consideration; that is the necessity of placing rotating masses as close together as possible and bearings ditto, the reason for this being to obviate any stresses being thrown on shafts when the engine is moved. The advantage appears too small, as the Gnome on test has been shown to possess a very small gyrostatic couple for ordinary deflections. The magnitude of the effect on the machine depends on the design therefore to a large extent.

Bedford Park, W. F. C. SHEPLEY-PART.

Aerial War and Parachutes.

[1832] After reading in Eddies, January 17th, that "the best way to disable airships will be to get a pilot on a monoplane to fly right into one," it went on to say "that of course this meant destruction to the pilot . . . .", I do not see why the pilot should not leave the machine by parachute a few seconds before the machine strikes the airship, and so give him some chance of escape; also the monoplane could carry a certain amount of high explosives on board, so that on being flown into an airship it might do a little more than merely "disable" it.

Tunbridge Wells. L. MARSHALL.

Models

Edited by V. E. JOHNSON, M.A.

The Dependence of Aviation on Model Experimental Work.*

By F. HANDLEY PAGE, A.F.Ae.S.

THE subject for this evening is "The Dependence of Aviation on Model Experimental Work." I will, therefore, endeavour to show you how dependent aeroplane designs are on model makers and research work carried out on models. I will also deal with the lines on which the research work must be carried out, not necessarily in the orthodox laboratory method, but even with experiments on what are sometimes termed "Flying Sticks." The experiments carried out on the latter should be of more interest than the small laboratory experiments if they are carried out correctly.

Let us consider the relations of models to the full-sized machines. The whole science of aeronautics is founded on experimental work. There are many elaborate mathematical theories which deal with the theoretical side of aviation. These theories can, however, only act as pointers in the direction to be taken; they are absolutely useless without the experimental data giving the necessary constant in the fundamental equations. Let me give you an instance.

Professor Bryan has written a book on stability, containing a long series of mathematical equations defining the stability characteristics of a machine. To properly apply this to practical aeroplane design it is necessary that a large amount of experimental work must be done to find the value of this constant. For this one has to fall back on models, and thus to properly design an aeroplane one must go back to model research work.

I have shown how important it is to the science that experimental work should be undertaken. You may say, however, that experimental work on models is uncertain in its results, and has not the same value as tests on full-sized machines. This may to a certain extent be true, but experimental work with full-sized machines can only be carried out on a large scale if you are a millionaire. It is very costly both in time and expenditure, and is attended with danger to the experimenter.

It is quite simple, of course, to make a model, having a weight in it to represent passenger, pilot, engine and petrol, &c., and let the machine fly. If it comes to grief there is no danger of lives lost nor of much time or money wasted.

You will thus see that model experimental work must be of great help to the science, although it will have to be supplemented by tests on the full-sized machines.

There are two classes of experimental work:—

1. The aeroplane is stationary and the wind blows against it.
2. The model moves, and the air is still.

In each of these classes there are two problems that confront the designer: the problem of lift and drift firstly, and the problem of stability secondly. These two problems are separate as regards the research work necessary. I will deal firstly with the experiment on the stationary model with the air blowing against it.

Experiments of this kind have been carried out in this country and abroad by many experimenters, and one recalls a long series of distinguished names in connection with this work: Eiffel, Rateau and Andre de Gaumont in France; Prandtl in Germany, Drs. Finzi and Soldati in Italy, Rabouchinsky in Russia, and in our country Dr. Stanton and his staff at the National Physical Laboratory.

These people have all employed stationary models to measure the lift and resistance of many types of planes and struts and streamline bodies. From these experiments one can tell the plane which has the maximum lift with the minimum drift, and tell how much area is necessary to lift the load which you are going to carry at the speed for which the aeroplane is designed; to tell also the thrust of the propeller, and further, the horse-power required to make flight possible. The model experiments then determine the angle of inclination, the area, and the cross section of the plane which you are going to use. There is a further series of experiments in the wind tunnel which are most useful to the aeroplane designers; I refer to the curves of pressure distribution which have been taken on many types of planes. In this one sees exactly how the pressure is distributed from the front edge to the back edge of the plane. These pressures are measured by having a series of small holes drilled across the section of the plane, and the pressure is measured with a pressure gauge connected to each of these points.

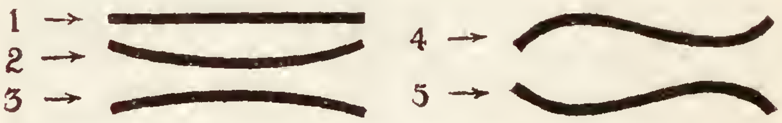
The first interesting thing that was found out from these experiments was that the lift or suction on the top side of the planes was three to five times as great as the lift due to direct pressure underneath the planes. The top surface has therefore to be much more carefully designed than the lower one. These pressure-distribution curves are useful also in telling us how we may modify our cross section to obtain a better lift and a lower drift of the resistance, how we may modify the camber and cross section of our planes to improve the results.

There is another way in which the laboratory models are so useful for obtaining results for full-sized designs, and that is in the determination of the movement of the centres of pressures of the planes.

In this connection I would refer to the very careful series of tests which Mr. Turnbull carried out in 1906 at his laboratory at Rothesay, New Brunswick. At that time there was very little data to which one could refer on which to base the design of full-sized machines. Mr. Turnbull saw that it was necessary that an aeroplane to be successful must be stable in the air; when the angle of inclination decreased and the machine tended to dive, he saw that the centre of pressure must move forward to provide the necessary righting moment to bring the machine back to a level keel, and that the converse of these results must take place when the angle increased.

He experimented with planes of varying cross section of the type illustrated and numbered below.

The arrow of these illustrations shows the direction from which the wind blew, and the cross section of the planes upon which it blew. He found that the only plane which was self-righting in any way described above, was the combination of two and three obtained in section 4. For this type he took out a number of patents all over the world; but this section had already been used previously by Lilienthal, the famous German pioneer.



Experiments on this type—type 4—have been carried out more recently at Gottingen University in Germany, and by Eiffel in Paris, and Turnbull's results are fully borne out.

I have now outlined to you the scope of the experiments in the laboratory. In the laboratory the weight of the models does not matter, as these can be easily balanced on the measuring apparatus, but where in the second place the model has to fly, the weight becomes of great importance. It is here not only necessary to look at the aeronautical problems which have to be solved, but also the constructional details. If the model tests are to be satisfactory, a great number of experiments must be carried out and the model must therefore be able to withstand a great deal of knocking about. The first thing then is to design a model which is not easily smashed up.

Now as to the results obtainable from a model, and their relation to the full-sized machine.

To obtain a model which has the same stability characteristics as a full-sized machine, the flying speed of the model must be to the flying speed of the full-sized machine as the square root of the ratio of the dimensions.

Let me give you an example.

If the full-sized machine flies at 60 miles per hour, and the scale model is $\frac{1}{16}$ full size, the scale model must fly at $\frac{1}{\sqrt{16}}$ $(=\frac{1}{4})$ of the speed of the full-sized machine, or at 15 miles per hour. This is a point where a great many experimenters come to grief. They test the model and find it wonderfully stable when it is flying at, say, 30 miles per hour. If this $\frac{1}{16}$ scale model had the same stability characteristics as the large one, the speed of this would be 120 miles per hour, at which speed wind gusts have not the same relative force.

It is easier when carrying out model flying experiments to start with the models as gliders. The propeller-driven model has to be built stronger to take the power unit, and it is, therefore, more difficult and expensive to make; there is also the propeller's efficiency, and thus, for a start, at any rate, it is easier to leave the power unit out. With gliders, one can test the lifting capacity, speed, and gliding angle for straight flights in calm air, taking different cambers and cross sections, different angles of inclination and varying plane forms to verify any flying experiment from laboratory work upon which your model design is based.

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* A lecture delivered before the K. and M.A.A., at Caxton Hall, January 9th, 1914.

After this has been carried out, there is then the problem of determining in what way we shall place the fin areas of out body and tail so that the machine will fly steadily in gusty weather. To describe better the procedure of these model tests, I will give an account of experiments which I conducted some few years ago on models, to obtain data for the full-sized machine.

At that time the difference on planes of curved cross section was very meagre, and the tests which we made were to determine not only the stability features of the models, but also their landing power and resistance.

The models were all made of 14 and 17 gauge wire, built up into a framework with thin wire ribs. These frameworks were covered with linen tracing paper. They were mounted on a central ash stick about ⅜ in. square; a solid lead weight fixed to this stick formed the equivalent of the useful load and engine in an aeroplane. The models were all one-twelfth the full size, being 30 ins. in span. We tried innumerable series of shapes and cambers, keeping the area all the time approximately the same. These experiments were not confined to planes of a special shape, but also dealt with planes of the ordinary square edge type fitted with stabilising tail planes. The camber on the planes was varied from about 1 in 25 up to as high as 1 in 6. The models were all launched by hand from the top of a mound about 35 ft. high, and the distance at which they alighted after a straight flight from the point of launching gave us the figures for the gliding angle, as we already knew the height at which they were launched. From these models we found out which had the best gliding angles.

(*To be continued.*)

Club Management.

Mr. O. Hamilton, jun. (Hon. Sec., Stony Stratford and District Model Aeroplane Club), writing *re* Mr. W. E. Evans' remarks in FLIGHT, January 17th, says: "I heartily agree with Mr. Evans' first paragraph, and would couple with it his sixth, dealing with a secretary's 'visiting duties,' and would emphatically state that a club's sound standing is all based upon an energetic secretary, and as I, for one, lack that feature, I can write it and feel I am not blowing my own trumpet on the subject.

Secondly, and in a parallel paragraph to the article in question, is the question of subscription. Speaking from my own efforts in club control, I feel safe in asserting that you cannot advocate or even fix a minimum rate of subscription, especially one in the neighbourhood of one shilling a month. To give an example: when my own club was in process of formation, five shillings was suggested as the annual subscription. My current chairman, speaking from long experience of other societies and clubs in the district, proposed at the inaugural meeting that the subscription be half-a-crown annually, and this is the rate we have fixed. It has the drawback that Mr. Evans suggests, but every cloud has a silver lining, and our way out of this difficulty is to allot so much per month for competitions, and charge a small entry fee to the competitors. We have had no complaint from our present members, who would willingly pay a higher subscription, but if we are to interest a large circle, we must keep our rate low. In addition to the seniors' rate of 2*s.* 6*d.*, juniors are admitted at 1*s.* annually. We are so fortunate as to possess two fields at Stony Stratford and one at Buckingham, which we can use rent free; but to counteract this we have rental for three rooms—one at Stony Stratford, one at Wolverton, and one at Buckingham.

"*Re* club workshop, in a country district like ours there is not such a great need for one as in certain other instances. Mr. Evans' suggestion *re* open competitions is very good, and if, in the future, our members get more heart and faith in their abilities, we may carry it into practice.

"Just one more word on the subscription question, which clearly shows our difficulty in this district. In April, 1912, we held a kite competition for juniors—an open event—and when the winner came along with his father to draw the prize money, the father, on parting, said: 'I wish you could lower your subscription; it's a lot for a mechanic to have to pay for a club.' My reply was 'that it was a physical impossibility to run the club on fresh air, or we should be pleased to oblige.' Truly, I thought this was the last straw."

Mr. G. Crooke-Rogers' Machine.

The following are the chief particulars of this machine which won the Birmingham Aero Club's Championship Shield:—

Length, 40 ins.; triangular frame; span, 30 ins.; chord, 6 ins.; elevator, 10 ins. by 2¾ ins. mounted above the framework; propellers, 11½ ins.; diameter, 11·5 ins.; pitch, 24 ins.; number of strands of rubber a side, 8 of ¼ in. strip; weight of rubber, 1·75 ozs.; weight of machine, 4 ozs.; total weight, 5¾ ozs. Main plane constructed of steel piano wire, gauge 18. A centre spar of bamboo is fitted at the top of the camber. The rear edge is very flexible and appears to give added stability to the machine. It does not roll in flight at all, but when struck by a side-gust banks and recovers. The propellers are steamed ones.

Photo. by Mr. T. Lockhead.

The Birmingham Aero Club's Championship Shield winner.

More Records.

"With reference to the remarks *re* quick-rising models, by Mr. Tinson, in your issue of January 3rd, I do not think," writes Mr. G. C. Beeching (Ealing), "that this distance is a record for models, as one occasionally sees a model get off in a foot or so by a fluke. However, I have made some experiments with a small model, 12 ins. span and of the same length. I had no French chalk for putting on the rising board, which was, of course, indoors, and so I had to use common salt, which impeded the travel of the model somewhat, but the wheel tracks of the model showed very clearly. The five shortest successive runs were as follows: 19·5, 31, 18, 23 and 15 ins. respectively, the shortest being thus only 1·25 times the length of the model.

The motive power was 3 strands of ⅛ in. rubber driving twin 4 in. propellers of coarse pitch."

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver	85 secs.
Twin screw, do.	Distance	R. Lucas	590 yards.
	Duration	G. Hayden	137 secs.
Single screw, rise off ground	Distance	W. E. Evans	290 yards.
	Duration	W. E. Evans	64 secs.
Twin screw, do.	Distance	L. H. Slatter	365 yards.
	Duration	J. E. Louch	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance	C. C. Dutton	266 yards
	Duration	J. E. Louch	91 secs
Do., off-ground	Distance	C. C. Dutton	190 yards.
	Duration	J. E. Louch	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter	60 secs.

Wireless Kite Section.—This section during the week-end carried out some interesting experiments with their amateur outfit. Will someone interested come forward and present the section with a good portable station? The hon. sec. will be pleased to give full details, &c., of outfit needed.

Competitions for Kites and Models.—Will any members who have suggestions for competitions kindly forward them to the hon. sec. so that he can lay them before the Secretaries' Guild and the council.

Farrow Shield.—This challenge shield has been received from Mr. Thomas Farrow, and it is hoped to exhibit same in a prominent West End window during February, and to publish photo. of same in this paper. This shield and all trophies will be exhibited at the Aero Exhibition in March. All holders are therefore asked to return same to the hon. sec. by the end of February for this purpose. Any one wishing to give a trophy should therefore present same at once, so that the aeronautical world shall have the pleasure of seeing.

Nominations, &c.—The hon. sec. will be pleased to receive any nominations for the presidency, &c., for coming year, so that the council can go through them at their next meeting. Already several gentlemen have been nominated as vice-patrons, vice-presidents, &c.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (N. Branch) (27A, SEDGEMERE AVENUE, EAST FINCHLEY, N.)

JAN. 31ST, flying Finchley, 3 p.m.; Feb. 1st, 10 a.m.

Monthly Report.—Interest for the past month has centred on the change o secretary and committee. Mr. Hindsley's resignation has been received with great regret, he having done a great deal of good work for the club. Mr. T. W. Dann is the new secretary, and the committee is as follows: Messrs. Hindsley, Fletcher, Ross, Cauder, and Rogers. An indoor meeting was held at "The Cabin" Jan. 22nd. Flying meetings were held Jan. 10th, 11th, 17th, and 19th, those flying being E. Colman, 0-1-1-P, good glides, about 40 secs; Mr. Claflin, 1-1-0-P2, 4 oz. machine; Mr. F. G. Hindsley, speed machine incorporating inherent instability; Root, tractor, 30 secs., bow frame; Mr. Wilson, very fast 8 oz. tractor (100 yards).

Bristol and West of England Aero Club (Model Section) (42, ROYAL YORK CRESCENT, CLIFTON, BRISTOL).

MR. C. W. TINSON has resigned his office of official observer, and Mr. N. Gordon Stephens has been elected by the committee (subject to the approval of the K.M.A.A.) to fill the vacancy *pro tem.* until the annual general meeting. Model flying meetings will be held at the Sea Walls every Saturday at 3 p.m. Members who have not yet paid their subscriptions to the hon. secretary should do so as soon as possible.

Monthly Report. — The R.F.G. duration competition commenced on Nov. 22nd, was concluded on Jan. 3rd, the winning flights being: First, R. T. Howse (1-1-2 P), 50 secs.; second, W. A. Smallcombe (1-1-2 P), 46 secs. The competition in this event was very keen, and the winning flight of 50 secs. r.f.g. was made at dusk on the day when the contest closed. The prizes were presented to the winners at a general meeting on Jan. 14th. A flight golf competition was held on Jan. 17th, when Messrs. R. T. Howse, E. Martin, W. A. Smallcombe, and N. Gordon Stephens competed. Mr. Smallcombe's machine (a twin-screw "canard" model with a pronounced dihedral angle) landed in the 20 ft. circle in five straight flights, and the prize was awarded to him. On Jan. 24th, a high flight of 62 secs. duration was made by a twin-screw tail type model flown by Mr. Smallcombe. The wings were flexible, and of modified "Weiss" design. This flight was chiefly remarkable for the reason that the backswept flexible wing tips flapped rapidly up and down in flight actuated by wind pressure. If this natural flapping could be artificially assisted there is no doubt that the machine would thereby be propelled forward. At these meetings the hon. sec. has been experimenting with his steam-driven Weiss model, but no flights have yet been made under engine power. The machine has made short flights driven by a geared rubber motor (the weight being then 22 ozs.), and towed behind a bicycle with the engine on board (total weight 32 ozs.), it has left the ground at a wind speed of approximately 20 miles an hour. The dimensions are: Span, 4 ft.; chord, 6 ins.; length, 3 ft. 6 ins.; weight (machine 15 ozs., engine and fuel 17 ozs.), 32 ozs.; effective lifting surface, 180 sq ins.; loading, 25·6 ozs. to the sq. ft. (the loading when the machine rose from the ground driven by one of Bonn's geared motors was 17·6 ozs. to the sq. ft.). The wings are modelled on those employed on the Keith-Weiss "aviette."

Croydon and District Ae.C. (158, HIGH STREET, CROYDON).

Monthly Report.—Very little flying during January owing to work with Show models. Those members that have been out during January have certainly favoured tractor models, and with the exception of Messrs. C. Smither and W. Bell, who have flown hand-launched models, no other type of model has made an appearance. Messrs. Bell and Smither had some of the finest distance flights yet seen at Mitcham, Mr. Smither's model climbing to a fine height. Mr. H. Smither has been out with a very original tractor monoplane with Caudron type planes. He has had very good flights and the model is very stable. Mr. Bell, with a small tractor, has been out for height, and his model has proved itself a good climber. Messrs. Hart and Mullins have also had good flights with their Dep.-type models. Mr. F. Carter has had out the smallest tractor mono. we have yet seen, and has succeeded in getting it to fly very well, though its landings are somewhat abrupt. Mr. Pavely has been out tuning up his tractor model intended for Olympia.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

FEB. 1ST, at 10 a.m., meet on Wanstead Flats as usual; if wet meet at club-room.

Monthly Report.—Jan. 4th, meet of the members on Wanstead Flats. Mr. H. Bedford opened proceedings with a small tractor, which flew well. Messrs. S. C. Hersom, F. Wood, and F. Hawthorn were all obtaining good duration with r.o.gs., and six h.l. models were flown during the morning. Jan. 11th, in spite of a gale, 20 members assembled, and Mr. Thos. Kimpton obtained the best flight of the morning, 100 secs., h.l. The model travelling with the strong wind was lost over some houses fully half a mile distant. Other h.l. models were flown by Messrs. H. Frost, G. Pitt, W. Hersom, and F. Wood. Messrs. H. Bedford and F. E. Grattan were each obtaining good flights with tractors; r.o.gs. were flown by Messrs. S. C. Hersom and F. Wood, while Messrs. J. E. Louch and H. Bedford vied with each other for hydro. honours. Members are beginning work in earnest on exhibition models, as can be seen by the falling off in attendance. Only 18 members turned out on the 18th, but some good flying was the result. Messrs. S. C. Hersom and F. Wood accounted for the hydros., and r.o.gs. were flown by Messrs. F. Hawthorn, F. Wood, and S. C. Hersom; six h.l. models were also flown with varying success by different members during the morning. Jan. 25th, Messrs. F. Wood and H. Bedford, arriving with hydros., were confronted with the difficulty of getting them off ice. Mr. Bedford detached his floats, and hastily fitted runners, from which his model rose very easily (ice makes a splendid rising surface). Messrs. F. Wood, S. C. Hersom, H. G. Bond, W. Hersom, and F. Hawthorn arrived with r.o.gs., Messrs. Thos. Kimpton and F. Wood with h.l., and Mr. Frank Hawthorn with a small tractor. Weather conditions throughout the month have been very unfavourable.

N.E. London Model Ae.C. (47, JENNER RD. STOKE NEWINGTON, N.)

Monthly Report.—Saturday afternoon's interest has centred chiefly round Mr. Burton's 5 ft. span r.o.g. tractor. Mr. Longstaffe's scale 14-oz. tractor has been doing exciting "straights." At general meeting for reorganising club on Jan. 17th, Mr. Longstaffe was elected hon. sec., Mr. Burton treasurer and assistant sec., with the following committee: Messrs. Lewin, Dore, Griffett, Sutton, Cowderoy, Sherratt, and Wood. The annual subscription was fixed at 4*s.*, a certain amount of which is to be devoted to prize work. Applications are invited for membership. A hydro. meeting on Sunday morning is to be inaugurated, if sufficient support is forthcoming; members are asked to inform the hon. sec. whether they are willing to support such a meeting. A club stand has been reserved at Olympia, and several members who intend exhibiting have already commenced on their machines.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

JAN. 31ST, flying at Sudbury. Competitions for Aero Show models commence.

Monthly Report.—Jan. 3rd, C. C. Dutton with h.l. twin-screw flew six timed flights, ranging from 73 to 89 secs.; W. Evans single-screw r.o.g., five ranging from 40 to 61 secs. Jan. 10th, showery; flying by F. W. Johnson (twin-screw r.o.g.), M. Levy, C. Levy (h.l. twin-screw), W. Evans (single screw r.o.g. with doubled-surfaced plane and elevator). At conclusion, members journeyed to secretary's house, where tea was provided prior to annual general meeting. Other members having arrived, the secretary, W. E. Evans, commenced the business of the evening by reading the report and balance sheet. These two documents, copies of which were handed to every member, show that last year was by far the most successful, both practically and financially, since the club was formed in June, 1910. The chief successes were due to the energy and perseverance of Mr. C. C. Dutton, who won two trophies in open competitions, also two gold medals, four silver-gilt, two silver, and two bronze medals. Mr. A. Cannell won one trophy, including silver plaque, in open competition. Other members who distinguished themselves in such competitions were Messrs. R. Bird and T. Carter. Six British model records were secured by that club, Mr. C. C. Dutton holds three, Mr. W. E. Evans two, and Mr. D. Driver one. The balance sheet showed cash in hand, £1 7*s.* 3*d.*, after spending £8 2*s.* 6*d.* in prizes. Fifteen medals were awarded during the year—namely, one gold, nine silver-gilt, two silver, and three bronze. £2 6*s.* 3*d.* was devoted to cash prizes. In inter-club contests the club held their own in matches with two of the leading London clubs. The officers of the club elected for the ensuing year were: President, Mr. Alfred Perkins; hon. sec. and treasurer, Mr. W. E. Evans; committee of management, Messrs. R. Bird, M. Canning, T. Carter, F. Johnson, M. Levy, and H. Woolley. Now is an excellent time for new members to join. Entrance fee 1*s.*, and subscription 1*s.* per month.

Reigate, Redhill and District (THE COTTAGE, WOODLANDS AVENUE, REDHILL).

JAN. 31ST, flying as usual, Earlswood Common.

Monthly Report.—The chief work during the month has been done in the workshop, members being hot on machines for the forthcoming Show at Olympia. The flying has been of an experimental character, Messrs Sutton and Norton having been experimenting a good deal with tractors. A tea and general meeting was held on Jan. 17th, and a very pleasant evening was spent in combining pleasure with business. The officers of the club were re-elected *en bloc.* It was found that the club stands in a good financial position, and a very gratifying report was read. On Jan. 21st the club r.o.g. record was broken by Mr. R. G. Wilson, he having obtained 56 secs. with a 6-oz. floating tail mono. and a point-to-point distance of 389 yds., the record being for duration. Mr. Sutton has had a h.l. floating tail out, getting very stable flights; also 8½-oz. tractor mono. with Handley Page type plane. This has proved to be very stable, behaving excellently in side winds. With this he has been experimenting with different types of tail, also tractor screws; the best results having been obtained with non-lifting tail with negative flaps. Mr. Hoyle has been out with 2-oz. r.o.g., also h.l. mono., both very good. The Wilson family have been busy with r.o.gs., their chief event being 56 secs. with floating tail; they have also had a 12-oz. r.o.g. "parasol" mono. which gives great promise, having had 42 secs. off ground and 46 secs. hand-launched. With a r.o.g. mono. loaded 9 oz. to 1 sq. ft. they have had 309 yds. and 36 secs., and r.o.g. biplane loaded 6 oz. to 1 sq. ft. 32 secs., about 80 ft. high. Mr. Hooton has been out with 8-oz. r.o.g. mono. and 10-oz. r.o.g. biplane with usual good flying. Mr. Funnell has had a 10 oz. r.o.g. mono. loaded 5 oz. to 1 sq. ft. This is the first machine of a new member, and certainly gives him great credit; he obtained 200 yds. with the first flight, but further trials were ended by a rubber breakage. Mr. Greenhead has been out with 7-oz. r.o.g. mono. and h.l. mono., getting 45 secs. with latter. Mr. Norton has been out with 9-oz. tractor mono. with Etrich type plane; this rode a nasty east wind well, crabbing on side wind, and steady as in calm. Messrs. Kennard and Young have also been flying.

Sheffield Ae.C. (41, CONISTON ROAD, ABBEYDALE, SHEFFIELD).

FEB. 7TH, at 3 p.m., general meeting at Broomhead's, Leopold Street, when important announcements will be made. All members and those interested in aviation invited to attend. Please observe change of secretary's address.

Stony Stratford and District Kite and Model Ae.C. (OLD STRATFORD).

STONY STRATORD AND WOLVERTON, Feb. 4th, discussional meeting at Wolverton. Feb. 16th, building evening at Stony Stratford. Buckingham Branch, Jan. 30th, discussional meeting. Feb. 14th, building evening. Feb. 27th, discussional meeting. Feb. 21st, members competition for both branches at Buckingham at 2.45 p.m.

Monthly Report.—Stony Stratford and Wolverton, Jan. 7th, general meeting at Wolverton. Subject for discussion, "The Competition Classes at Olympia." It was unanimously resolved that the club become affiliated to the K. & M.A.A. Owing to one or two spectators being struck by models at competitions, it was resolved to include the Association Rules *re* Protectors in the club rules. It was unanimously resolved that a vote of thanks and appreciation be recorded to the Model Editor of FLIGHT, Mr. V. E. Johnson, for his appreciative paragraph. Jan. 17th, on club ground at Old Stratford, a distance competition was held. Results calculated on average of three flights were: Messrs, E. Brown and W. Palmer, 1st, tied with average of 87 yards; Mr. E. Brown, 2nd, with average of 69 yards; Mr. R. Elmes, 3rd, with average of 64 yards. Jan. 31st, at Stony Stratford, a building evening was held, members present overhauling machines.

Buckingham Branch.—Jan. 9th, members' meeting. Subject, "Some Points on Model Design." Jan. 16th, building evening—Single-propeller machines on the stocks and gliding experiments. During the month members attended a lecture at Padbury given by Lieut. Lawrence, R.F.C.

Wimbledon and District (165, HOLLAND ROAD, W.).

JAN. 31ST and Feb. 1st, flying as usual.

Monthly Report.—Not much flying during past month, members being busy on their Olympia machines. Several new machines have been out, the most note worthy being two large tractors flown by Messrs. Tucker and Laing respectively. Mr. Tucker's machine is on the lines of the "Martinsyde" monoplane, which it resembles in the chassis and in the planes, which taper towards the tips and are braced from a king-post in the centre. The machine gets off and flies well, though it has a tendency to stall at the end of the flight. Mr. Laing has had out his reconstructed "D.F.W." monoplane, weighing 11 ozs., the built-up *fuselage* now being replaced by a hollow spar of large section. The model is very stable, and the duration has been improved up to 30 secs. Mr. Easdale has flown his large tractor every week, and continues to improve on his previous results. The stability is excellent, and the duration has been increased by the use of a larger screw, the average being about 40 secs. A machine which flies very well in a wind is Mr. W. G. Smith's 3 ft. A frame, type 1-1-0-P2; it gets up to a great height and covers about ¼ mile every time. Unfortunately at the conclusion of a long flight of about 600 yds. it was annexed by some urchins who decamped before Mr. Smith could arrive. It has not been recovered. Mr. Laing has flown an A frame twin-screw type 1-1-0-P2, getting very high flights and durations up to 65 secs. He has also made some interesting experiments with his large tractor as a glider. On a line of 30 yds. in length the machine rises into the wind and soars at a height of 40 ft. for periods of 2 mins. Mr. Cunningham has had out his Olympia-type tractor with built-up *fuselage*. The machine made several short flights, but further experiments were stopped by the screw coming off in mid-air. Mr. Hayden has flown his 4-ft. 9-in. 'bus throughout the month. It is now fitted with a larger elevator which has improved the flight considerably. Mr. Boniface's single-screw pusher has been flying well, both r.o.g. and h.l. doing durations up to 40 secs. It was originally fitted with an elevator, but this has now been replaced by a tail, and the stability has greatly improved in consequence. Mr. Powell has flown his hollow spar type 0-1-1-P2 machine, getting good results in all weathers; average duration 80 secs. On one occasion it alighted in a pond at the conclusion of a long flight, and had to be retrieved with a line, none the worse for its bath however.

UNAFFILIATED CLUBS.

Edinburgh Ae. Soc. (Model Section) (13, HERMAND TERRACE).

PRACTICES Feb. 7th, King's Park; Feb. 14th, Blackford Hill Observatory; Feb. 21st, Braid Hills, Pond Gate; Feb. 28th, r.o g. duration sweepstake in meadows; all practices commence at 2.30 p.m. Lantern lecture on "Some Points on Model Aeroplane Construction and Design," will be given by Mr. S. Harrison, at 46, Torpbichen Street, on Thursday, Jan. 26th, at 8 p.m.

Monthly Report.—The first Scottish Model Aeroplane Championship Meeting was held on Jan. 1st, at Edinburgh, when competitors from Glasgow, Dundee, North Berwick, and Edinburgh took part. Unfortunately, owing to a strong wind, only one new Scottish record was put up, namely: r.o.g. distance, 262 yards 2 ft. by Mr. Craig Boyd, S.A.S. Model Aero Club, and which was done in the inter-club competition. In the inter-club competition each club was represented by h.l. monoplane, h.l. biplane, and r.o.g.; each machine made three flights in both distance and duration, and scoring was by points. The following were the results:—Open competition (distance)—1. S. Harrison; 2. E. Hardy; 3. H. Hartley. Open Competition (Duration)—1. J. P. Graham; 2. H. Hartley; 3. S. Harrison. R.O.G. (Distance)—1. J. P. Graham; 2. S. Harrison. R.O.G. (Duration)—1. J. Hall; 2. J. Graham. Inter-club Competition—1. Edinburgh, 34 pts.; 2. Glasgow, 28; 3. Dundee, 22; 4. North Berwick, scratched. On Jan. 24, a few members went down on the invitation of Major Gordon to Port Laing to inspect the seaplanes stationed there.

Finsbury and District (52, LAMBTON ROAD, HORNSEY RISE, N.).

FLYING as usual, Finsbury Park (kite ground), from 3 p.m. till dusk.

Ilford Model Ae.C. (83, ENDSLEIGH GARDENS, ILFORD).

FEB. 7TH, 8th, 14th, 15th, 21st, 22nd, and 28th, flying as usual. On Feb. 4th, committee meeting; Feb. 9th, general meeting to discuss the building of a club glider.

Monthly Report.—There has not been very much flying this month, for the club has just been reorganised, and programme for 1914 planned. The best performances have been made by Mr. R. C. Nicholls and Mr. B. Seabright. It is to be regretted there has been a marked absence of tractors. Biplanes seem, however, to hold a prominent position, most of them being r.o.gs. The best performance was put up by Mr. G. Warren with 35 secs. duration. The secretary is going to experiment on Rochet planes, which were illustrated in the back numbers of FLIGHT. Mr. Nicholls put up a very good performance with his "light weight" twin-screw "pusher," which weighs less than 2 ozs. His performance being the club's record for the "light weight class," 41 secs. duration obtained on Jan. 18th. There is only one hydro-biplane in the club at present, owned by Mr. G. Warren, which has flown with fair success. The secretary's twin-screw "pusher," with backswept wings *à la* Handley-Page, caused quite a sensation. It flew very well, and was exceedingly stable fore and aft, but was inclined to wobble, for the wings were turned up too much. From the end of January onwards tractors will receive most encouragement, as they are so much in the minority, and also are more difficult to construct. The secretary would be exceedingly pleased to receive catalogues, &c., from model and accessory manufacturers, and also from aero-model enthusiasts who would care to join the club.

Scottish Ae.S. Model Aero Club ("ROCHELLE," LIMESIDE AVENUE, RUTHERGLEN).

JAN. 31ST, Feb. 14th and 28th, Paisley Racecourse, h.l. and r.o.g.

Monthly Report.—Dec. 20th members visited Paisley Racecourse. Several new models were out, including Mr. Mills' new hollow spar biplane, 0-1-1-P2, and Mr. Balden's new duration model, 1-1-0-P2, whose best durations were 65, 68 and 78⅓ secs. Jan. 1st members travelled through to Edinburgh to compete in several competitions organised by the Edinburgh Aero Club, and also to compete in an inter-club match for the championship of Scotland. Teams of three members (each flying a different type, namely, h.l., r.o.g., and h.l. biplane) were forward from Edinburgh, Dundee and North Berwick. Unfortunately the weather was rather boisterous, and was all against good flying. Owing to this a good many smashes took place. The result of the match was: 1, Edinburgh; 2, S.A.S.; 3, Dundee; 4, North Berwick. During the day Mr. W. Craig Boyd, S.A.S., raised the Scottish distance record for r.o.gs. to 262 yds. On Jan. 28th Mr. James G. Gray, D.Sc., will deliver a lecture entitled "New Gyroscopes and their Applications," to the Scottish Aeronautical Society, in the Glasgow University, at 8 p.m. All interested are invited to be present.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

JAN. 31st, Woolwich Common, 3.30 p.m. until dusk; Feb. 1st, Blackheath, 7.30 to 10 a.m.; Lee Aerodrome, 10.30 a.m. to 12.30 p.m.

Monthly Report.—Owing to the Exhibition, the past month has been one of exceptional industry, and a record number of models have been completed. In addition to the ordinary flying models, F. Plummer has built a scale Morane-Saulnier mono., A. B. Clark a scale Blériot, W. R. Prance a petrol motor, and Mr. Hock a steam plant. This Exhibition, held at the Central Hall, High Street, Peckham, on Thursday last (29th), will be reopened at the All Saints Men's Club, Ripon Road, Herbert Road, Plumstead, on Thursday next (Feb. 5th). Aero-modellists and their friends are heartily invited. Admission free. Visitors will be entitled to cast a vote for the most interesting exhibit, which will hold the "South-Eastern Trophy" for the present quarter. The next contest for the trophy, the rules for which appeared in these columns last week, will be held on Feb. 28th. G. H. Westwood has spent a very busy month with his numerous tractor monoplanes. A. Beere has developed a similar stud, but on a much smaller scale, and has also tackled a tractor biplane. C. Beere's monoplanes have been well to the fore, and show considerable promise. A. B. Clark's all-metal model is still looping merrily, and now does three consecutive perfect loops without any effort. F. Plummer's hollow-spar mono. maintains its high style of flying, and G. Brown has now reverted to a small single-propeller model. E. W. Brunton has flown a promising tractor, and A. D. Nicholls his very efficient hollow-spar monoplane. It is with mingled feelings that one announces that A. F. Chinery has now apparently forsaken his realistic gull's wing tractor for the "hollow spa brigade," and now flies a very creditable specimen. F. Dixson is experimenting with a Dunne-type glider, and Mr. Bennett with a twin-tractor. This member has also had good flights from a floating tail "A" frame, and F. W. Edwards has flown a very promising twin-geared tractor fitted with an electric searchlight and a twin-propeller biplane.

Twickenham Model Ae.C. (74, CLIFDEN ROAD, TWICKENHAM).

Monthly Report.—During the early part of the month Messrs. Hill and Clayton did some exceptionally good tractor flights, R. Hill with one making the club record of 176 yds., although the machine lost a lot owing to circling. Saturday, 10th, Mr. Stagg brought down a Dunne-type mono. and also two tractors, one modelled on a Clarke's Dep., another of his own design. A competition was held for flying-sticks, the winner being the one who had the greatest total when his duration and length were multiplied together. Mr. Franklin, jun. was winner, with Mr. Ord as runner-up. Jan. 17th, the tractor competition was to be the main feature, there being ten entries. But the weather turned out abominable, so that the competition was declared off. On 24th Messrs. Hill, Clayton, Franklin, jun., Whyte, Rice-Skinner, Stagg, Williams and Harries out with tractors, and Messrs. Ord and Whyte during week-end with flying-sticks. Mr. Franklin, sen., has kindly accepted the presidentship of the club, which has met with unanimous approval, as he and his son have shown such enthusiasm in the welfare of the club. The members who have joined during the month include Messrs. Ord, Whyte, Stagg, Williams and Harries. Messrs. Franklin and Taylor are offering prizes, and together with those already given should do much to stimulate members to do their utmost. So taking things all round the club should be looking forward to a successful season this summer.

Windsor Model and Gliding Club (10, ALMA RD., WINDSOR).

Monthly Report.—The usual flying has been done this month. One or two models have been of more than ordinary interest. Mr. Rogers' big monoplane, 6 ft. span, has undergone some tuning-up flights, and shows great promise. It will be remembered that it was exhibited at the *Model Engineer* Exhibition, but has since undergone some little alteration. Mr. Stanbrook has flown a big 12-oz. tractor-biplane with great success, and a feature of which is the stability in a high wind. Mr. S. Camm has flown a tractor monoplane, reaching big altitudes. Messrs. F. Camm, S. Spicer, S. Dandridge, H. Dellar, and J. E. Staines have flown various models. Most members are now engaged on the models for Olympia, and it is hoped that the exhibit will be thoroughly representative. No gliding has been done, but next month should prove suitable weather. Arrangements are almost completed for the building of the full-size aeroplane. It will be of the tractor-biplane type, with a *fuselage* of the Blériot variety. Work will begin almost at once. Any students of aviation in the locality who would care to join in should apply to the secretary.

* * *

PUBLICATION RECEIVED.

Annual Report of the Board of Regents of the Smithsonian Institution, 1912. Washington: The Smithsonian Institution.

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Aeronautical Patents Published.

Applied for in 1912.

Published January 8th, 1914.

29,170. A. P. FILIPPI. Aerial or nautical propeller.
29,252. F. AMOORE. Aeroplanes.

Published January 15th, 1914.

29,401. H. COANDA AND BRITISH AND COLONIAL AEROPLANE CO., LTD. Aeroplanes.

Applied for in 1913.

Published January 8th, 1914.

3,470. H. T. ALESBURY. Aerial planes.
9,599. F. BLICHARSKI. Flying machines.
14,233. G. H. THOMAS. Biplanes.
15,488. BALLONHALLENBAU GES. Airship sheds or hangars.

Published January 15th, 1914.

7,448. H. COANDA AND BRITISH AND COLONIAL AEROPLANE CO., LTD. Aeroplanes.
7,553. H. COANDA AND BRITISH AND COLONIAL AEROPLANE CO., LTD. Aeroplanes.
8,759. C. BIENZ. Automatic stabilising apparatus in combination with landing framework.

Published January 22nd, 1914.

1,174. C. J. LAKE. Flying-machines.
1,972. B. D. PORRITT AND NORTH BRITISH RUBBER CO. Balloon fabrics.
3,126. G. GRAMATICESCO. Aeroplanes, &c.
3,263. J. R. PORTER. Aeronautical machines.
18,715. L. MOCHA. Flying-apparatus.

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FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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CONTENTS.

Editorial Comment:

PAGE
An Air Race Round the World ... 131
The Future of Our Flying Officers ... 131
Men of Moment in the World of Flight: Signor Enrico Forlanini ... 133
Flying at Hendon ... 134
Aero Engines at the Paris Show, 1913 ... 135
Armchair Reflections. By "The Dreamer" ... 137
Royal Aero Club. Official Notices ... 138
From the British Flying Grounds ... 140
Eddies. By "Will o' the Wisp" ... 142
The Thomas Flying Boat ... 143
Some Notes on the Principles of Steering and Stability in Aeroplanes. By Maurice J. Dodd, Assoc.M.Inst.C.E.I. ... 144
An Aeroplane in the Making ... 148
Foreign Aircraft News ... 150
Correspondence... ... 152
Models. Edited by V. E. Johnson, M.A. ... 154

EDITORIAL COMMENT.

An Air Race Round the World.

It is announced that the Aero Club of America has sanctioned a projected air race round the world, starting from the San Francisco Exposition in May of next year. The idea seems to have originated with the exposition authorities, who are offering a prize of no less than £20,000 to the aviator who succeeds in putting a girdle round the earth in ninety days. On another page of this issue of FLIGHT will be found a map indicating the proposed route of the flight, together with other details and distances.

Wonderful as has been the progress made in flight, we do not think for a moment that the £20,000 offered as the first prize will change hands in 1915. There are so many physical difficulties to be encountered in connection with an aerial journey of such magnitude that, without predicating its impossibility, there is so great an element of doubt about it, as to almost put it out of the question. At the same time, the strides made in aerial navigation are so astonishing in their rapidity, that it is more than ever unsafe to indulge in prophecy, and we can thus only wait and see. It may be pointed out, however, that in order to win the money of the San Francisco exposition authorities, the successful airman would in all probability incidentally qualify for the £10,000 prize of the *Daily Mail* for a Transatlantic flight, and that the prospects of even the latter being won this year or next are anything but assured. Apart, however, from any inherent probabilities connected with this specific event, it may be pointed out that the offer of the prize and the fact that it is being seriously discussed by the experts, while even from outside the criticisms are all seriously worded, is eloquent of the progress to which we have already made passing reference.

It is a well-worn theme, but one which nevertheless is of constant interest, this question of day to day progress, and we therefore make no apology for constantly reverting to it. Not so very long ago the offer of £10,000 by the *Daily Mail* was laughed to scorn by the Press and people of the world, who with one accord set the offer down to a desire to obtain a cheap advertisement. Then almost as much amusement was caused later by the offer of prizes for a cross-Channel flight, until one morning the world awoke to find that a French aviator—to wit, M. Blériot—had actually accomplished the Channel flight. Then people began to think that there was really something in this new movement, and by the time the realisation had sunk in, another Frenchman had given the lie to the scoffers by winning the *Daily Mail's* money, and aviation had really arrived. Since then progress has been so bewilderingly rapid that the thing which would have been voted a fairy tale yesterday is accepted as a plain statement of fact to-day. It is this aspect of the projected round-the-world flight that most appeals to us—that its *bona fides* are accepted without question, and that people are discussing its possible realisation with as much calmness as they discuss the latest strike news from South Africa.

◆ ◆ ◆

The Future of Our Flying Officers.

The Naval Correspondent of the *Morning Post* has raised the question of the future of our flying officers, particularly with regard to those of the Naval wing of the R.F.C. He points out that a new, inevitable and increasing addition to the Navy Estimates is involved in the maintenance and extension of this Wing, a service which draws upon the number of officers available for the Fleet. Each officer who enters the Flying School is an officer withdrawn from the ordinary service of the Fleet, and the number entering the School continues to increase. What the future of these officers is seems to be uncertain. At present the executive and Marine officers, having qualified in flying, may be required to rejoin the Fleet. Thus the flying branch is treated as incidental to he Navy itself, and service in it is temporary. As the *Morning Post* correspondent points out, the flying service is so highly specialised an occupation that the development of a new system seems probable. Entrance into the flying service is already open to others besides naval officers, and it may be that it will become a separate service while remaining under naval command.

We do not know if the *Morning Post* expert is speaking by the book, or whether he is merely regarding the thing from the apparently most logical standpoint. If his remarks are prompted by inside knowledge of official intention, then we may say that we are exceedingly pleased to hear it. If, however, the second hypothesis is the correct one, then we agree absolutely that there is an excellent case for the establishment of a separate service, separate, that is, in the way that the Royal Artillery or the Royal Engineers are separate and distinct branches of the Army, having their own self-contained organisation and their own especially trained *personnel*, but subject at all times to the orders of headquarters.

These two are specialist branches, entailing special knowledge and special training for proper efficiency. No one with any pretensions to knowledge of Service matters would argue for a moment that the gunner officer should be attached to a school of gunnery for a short course of training, and then sent to an infantry battalion for duty to be called upon, possibly, in case of war to do duty with the scientific arm and to find himself hopelessly out of touch with the most recent developments of the branch of the Service.

How much more does the specialist argument apply in the case of flying, for which constant practice and continuous training are so essential? Regarding the question from that—which, we submit, is the only—point of view, the arguments seem to be absolutely clear for making the R.F.C., both Military and Naval Wings, an entirely separate and distinct branch of the Services, not, as has been advocated by some, by the constitution of a new Service, distinct from the Navy and Army altogether, but as specialist branches to which officers and men are entered on a permanent and non-transferable basis. Thus, and thus only, we believe, can we secure that body of trained and practised pilots with the necessary reserve against the wastage of war, which we shall one day find so vital to the national safety.

In support of the arguments we have put forward, let us regard the case of France where the same system as our own obtains. Officers and men have been allowed to volunteer from their various units for training as pilots, to be sent back to regimental duty at the expiry of their period of training. The result of the system has been that now the number of volunteers for the air service has fallen almost to vanishing point. According to the latest available figures, the number of volunteers in 1911 was over 1,500. In 1912 only 300 presented themselves, while last year the figures fell to 22! In some measure this appalling drop may be ascribed to the internal troubles of the French air service—the "scandals," as they are described in the French Press—but in great part we believe the cause is to be found in the fact that there is no security of tenure. The man who desires to specialise in some particular branch wants continuity of employment in that branch, and it does not satisfy him to receive a more or less perfunctory training in it and then be sent back to take the ordinary duty he has escaped during his specialist days. The system is neither good for the Service nor for the keenness of the men themselves. True, this trouble has not so far spread to our own Services, in fact, quite the contrary, but there are possibilities of it ultimately doing so, which again is an argument for the creation of that special branch we are advocating.

SIGNOR ENRICO FORLANINI.

Our "Man of the Moment" this week is Signor Enrico Forlanini, the designer and constructor of the dirigible airship bearing his name, and which has found much favour in the eyes of those who are advising the British Government, resulting in the decision to acquire three of this type as a commencement. The formal order for the first of these was placed by the Admiralty through Sir W. G. Armstrong, Whitworth and Co., and the vessel will be constructed by the "Societa Leonardo da Vinci" near Milan. Other airships of the Forlanini type are to be built under licence in England by the Armstrong Co. We understand that the dirigible now ordered, though embodying several important improvements and modifications, will be of similar type and design to the "Citta di Milano," which was described in Flight for January 24th, and which was taken over by the Italian Army last August.

We learn that the British rights of construction were obtained, and all negotiations in Italy were carried through on behalf of the Armstrong Company by Messrs. Delacombe and Maréchal of London.

The Hawk.

Annual Dinner of the Royal Aero Club.

The date arranged for the Annual Dinner of the Royal Aero Club is Friday, the 27th inst., and it will be held at the Royal Automobile Club. The Marquess of Tullibardine, M.V.O., D.S.O., M.P., Chairman of the Club, will preside, and the distinguished guests present will include the Right Hon. Winston S. Churchill, M.P., First Lord of the Admiralty.

British Entries for the Gordon-Bennett Race, &c.

Two entries have already been received by the Royal Aero Club for this year's Gordon-Bennett Race, one being from A. V. Roe and Co., and the other from the Sopwith Aviation Co. The latter firm has also entered for the Jacques Schneider Maritime Cup. Entries for both these international events close on Tuesday, the 24th inst.

£1,000 for Imperial Air Fleet Committee.

In response to the appeal made by the Imperial Air Fleet Committee, the distributors of "Shell" Motor Spirit have made a donation of £1,000, this being the second donation from this source.

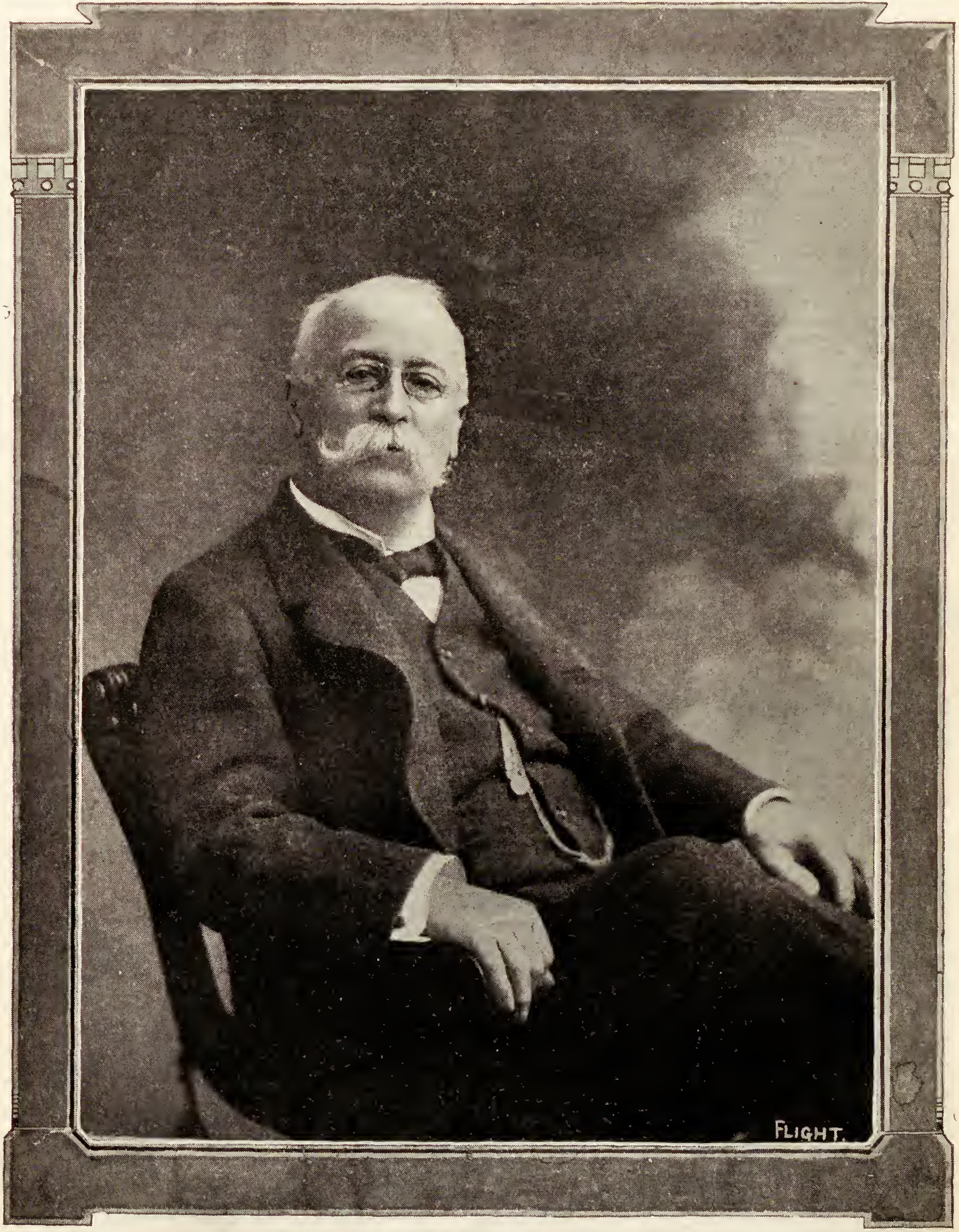
A Council for French Military Aeronautics.

As a result of the report, made to the Senate by Senator Reymond, on the state of French military aeronautics, M. Noulens, the Minister of War, has appointed a Supreme Council to control the workings of the reorganised Air Department of the Army. The Council includes four Senators, four Deputies, four members of the Institute of France, and one representative each of the Automobile Club, the Aero Club, the National Aerial League, and the University of Paris.

Index and Title Page for Vol. V.

The Index and Title Page for Vol. V, January to December, 1913, has now been printed, and can be obtained by sending 2*d.* to the publishers, 44, St. Martin's Lane, W.C. After February 21st the price will be 6*d.* post free.

MEN OF MOMENT IN THE WORLD OF FLIGHT.



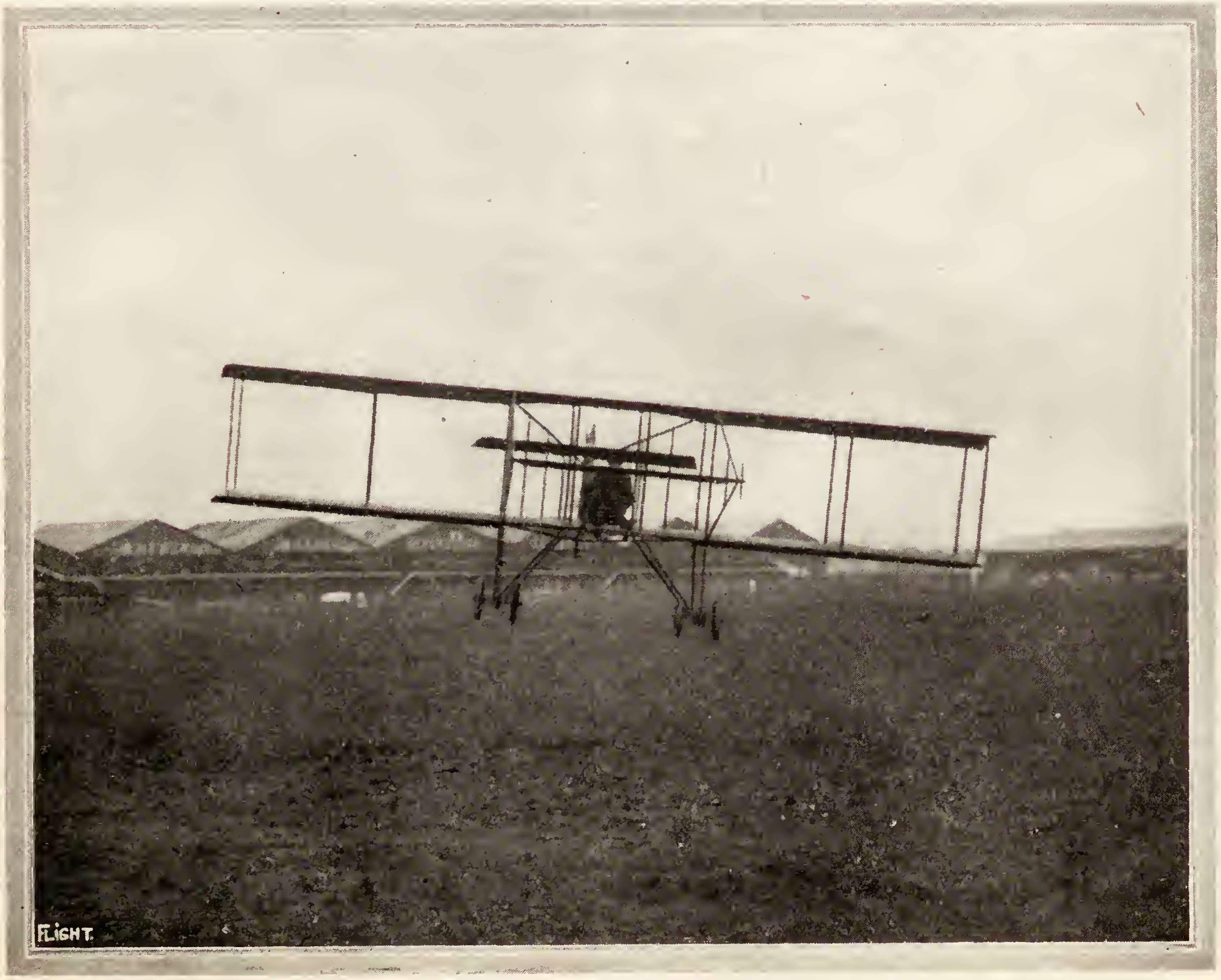
SIGNOR ENRICO FORLANINI.

FLYING AT HENDON.

VERY little flying took place at Hendon last Saturday on the occasion of the Metropolitan Meeting, owing to the somewhat dangerous wind that prevailed. It was blowing from the south-west in strong gusts varying from 30 to 40 m.p.h., but otherwise it was not so very unpleasant on the ground, and not anything like so cold as it had been the last four or five meetings. Arrangements had been made to hold a speed handicap round the aerodome, but conditions did not look at all favourable for this kind of event, so at 3 o'clock Louis Noel, with a passenger, braved the elements on the 75 h.p. Maurice Farman in order to ascertain what it was like up above. Noel's machine was blown about in an extraordinary, not to say alarming, manner, but he remained up for some considerable time, and made several circuits of the aerodrome. When flying broadside on to the wind the biplane appeared to make about as much progress sideways as it did forwards—which made it very strange to watch. Just as Noel was about to land, Philippe Marty came out on the Morane-Saulnier monoplane, and taxied out over to the far end of the aerodrome in order that he might get off head to wind. He turned round and started off, but had hardly got up speed when, owing to the bumpy nature of both ground and wind, the left wing tip struck the ground and the machine made a terrific cart wheel, the left wing crumpling up under the body and the nose of the machine digging into the ground with the tail pointing upwards; it then settled down on its side with the right wing vertical. Marty was thrown out a yard or two from the machine, and remained lying on the ground for about half a minute, and then everyone was relieved to see him try and get up. He was unable to walk, however, and he was seen to fall back again. Assistance was quickly on the way to him, and Noel, who had just landed, flew over to the scene of the smash, the ambulance car, with Dr. A. B. Leakey in charge, being close behind. Marty was speedily attended to, and it was found that fortunately he had only sustained slight injuries to his legs and chin, although, of course, he was also badly shaken by the fall. On examining the machine, the damage done was found to consist of a broken left wing, elevator, engine and propeller, but otherwise little or no further damage was done. Whilst Marty was being attended to, F. W. Goodden taxied over on the 45 h.p. Caudron, and, on learning that nothing serious had occurred, ascended. He put up a really brilliant exhibition flight, reaching a good height and making some fine banked turns. Noel had reported that it was unsuitable for racing, it being very tricky near the ground, so it was announced that the race would have to be cancelled. By this time it was 4 o'clock, and Noel made another flight on the Maurice Farman, accompanied by a passenger. The machine was taxied out to the far side of the aerodrome, held down by a man at each wing tip. On turning round and starting off against the wind, the biplane was lifted almost vertically off the ground. Its progress towards the enclosures was exciting to watch, for it was with difficulty that Noel kept it up, and he was almost beaten to the ground several times. However, he made several circuits of the aerodrome, and, except for another short flight, the proceedings were brought to a close. Amongst the visitors during the afternoon were noticed Marcel Desoutter and B. C. Hucks.

Sunday was much brighter, but the wind was still against much flying. Claude Grahame-White and Louis Noel, however, went out several times, and put up some very fine exhibitions of wind fighting. Both flew the 75 h.p. Maurice Farman biplane.

The February Meeting will take place this (Saturday) afternoon at 3 p.m., the principal event being a 16-mile cross-country handicap.



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A NEAR THING FOR OUR PHOTOGRAPHER.—A direct snap from in front of Mr. Reginald Carr on the G.-W. biplane at Hendon Aerodrome.

AERO ENGINES AT PARIS SHOW, 1913.

(*Continued from page* 122.)

D'Henain.

A 7-cyl. 50 h.p. engine was exhibited of a somewhat similar design to the small 10–12 h.p. air-cooled rotary engine shown at the 1912 Show. This engine differs in several ways from the usual type of rotary engine. For example, the cylinder and crank-case are made in one piece of cast-iron instead of in steel with the parts made separately. Further, the cooling fins on the head of the cylinder radiate from the centre of the cylinder. The valve mechanism was described in *The Auto.* of January 11th, 1913, and resembles that used on the rotary Clerget engines by the employment of two special eccentric plates, one for the inlet and the other for the exhaust. These are mounted on ball-bearings over the crank-shaft, and have toothed recesses formed in its periphery, into which the push-rods for actuating the valves fall in turn as the shaft rotates. By moving these plates the times of opening and closing the valves may be varied.

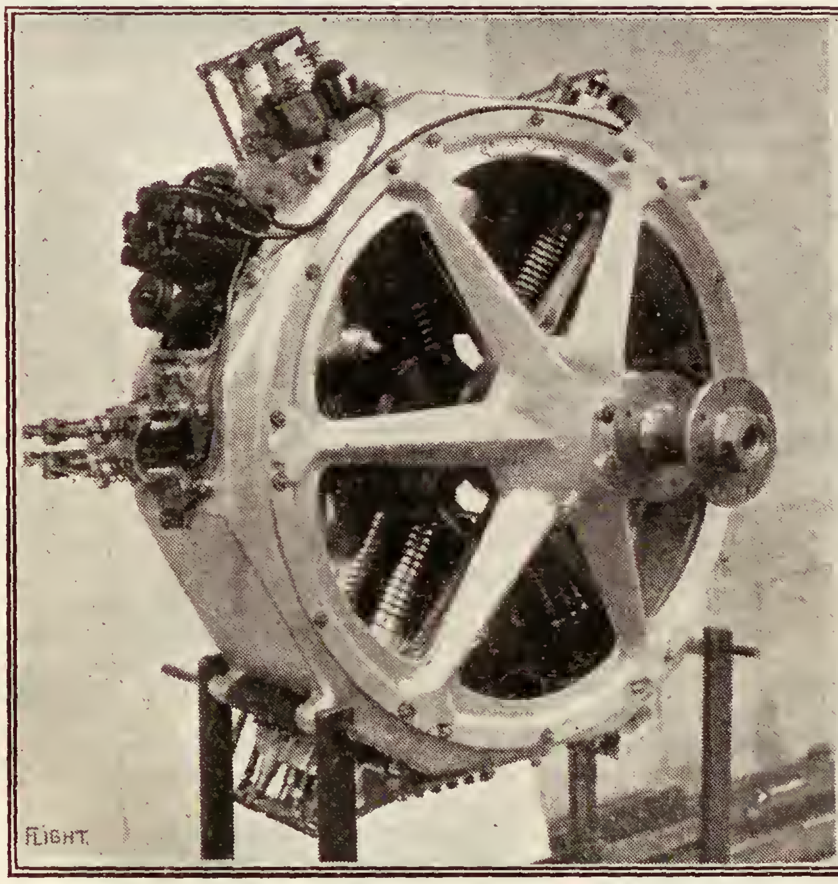
The crank-shaft is supported on ball-bearings, which are also fitted to the crank-pin, and as is usual in this type of engine the gas is taken through the hollow crank-shaft through radial ports to a chamber cast within the crank-case, from which it is distributed by piping to the various cylinders.

The lubrication of the cylinder and piston is effected by mixing oil with the air carried over into the cylinder.

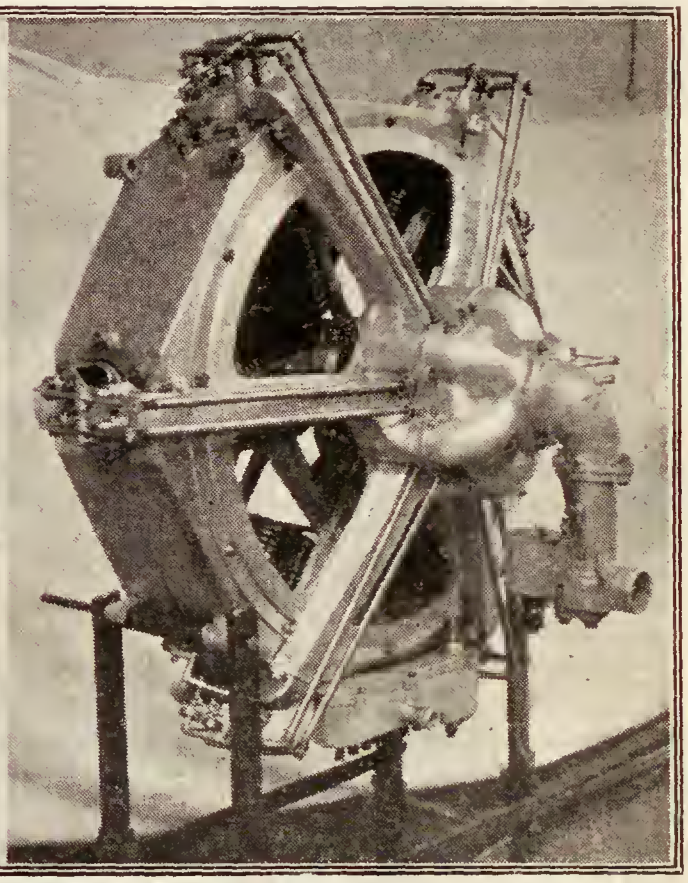
Edelweiss.

These motors embody an extremely interesting construction, somewhat similar in principle and design to the Weisz four-cylinder engine exhibited at Paris in 1910 (see FLIGHT, October 29th, 1910).

In these engines the pistons are fixed, and the cylinders of high tension steel are reciprocated by exceptionally long connecting rods attached to the crankpins—each cylinder having two connecting rods, which are fastened together so as to gain greater lateral rigidity by two bolts passing between them immediately beneath the piston. There are three cranks to the shaft, the two outer cranks being placed at an angle of 180° with the centre crank. The cylinders are virtually arranged in sets of three on the six-cylinder, and in sets of five on the ten-cylinder, as one set in each engine is driven by the centre crank, and the other set by two outer cranks. Gudgeon pins are formed upon the outer ends of the cylinders, which have blank inner heads, whilst air-cooling fins are turned on the cylinder barrel. The pistons, which are of cast iron and have three rings, all lie in the same plane at right-angles to the axis of rotation, and are attached to a polygonal aluminium casing that resembles in appearance the field magnet casting of a dynamo, the pistons corresponding to the pole pieces. The valves, both of which are mechanically operated through rocking levers, as well as the sparking plugs, are placed in the end of the piston.

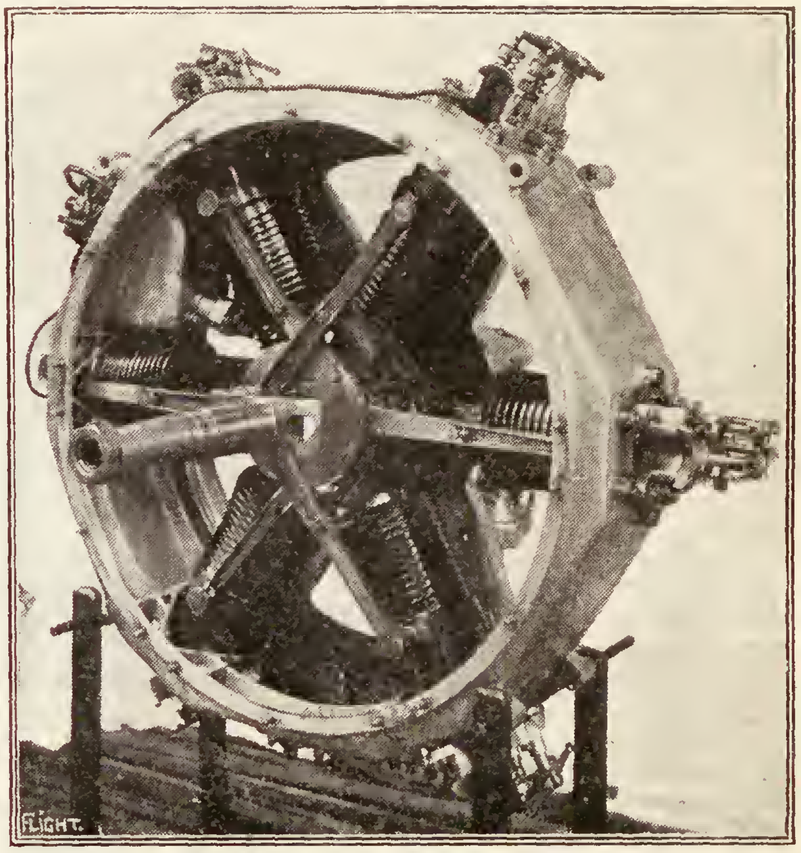


75 H.P. EDELWEISS.—View from front side.



75 H.P.—EDELWEISS.—View of rear side.

The magneto is driven by worm-gear off the crankshaft, and is fixed in a recess cast in the aluminium casing to which the pistons are attached. The crankshaft is supported in ball-bearings fitted to housings in the bosses of two spiders, one of which is fitted on each side of the engine. These spiders have circumferential flanges by means of which they are attached to the polygonal casing, whilst radiating arms connect the rim with the bosses. The arms on the rear side of the engine are permitted to act as conduits for the passage of the mixture between the carburettor and the inlet valves, and are therefore placed in communication with an inlet manifold in the centre of the engine, to which the carburettor—a Zenith—is attached.



75 H.P. EDELWEISS.—With end spider removed.

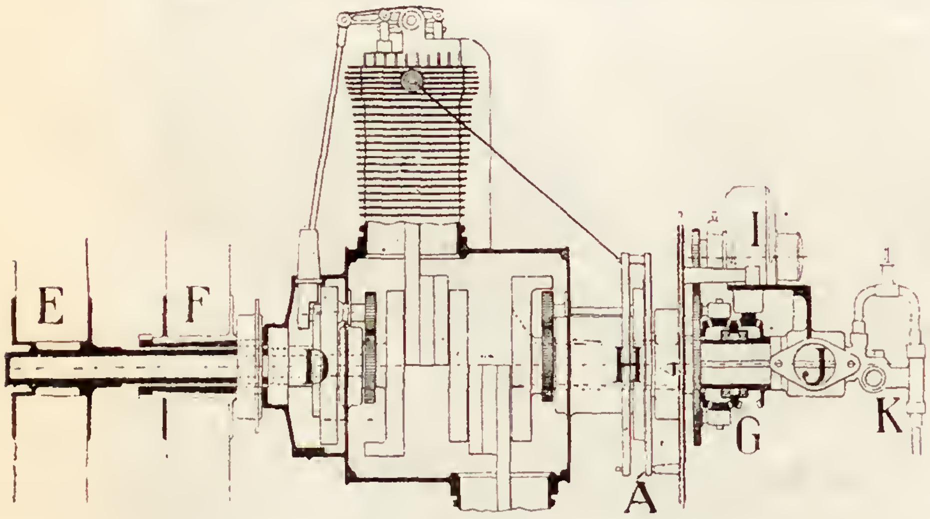
The oil reservoir is attached to the bottom of the casing, and within this the lubricating pump is placed from which the separate leads to the pistons, &c., are taken. The timing gears and pump driving mechanism are enclosed in a chamber formed at the boss of the spider frame on the rear side of the engine and immediately in front of the inlet manifold.

It is claimed that by the adoption of the particular construction used in these engines the balance is made perfect, that the absence of troubles through overheating enables a higher efficiency and greater power to be attained, and all parts which are likely to require attention may be dismantled in a very few minutes. From the arrangement of cylinders and cranks which is employed the engines should be very smooth running, as the only unbalanced forces which are likely to exist are such as may be due to inequalities in the masses of the reciprocating parts, and these may also be eliminated by careful attention during manufacture. It will be observed that as the cylinders are all in the same plane there is no tendency to rock the engine in a plane through the axis of the shaft. The extremely effective cooling afforded to the cylinders by the passage of air over them, due to the translation of the machine as well as from their reciprocating movement, together with the cooling of the exposed portion of the piston during a portion of the stroke, will no doubt contribute greatly to the more efficient lubrication of the cylinders and pistons—namely those parts in which the greatest amount of power at present is wasted in the internal combustion engine. But whether the power developed and the efficiency attained will be greater than that of other types of motor can only be determined by experiment. The claim for accessibility would also appear to be well substantiated, because all the working parts are quite open and visible, even whilst running, and it would seem that their condition may be very readily examined during use.

E.J.C. Motors.

The 60 h.p. 6-cyl. rotary engine exhibited on this stand presents an interesting problem in relative motion, since the crank-shaft, as well as the cylinders, rotates, although in opposite directions. The construction employed is shown in the accompanying diagram, in which the propeller F is attached to the crank-case and the propeller E to the crank-shaft. The crank-shaft and the crank-case are each supported in roller bearings and function in the ordinary manner relative to one another; but since neither is fixed, the reaction from the piston due to the obliquity of the connecting-rod, causes the cylinder to rotate in an opposite direction to the crank—the relative speed depending solely upon the resistances offered by the air to the rotation of the propeller, cylinders, &c. In the type shown, the makers state the revolutions made by the crank-case are 800 per minute, and by the crank-shaft 1,200 per minute, giving a relative speed of 2,000 revolutions per minute.

Such a construction necessarily involves some complication in the valve timing and in driving the magneto, especially for the latter, which is fixed in position. As regards the timing of the cam-plate, D, and high-tension distributor, H, this is accomplished by the introduction of two planetary systems of gearing as illustrated in the diagram, the required two-to-one reduction of the cam-plate being effected by the left-hand gear, whilst the plate marked A is kept in phase with the relative positions of the cylinders and crank-shaft by the planetary gear attached to it. The plate, H, which surrounds the shaft, is mounted on the crank-case, and carries the wires to the separate cylinders. The magneto, I, is driven from the crank-shaft by a sleeve through the double differential gear and spur wheels at G. On the sleeve is a bevel driving the pinion carried on the fixed support, which, in turn, drives the reversed pair of bevels, and these latter engage with two pinions supported by the large spur wheel that drives the smaller pinion on the armature shaft of the magneto.



6-cylinder E.J.C. double rotary engine.

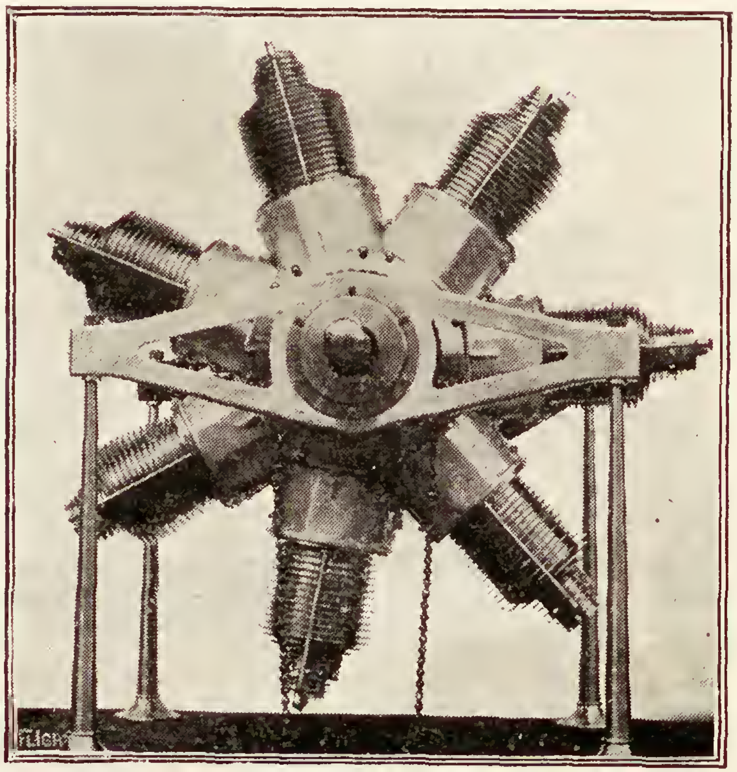
The carburettor is attached at J, and the mixture is fed through the interior of the crank-shaft to the crank-case and by radiating piping to the cylinders. Both valves are placed in the head, and are mechanically operated by a single push and pull rod controlled by the cam-plate. The lubrication of the cylinders and pistons is effected by a pump driven off the end of the shaft at K.

A ten-cylinder 100 h.p. engine of a similar type is shortly to be placed upon the market.

Esselbé.

The new 65 h.p. rotary engine is of more conventional design than the ingenious rotary engine which employed reciprocating pistons working in a circular cylinder seen at the 1912 Show. There is, however, still novelty in the construction adopted, in that the inlet is controlled by a sleeve valve and the exhaust by a piston valve. All the principal working parts of the engine, excepting the sleeve valve that controls the admission of the mixture to the cylinder, and which is of aluminium, are manufactured of high tension steel.

The general design of the engine is shown in the accompanying illustration, from which it will be observed that the cylinders are attached to a heptagonal crank-case having cylindrical projections for the reception of the various cylinders, on each face. These cylinders all lie in the same transverse plane, and have two diameters, the smaller, within which the exhaust valve is placed, being at the outer end. The inner ends of the cylinders extend for some distance within the cylindrical chambers on the crank-case, and ports, through which the fresh gas passes into the cylinder, are cut through these extensions, the opening being controlled by the sleeve valve, which slides over them on the outside of the cylinder. The connecting rods, which are of rectangular cross section, suitably lightened, run on ball-bearings placed on a bush through which the crank-pin passes, and to which the two gear wheels for driving the magneto, pumps, &c., are also secured. These gear wheels—one on each end of the crank-pin—engage with pinions mounted upon the two steel plates used for closing the ends of the crank-case—the rear door being also fitted with passages leading to the gas chambers, as they are termed, at the inner ends of the cylinders. These radial passages are also placed in communication with the orifices cut in the surface of the hollow crank-shaft through which the gas is led from the carburettor in order to avoid the admission of the carburetted air to the interior of the crank-chamber.



65 h.p. 7-cylinder Esselbé engine.

A Bosch magneto is fitted, and oil is supplied to the connecting-rod ends, &c., by two independent pumps, each of which forces oil through separate leads through the crank-shaft.

The valves are operated through rods by means of two groups of seven eccentrics mounted on the crank-pin—two of each being for each cylinder. These rods are attached to the sleeve valve controlling the opening of the inlet ports, whilst two rods, which are placed radially on the two sides of the engine, make a rigid connection between the sleeve valve and the bridge, carrying the piston valve at its centre, as may be seen in the illustration. A close examination of the details of the smaller diameter of the cylinder will reveal the presence of a number of elongated holes, which constitute the exhaust ports, between the cooling fins.

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Glasgow.

The method of operation is as follows :—On the induction stroke of the cycle, the piston moves for some distance down the cylinder before uncovering the ports communicating with the gas chambers, but when the top of the piston reaches the edges of these ports, they are fully open and the gas rushes in at a high velocity owing to the high suction pressure existing in the cylinder. The exhaust valve closes the exhaust ports early in this stroke, and is still descending when the piston commences to return. On the return stroke, the piston first closes the inlet ports and then compresses the charge, which, when the dead centre is reached, is fired, and the piston moves foward on the power stroke of the engine. While the compression stroke is being made, the valve system commences to move towards the head of the cylinder, and by the time the piston again reaches the edge of the inlet ports on the power stroke, they are closed by the sleeve-valve. During the exhaust period, the valves continue to move outwards until the limit of their travel is reached, when they return and finally close the exhaust ports shortly after the piston has commenced the induction stroke. The sequence of operations is then repeated.

By means of the construction employed, the inlet valve is not subjected to the full pressure and temperature in the cylinder, and it is claimed that the troubles which are so frequently experienced in poppet valve engines are entirely eliminated.

(*To be continued.*)

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ARMCHAIR REFLECTIONS.

By THE DREAMER.

The Pilot-Instructor.

As a type, surely the pilot-instructor stands out peculiarly and splendidly alone. I can recall no other business or profession in which those called upon to instruct pupils have to work so long, who have more need of patience and less need of nerves, who take greater risks with less thought of them, than the pilot-instructor. At his best he is a splendid type of man, and worthy of every consideration by his employers. One has but to visit the aerodrome during lesson time, to realise that instructing pupils in aviation is work that calls for a man as instructor who must be no laggard. An early-riser, in the summer-time he must be at the aerodrome soon after four to take charge of his pupils during their early morning practice. First, he must thoroughly and personally test the machines and the air to see that everything is right; then he and his assistants—generally old pupils who have obtained their *brevets* and remain at the school—proceed to instruct the beginner. In most things it is but the commencement that is difficult, the rest following on by easy stages. But in learning to fly this is not so; the commencement is comparatively easy, the lessons not only getting more difficult as they progress, but the danger increasing. Quite new hands have the various parts of the machine and controls explained to them; others more advanced are taking their first experience of a run over the ground, or making a short flight as a passenger. Some still more advanced are making straight flights a few feet above the ground, landing at the far side of the aerodrome to taxi the machine round and fly back. These are generally under the supervision of the assistant-instructors, the chief or pilot-instructor having more arduous and responsible work on hand; he is up in the air as a passenger, sitting behind or alongside an advanced pupil who has sole control of the machine, possibly for the first time.

This sounds a risky thing to do, but it has to be done sometime with all the pupils, and at some of the larger schools, having always a great number of pupils on hand, has to be done a dozen times a day. If passengers at Hendon or Brooklands ever have any qualms about going up behind a fully-qualified pilot, what must that pilot feel like when he goes up, as he does many times every day, year in and year out, behind novices? It is true that some machines have dual control, but many have not; and even where such is fitted it is by no means certain that a pilot will be able to correct the mistake of a pupil. In cases of urgent decision as to what to do, when seconds are precious, it is almost impossible that any two people, even when they are both pilots, will do the same thing at the exact moment; how very much more so is this unlikely when one is an unskilled pupil, likely to lose his head just at the time when he most needs to keep it? In this many-sided business, flying as a passenger on a machine under the control of a pupil calls for more pluck than is generally possessed by the average man. At breakfast-time, when the wind begins to gain strength, the pupils have finished till evening, unless it happens to be a very still and favourable day, when practice may go on throughout the entire day. For the pilot-instructor, however, there is no rest. In addition to instructing, he generally has also the management of the teaching side of the business, and must keep a log of all lessons and flights made by his pupils, which have to be entered up and progress noted every day.

Machines have to be overhauled and inspected to locate minor defects, and it is surprising what a lot of small damage a machine sustains when used for tuition purposes—damage which is sometimes very hard to detect, but which may lead to a very effective smash during landing later on, if not discovered and rectified.

Instructions have to be given to the mechanic to "put this right," or "strengthen that," and quite a lot of time and care is expended over this part of the business.

During the afternoon, on several days in the week, the pilot-instructor at some aerodromes must become an exhibition flyer, and provide interest and amusement for the paying public; taking part in races and doing his best to win prizes for his employers. On these days he must also be ready with his machine to take up passengers, passenger-flights continuing in the summer-time right up to dark. On other days evening school is held, and again he has not finished till long after most other people have returned home to dinner and rest.

New machines, often of a type never tried before, have to be tested, and if they will fly at all, have to be flown in order to demonstrate the success or failure of some new idea; and at such work the pilot-instructor becomes hardened to minor smashes, such as a machine falling a few feet and breaking a wheel or strut, often pitching the pilot out with more speed than ceremony.

Nowadays it is also not at all an uncommon thing for a pilot to have to travel to the Continent to take charge of, and deliver by way of the air, a new machine of a type on which he has never flown before. Cross-Channel flying, once so wonderful, is now taken as part of the day's work.

Again, personality plays a great part in the making of a successful instructor. Pupils will learn rapidly under a man of charming personality, who would perhaps be slow under another man. An instructor who can make his pupils feel that he has a genuine interest in their progress, and can smile good-naturedly at their feeble attempts, meanwhile fostering them with words of encouragement, not only makes learning a pleasure, but benefits both the pupil and the school by obtaining the precious *brevet* in the shortest possible time without sacrificing thoroughness.

In after years it must be a source of great pleasure to him when one or other of his old pupils does something of note in the world of aviation; as he can then say with all justifiable pride, "I taught him to fly."

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

ANNUAL DINNER.

THE ANNUAL DINNER will take place at the **ROYAL AUTOMOBILE CLUB, PALL MALL, LONDON, S.W.,** (by kind permission) on **FRIDAY, FEBRUARY 27th, 1914,** at 7.30 for 8 o'clock.

In order to facilitate the arrangements, Members are requested to notify the Secretary as early as possible, if it is their intention to be present.

Members may be accompanied by Ladies.

Tickets (exclusive of Wines and Cigars) 12*s.* 6*d.* each.

The following presentations will be made during the Dinner.

Britannia Challenge Trophy to Capt. C. A. H. Longcroft, R.F.C.

British Empire Michelin Trophy No. 1 and £500 to Mr. R. H. Carr.

The Marquess of Tullibardine, M.V.O., D.S.O., M.P., the Chairman of the Club, will preside, and The Rt. Hon. Winston S. Churchill, M.P., First Lord of the Admiralty, has honoured the Club by accepting its invitation.

Committee Meeting.

A meeting of the Committee was held on Tuesday last, February 3rd, 1914, when there were present: Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Griffith Brewer, Mr. E. C. Bucknall, Mr. G. B. Cockburn, Major J. D. B. Fulton, C.B., R.F.A., Mr. Mervyn O'Gorman, C.B., Mr. C. F. Pollock, Com. C. R. Samson, R.N., Mr. T. O. M. Sopwith, Mr. R. W. Wallace, K.C., and the Secretary.

New Members.—The following new members were elected:—Capt. R. K. Bagnall-Wild, R.E., Arthur Charles Bonsor, H. S. W. Eyre, and John Clifford Savage.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

727 Com. Mansfield Cumming, R.N. (Maurice Farman Biplane, Etampes). Nov. 10th, 1913.

728 Frederick George Dunn (Blériot Monoplane, Blériot School, Hendon). Jan. 23rd, 1914.

729 Herbert Ambrose Cooper (Caudron Biplane, Ewen School, Hendon). Jan. 27th, 1914.

730 Lieut. Marmaduke Henry Monckton, R.A. (Vickers Biplane, Vickers School, Brooklands). Jan. 28th, 1914.

731 Edward Fraser Norris (Grahame-White Biplane, Grahame-White School, Hendon). Jan. 28th, 1914.

Aeronaut's Certificate.—The following Aeronaut's Certificate was granted:—

38 John L. Weston.

Airship Pilot's Certificate.—The following Airship Pilot's Certificate was granted:—

23 John L. Weston.

Accidents Investigation Committee.—On the motion of Col. H. C. L. Holden, the report on the fatal accident to Mr. George Lee Temple was unanimously adopted.

(Full report will be found following these notices.)

Annual Dinner.—It was decided to hold the Annual Dinner at the Royal Automobile Club on Friday, February 27th, 1914. The arrangements were left in the hands of the House Committee.

Accidents Investigation Committee.

A meeting of the Accidents Investigation Committee was held at the Royal Aero Club on Wednesday, January 28th, 1914, at 8.30 p.m., when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. A. E. Berriman, Eng.-Lieut. E. F. Briggs, R.N., Mr. G. B. Cockburn, Major J. D. B. Fulton, C.B., R.F.A., Mr. J. H Ledeboer, Mr. W. O. Manning, Mr. Mervyn O'Gorman, C.B., and the Secretary.

Fatal Accident to Mr. George Lee Temple.—The Committee proceeded to inquire into the accident which took place at the London Aerodrome, Hendon, N.W., on Sunday, January 25th, 1914.

The following gentlemen attended and gave evidence:—Mr. W. G. Beatty, Mr. N. Chereau, Mr. R. T. Gates, Mr. A. B. Leakey, M.B., Mr. Louis Noël, and Mr. F. Handley Page.

The Committee proceeded to draw up its report, which appears elsewhere in these notices.

International Races.

The attention of Aviators and Manufacturers is particularly drawn to the following notices regarding International Races:—

THE JACQUES SCHNEIDER MARITIME AVIATION CUP AND PRIZE, 25,000 FRS.

Mr. Jacques Schneider has given a trophy of the value of 25,000 francs and a cash prize of 25,000 francs for three years for international maritime aviation competition.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Regulations for 1914.

(Translation from the French.)

The distance to be accomplished for the Jacques Schneider Maritime Aviation Competition in 1914 is 150 nautical miles.

The Competition will take place exclusively at sea on a closed circuit having a minimum course of 5 nautical miles and situated outside any port or closed harbour. Alightings are permitted.

Competitors may start at any time they wish between 8 a.m. and the official hour of sunset. Only one attempt is allowed, and before starting a competitor must notify the officials of his intention to take part in the Race. Two copies of the final regulations will be handed to all contestants, and one copy of these regulations, signed as approved, must be handed by the competitor to the official before starting in the competition.

The competitor will then navigate his machine over the line of departure, rise, and make a tour of the course with at least two alightings on the water at points indicated by the officials. This having been accomplished, he must proceed without alighting to make the first lap of the circuit, clearing the line of departure in full flight. He must then continue the course until the whole distance has been completed, when the arriving line must be passed in full flight and the alighting made on the course.

The Race will take place at Monaco on April 20th, 1914.

The following entry has been received:—

Sopwith Aviation Co., Kingston-on-Thames.

GORDON-BENNETT AVIATION CUP.

Rules for 1914.

The Race for the Gordon-Bennett Aviation Cup will take place in France this year.

The Race will be over a distance of 200 kilometres on a course having a minimum distance of 5 kilometres.

Competing aircraft, before taking part in the Race, will have to pass the following preliminary test:—

A flight in a straight line out and back of about 2 kilometres, without touching the ground, at a constant height of not more than 30 metres. The speed of the test shall be the mean of the speeds of the flights out and back, which must not exceed 70 kilometres per hour. In this test the aircraft must carry sufficient petrol and oil to cover the whole course of 200 kilometres. Three attempts will be allowed to each competitor.

After the qualifying tests have been passed, no modifications may be made to the aircraft. Repairs will only be allowed with the permission and under the control of the Officials.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

The following entries have been received:—

A. V. Roe and Co., Manchester.

Sopwith Aviation Co., Kingston-on-Thames.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

ACCIDENTS INVESTIGATION COMMITTEE OF THE ROYAL AERO CLUB.

REPORT No. 19.

Report on the Fatal Accident to Mr. George Lee Temple when flying at the London Aerodrome, Hendon, London, N.W., on Sunday, January 25th, 1914, at about 4 p.m.

Brief Description of the Accident.—Mr. George Lee Temple was flying a Blériot monoplane, fitted with a 50 h.p. Gnome motor, at the London Aerodrome, Hendon, London, N.W., on Sunday, January 25th, 1914, at about 4 p.m. He had been in the air ten minutes, and had reached a height of approximately 500 ft. He then descended to about 150 ft., after which he flew horizontally for some 200 yds. During the descent he was heard to switch his engine on and off. At the end of the horizontal flight, the engine was heard to cease firing, and the aircraft thereupon dived as if the pilot intended to make one of his usual steep descents, prior to landing. Instead of flattening out, however, the aircraft progressively turned over beyond the vertical and alighted on its back. The pilot was found strapped in the seat and clear of the ground. When released from the machine, the pilot was dead, and his neck was found to be broken.

Mr. George Lee Temple was granted his Aviator's Certificate No. 424, on February 18th, 1913, by the Royal Aero Club.

Report.—The Committee sat on Wednesday, January 28th, 1914, and received the report of the Club's representative, who was present at the time of the accident. Evidence was also given by eye-witnesses of the accident, and the medical officer who made the post-mortem examination.

From the consideration of the evidence, the Committee regards the following facts as clearly established :—

(1) The aircraft was built early in 1912.

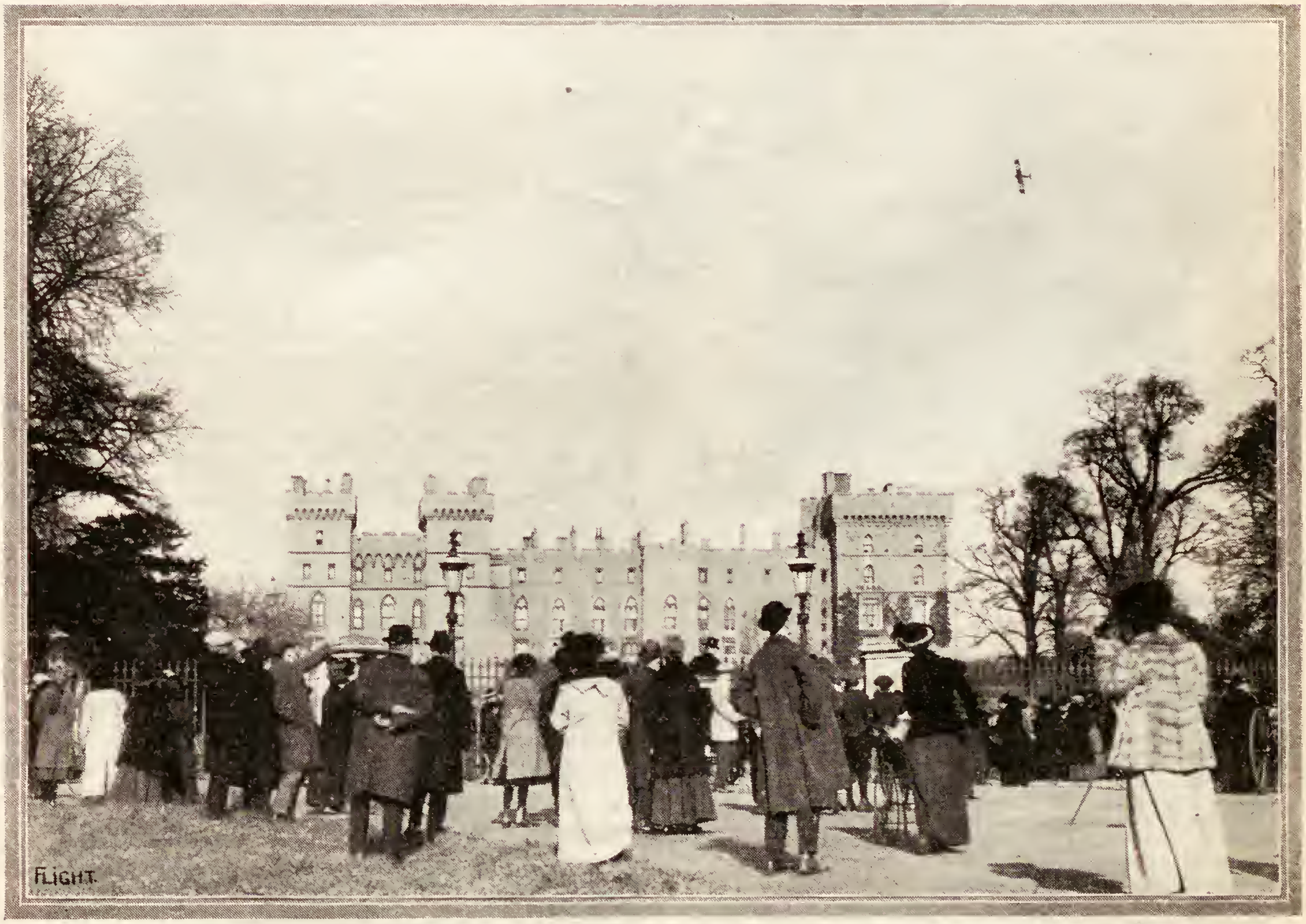
(2) All the controls were in working order.

(3) The then state of health of the pilot as disclosed by the post-mortem examination was such that he incurred grave risk by flying at all. The evidence of the doctor who examined the pilot and subsequently carried out the post-mortem was to the above effect. The doctor also stated that the pilot's neck was broken in such a manner as to indicate that the neck muscles were relaxed at the moment of breaking, pointing to the probability that the pilot was unconscious at that time.

Opinion.—The committee is of opinion that the condition of the pilot's health, as disclosed by the medical evidence, coupled with the fact of the gradual turning over of the aircraft in its descent to the ground, point to the pilot having lost consciousness just before or at the commencement of the dive, and that this loss of consciousness and control was the cause of the accident.

Mr. Hamel Flies Before the King.

Having received a command to give an exhibition before Their Majesties the King and Queen, Mr. Hamel flew from Hendon to Windsor on Thursday of last week, arriving at the Castle at about 12.45 p.m. After flying for about ten minutes over and round the Castle, Hamel alighted on the East Terrace. He was presented to Their Majesties, and the King and Queen inspected the machine. The Royal party included Princess Mary, Prince Henry and Prince John. The news of Mr. Hamel's intended visit leaked out, and a large crowd gathered within the Castle grounds and at other vantage points. Mr. Hamel had the honour of an invitation to luncheon at the Castle. At 2.30 p.m. he was again in the air giving a demonstration of high flying before Their Majesties, and half an hour later he disappeared in the direction of Hendon; and upon this occasion Mr. Hamel did not loop the loop, but this part of the programme was carried out during another visit to Windsor on Monday. A few minutes after twelve Mr. Hamel arrived on his 80 h.p. Morane-Saulnier machine and *vol plané* down to the East Lawn, where Their Majesties the King and Queen, with the Princess Royal, Princess Maud and Prince John were waiting. At 12.30 p.m. Mr. Hamel ascended again, and in the course of a 17-min. flight made fourteen loops. After luncheon at the Castle Mr. Hamel gave another display of looping before returning by the air-way to Hendon.



LOOPING THE LOOP BY COMMAND OF THE KING.—Mr. Gustav Hamel upside down over Windsor Castle before the King on Monday. Our photograph shows the spectators watching the evolutions from the Long Walk.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—On Monday, last week, a thick fog prevailed. Mr. Kemp made two short flights on a new BE 70 Renault, built by Messrs. Hewlett and Blondeau. Although this was the first time the machine had been up she flew well.

Tuesday again there was fog. Mr. Kemp was up again on BE, flying well nearly all morning. In the afternoon Lieut. Briggs was on Blériot 39 making numerous flights lasting till nearly dusk. Lieut. Rainey took up Dep. 36 and made one fine long flight, handling his machine nicely, and making well banked turns.

Wednesday saw all pilots up. Lieut. Pierce on S. 65 with Lieut. Clarke Hall. Lieut. Osmond with Lieut. Ireland on S. 64. Lieut. Collett on Avro 41 for two short flights. Capt. Kilburn on S. 63. Lieut. Marix on Sopwiths 27 and 104, making a long flight on each. Lieut. Davies on the new BE biplane, two good flights. Asst.-Paymaster Finch Noyes numerous short flights on H. Farman 31. Lieut. Rainey a flight on S. 63. Lieut. Briggs flying on Blériot 39. Capt. Courtney on S. 63, and also on H. Farman 31.

Thursday was again a busy day in spite of a very tricky wind. Com. Samson made some good flights on S. 10. Asst.-Paymaster Finch Noyes numerous short flights on H. Farman 31, Lieut. Marix flying well on Sopwith 104, taking Sub-Lieut. Fowler for a long trip. Lieut. Littleton on Avro 16 and M. Farman 70. Capt. Courtney some good flights on S. 63. Lieut. Collett on Avro 41. M. Farman 70 and S. 65 were taken up by different pilots. Lieut. Osmond on S. 28. Lieut. Briggs made an excellent flight on the Blériot 39.

Friday there was an absolute gale, and only Lieut. Pierce was up on S. 65.

Saturday was very windy, Lieut. Rainey up with Telegraphist Sparks as passenger on S. 64. Lieut. Edmonds on S. 28. Lieut. Marix piloted the Sopwith 104 for a long cross-country flight accompanied by Lieut. Osmond. Comr. Samson made a long flight on S. 10.

Mr. Edward Fraser Norris, who passed for his Royal Aero Club pilot tests at the Grahame-White School on a G.-W. biplane last week. Mr. Norris is just eighteen years and two months old.

Civilian Flying.—On Tuesday last week, Mr. Gordon Bell up on the Short tractor 100 h.p. Gnome. After making a short circuit of the aerodrome he flew the machine to the Naval Station at the Isle of Grain.

Mr. Raynham visited Eastchurch on Thursday on the latest Avro 80 h.p. Gnome from Brooklands. Coming down for a short rest and a refill of petrol, he then made a fine show of banked turns and flying at low speed. He was flying as smoothly and as flat as though he were running all out. After a little more trick flying he returned to Brooklands. On Saturday, Mr. Gordon Bell was up for two or three good high flights on a new Short tractor 100 h.p. Gnome, taking Mr. Fairey as passenger.

Brooklands Aerodrome.

FULL advantage was taken on Monday, last week, of the fine weather (the wind not registering more than 12 m.p.h.) by the Bristol and Vickers schools both morning and afternoon. In the morning Mr. Barnwell was out on the Vickers gun-carrier, on which he flew over to Farnborough, leaving the machine there in readiness for a test the next day. Messrs. Elsdon, Webb and Hinshelwood were flying respectively on the No. 5 Vickers monoplane. In the afternoon, Herr Roempler made a number of flights, both solo and with passengers. Mr. Knight and Mr. Hinshelwood were out on the No. 5 Vickers monoplane.

On Tuesday the weather was again good, both the Vickers and Bristol schools being busy in morning and afternoon. In the morning, Mr. Raynham (with Mr. Toop as a passenger) flew over to Hendon on the 80 h.p. Avro biplane. Herr Roempler made a number of solo flights, afterwards taking a passenger up to an altitude of 1,000 ft. In the afternoon Mr. Raynham returned from Hendon at a height of 4,500 ft., descending in spirals with engine shut off and making a good landing in front of his shed. Mr. Elsdon was out on the No. 5 Vickers monoplane, on which machine Messrs. Webb and Hinshelwood made some flights, the latter at 1,000 ft. Mr. Raynham made some good solo flights on the 80 h.p. Avro.

The weather was less favourable Wednesday, the wind blowing up to 21 m p.h., but good work was done by both the Vickers and Bristol schools. Mr. Vincent Waterfall was flying well for about half an hour on the Martinsyde monoplane. Mr. Hamel, with his manager, Mr. W. E. de B. Whittaker as a passenger, arrived from Hendon on his Morane-Saulnier monoplane, on which he gave some fine exhibition flights. Mr. Barnwell was flying solo and with a passenger on a Vickers biplane. Mr. Monckton passed his *brevet* tests in good style on a Vickers biplane, rising to 500 ft. in the altitude test.

On Thursday the wind was a little stronger, attaining a velocity of 23 m.p.h. Mr. Barnwell was on a Vickers biplane. The crankshaft of Mr. Hamel's Morane-Saulnier monoplane having given trouble, Mr. Raynham took him as a passenger on the 80 h.p. Avro to Hendon to borrow Mr. Grahame-White's 80 h.p. tandem Blériot, in order that Mr. Hamel might fly to Windsor, whither he had been "commanded" to give a flying exhibition before His Majesty the King. Ten minutes only was taken for the trip to Hendon by Mr. Raynham on the 80 h.p. Avro biplane, Mr. Raynham returning alone to Brooklands, and afterwards flying with his mechanic, F. G. Clifton, to Eastchurch, this journey only taking 35 mins., or at the rate of 108 m.p.h., a splendid performance reflecting the greatest credit on pilot and machine alike. Mr. Raynham returned from Eastchurch alone. Mr. Dukinfield Jones was testing the Isaacson engine of his Flanders biplane.

The force of the wind varied on Friday up to 32 m.p.h., and only two machines were out, Mr. Barnwell with a pupil as a passenger on a Vickers biplane, and Mr. Dukinfield Jones for several circuits on his Flanders biplane. Mr. Sidney Sippe arrived at the Bristol school to take charge in place of Mr. Merriam, whose many friends will sympathise with him in his accident, from which he is gradually recovering, but which will necessitate a few weeks' rest.

On Saturday, Mr. J. Alcock was testing the Sunbeam engine, which had been dismantled and overhauled, and was found to be running well up to expectations, on Mr. Coatalen's Maurice Farman biplane. Mr. Raynham made a number of good flights on the 80 h.p. Avro.

On Sunday the wind was fresh and bumpy, only 3 machines being out. Mr. Raynham was first to test the strength of the wind, quickly climbing to an altitude of 4,000 ft., the machine drifting backwards owing to Mr. Raynham incessantly switching the engine on and off, thus affording a very fine spectacle in the air. In the ballot for the free passenger flights, a second draw was necessary owing to no claimant putting in an appearance at first, the ultimate winner being Miss Mather, of Lunesdale, Beckenham, whom Mr. Raynham took up to an altitude of nearly 2,000 ft. on the 80 h.p. Avro biplane, a splendidly judged landing being made in front of the shed. Mr. Dukinfield Jones made a number of circuits on his Isaacson engined Flanders biplane, and Mr. Pixton was busy testing a 100 h.p. Green engine on a Sopwith biplane.

During next week Mr. Sippe expects delivery of an 80 h.p. (old type) Bristol tractor biplane, which he will use for the next fortnight until the arrival of an 85 h.p. Gnome-engined biplane of the up-to-date type. Two new Sopwith biplanes are also expected.

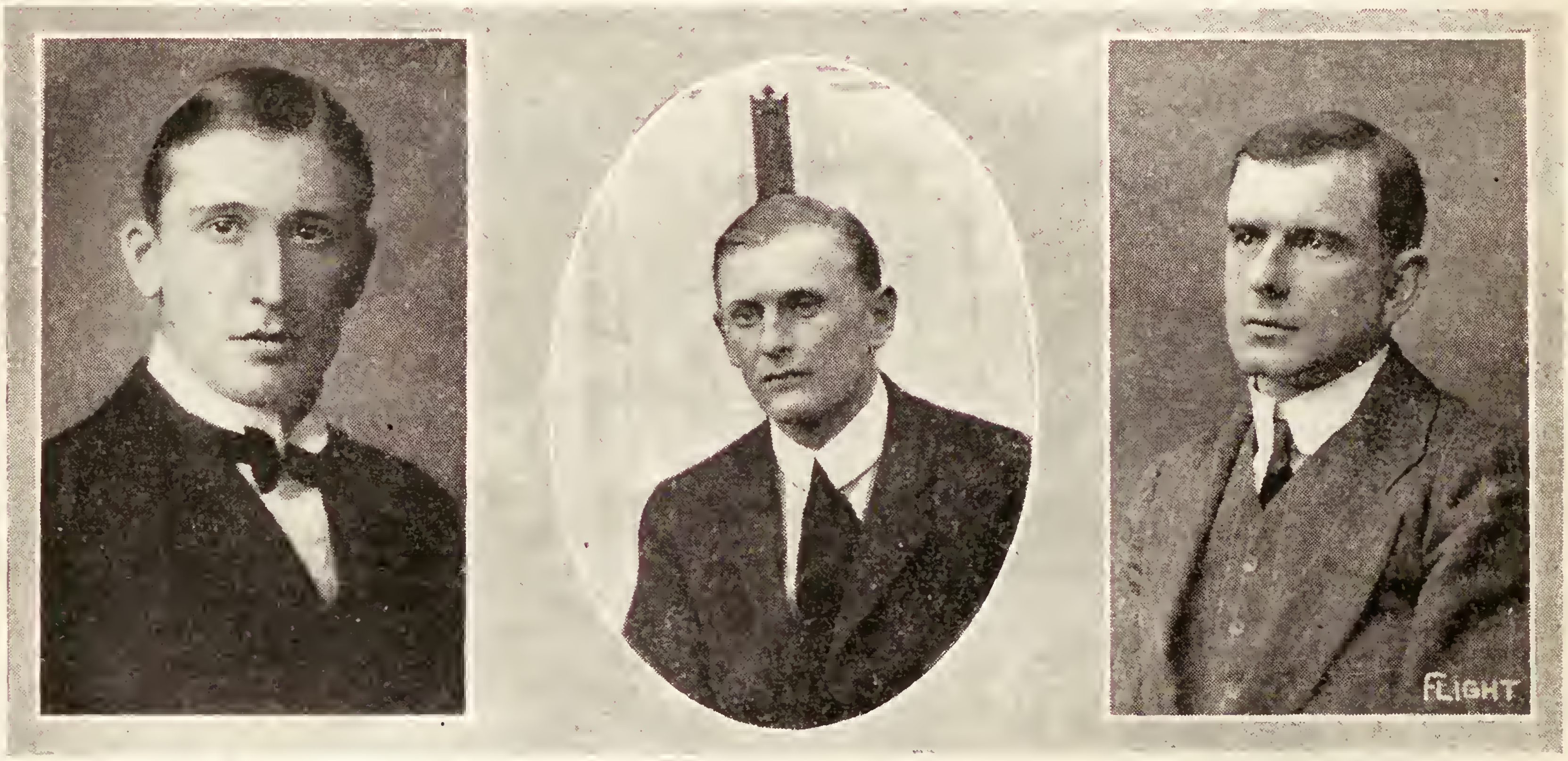
Bristol School.—Halford made two test flights, Monday, last week, and then took Air-Mechanic Locker for several flights, pupil having complete control. Mr. Racine-Jacques made three solo flights, after which Halford gave him tuition in *vol plané* landings. Halford gave three more tuition flights to Air-Mechanic Locker. In the afternoon, Halford made a test flight with Air-Mechanic Locker as passenger, following which Mr. Racine-Jacques took over the machine and practised landing. Halford then took up in succession Lieut. Ames (three flights), Air-Mechanic Locker (three flights) and Lieut. Fraser (once), all pupils sitting in the pilot's seat practising landings. Mr. Racine-Jacques finished the day's work by making a very fine solo flight.

The strong wind Tuesday morning prevented any flying, but dropping during the afternoon Halford gave two tuition flights to Lieut. Lawrence, while Mr. Racine-Jacques flew two solos. Halford then went up with Air-Mechanic Locker and Lieut. Lawrence, dusk preventing any further flying.

Wednesday, Halford first tested conditions, when the fog had cleared, taking Air-Mechanic Locker as passenger, then giving this pupil tuition on straights and landings, after which he flew for numerous straights, showing good judgment. Halford sat behind Lieut. Lawrence on three flights, and Mr. Locker made two more solos. Halford gave passenger tuition to Lieuts. Ames and Lawrence, but the strong wind prevented any more flights being made.

Thursday, Friday, and Saturday too windy for tuition.

Vickers School. — Monday, last week, Instructors Barnwell, Knight, and Elsdon on biplanes with Lieuts. Prichard, Monckton, and Crosbie and Mr. Hurst. Lieut. Monckton solo. Messrs. Hinshelwood and Webb solos on No. 5 mono. Mr. Creagh solo on biplane. On Tuesday, Knight and Elsdon on biplanes with Lieuts. Crosbie and Prichard, and with Messrs. Creagh and Hurst. Lieut. Monckton solo. Messrs. Webb and Hinshelwood on No. 5 mono. Barnwell on biplane with Lieut. Crosbie and Mr. Creagh.



Sub-Lieut. S. R. W. Smyth Pigott, R.N. **Lieut. J. T. Cull, R.N.** **Lieut. H. E. M. Watkins, R.N.**
Three more pilots who have recently taken their Royal Aero Club certificate at the Bristol Brooklands School under the tuition of Mr. Merriam.

Knight and Elsdon on biplanes with Lieuts. Prichard and Crosbie Wednesday. Lieut. Monckton on biplane for *brevet*, getting through in good style. Barnwell with Lieut. Lee-Jackson (new pupil). Mr. Creagh solo circuits on biplane. Knight with Lieut. Lee-Jackson.

Thursday and Friday, Barnwell on biplane with Capt. Ross Hume (new pupil) in bumpy wind.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Messrs. Cripps, Lillywhite, Norris, Bjorkland, solo circuits, spirals, &c. Messrs. Eldridge-Green, Graham, Parker, Lindop, Barrs, Moore, straights with Instructor Manton in passenger seat.

Tuesday, Messrs. Moore, Parker, Cowley, Eldridge-Green, Graham, Barrs, Piercy, Lindop, straights with Mr. Strange in passenger seat. Messrs. Carr, Norris, Cripps, Lillywhite and Bjorkland solo circuits, figures of 8, &c.

Wednesday, Messrs. Piercy and Graham straights with Mr. Strange in passenger seat. Messrs. Lillywhite, Bjorkland and Norris, circuits, &c. Mr. Norris afterwards going in for and passing *brevet* tests—he is presumably the youngest certificated pilot, being 18 years and 2 months old.

Blériot School.—Last week, after several good flights, Capt. D. Burdett successfully passed all "Certificate" trials except altitude, having to stop on account of late evening and darkness setting in. Mr. E. Gower, certificated pilot, made several practice flights during the week. Instructor: Mr. Jules Teulade.

W. H. Ewen School.—On Monday last week school was out at 8.30 a.m. Test flight by M. Baumann on *brevet* machine. Mr. Cooper then did circuits and figures of eight, and Mr. Murray circuits and landing practice. On 35 h.p. Caudron No. 1, Mr. Goodden instructing, Mr. Garvin was rolling, and Mr. Bankes-Price did straights. During afternoon, after test flight by M. Baumann, on *brevet* machine, Mr. Cooper went through the first half of his *brevet* tests, flying high and very steadily.

At 10.30 a.m. on Tuesday Mr. Goodden was making a test flight on 35 h.p. Caudron No. 1, after which Mr. Bankes-Price did straights and Mr. Garvin rolling practice. At 3.15 p.m. Mr. Cooper went through his altitude test for the R.Ae.C. certificate, reaching 700 ft. and making a good *vol plané* with an excellent landing. Mr. Goodden also out with 35 h.p. Caudron No. 1, Mr. Garvin rolling and short flights.

During the rest of the week the weather was not favourable for school practice.

Hall School.—Monday last week, in morning, H. Gering as passenger studying controls on Avro at 1,600 ft. In afternoon, Messrs. Gering, D'Arcier and Brookes on No. 2 Caudron doing several straights each. All getting on well. Later H. Gering good hops.

Denys Ware left school Tuesday to fulfil his military duties at Farnborough. Messrs. A. Brookes, H. Gering and D'Arcier out on No. 2 Caudron, three straights each. H. Gering making good progress, leaving ground on several occasions. In afternoon, A. Brookes, D'Arcier and H. Gering three straights apiece, the former two with tail well up, and the latter hops.

Gering did good straight alone Wednesday, then Messrs. D'Arcier two straights, Brookes one and Gering one. Wind prevented any further practice.

Thursday, J. L. Hall exhibitions on Avro in strong wind at 2,000 ft. Friday gale.

Saturday, school closed as a mark of respect for the funeral of the late G. L. Temple.

Sunday, gale.

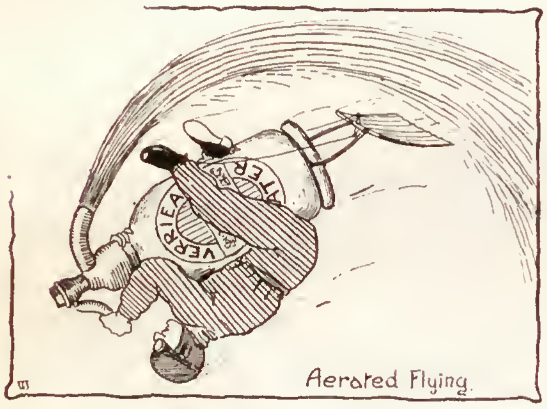
Salisbury Plain.

Bristol School.—Monday, last week, after test flights had been made by Jullerot, Mr. Tod went for a solo on the monoplane. Merriam then gave tuition to Capt. Wallcot on landings, afterwards taking Mr. Stutt, this pupil having complete control. Merriam then took Capt. Wallcot for a trip in the tractor biplane, during which Voigt gave tuition to Mr. Stutt (three flights) and Capt. Wallcot (two flights). In the afternoon Voigt again took Mr. Stutt for a long cross-country flight, while Jullerot gave tuition in *vol planés* and landings to Capt. Wallcot.

The strong wind prevented any tuition being given on Tuesday, whilst Wednesday, Thursday, Friday and Saturday, no tuition was possible owing to the high winds and rain.

EDDIES.

I AM not one to walk in fear and trembling for the welfare of a great industry because someone claims to have invented a contrivance that is going to knock the whole thing into the *Ewigkeit.* It is natural that in a new business like flying, great men will arise from time to time and evolve ideas that will simplify or make more safe the heavier-than-air machine; but in my blind conservativeness I adhere to the opinion that for quite a long time to come flying will be carried out mainly by the aid of wings, engine and propeller, arranged very much as in the present types of aeroplanes. To make an aeroplane fly without an engine or propeller and be safe in bad weather is the aim of Mr. K. de Proszynski, according to the *Daily Mirror.* This gentleman says flying is too easy, and that is why we have so many fatal accidents. I don't quite see myself how, if it is going to be harder to fly under the new principle, it is also going to be more safe. If it is harder, it seems to me that there will be more likelihood of making mistakes, and mistakes generally lead to accidents.



Aerated Flying.

According to my source of information, Mr. Proszynski has said that within three months he will produce an aeroplane without engine or propeller, and will give a flight demonstration with it on a flying ground near London.

> "The apparatus takes the form of a large cylinder that contains petrol, gas, and air. Apart from this cylinder and the petrol tank there is no machinery of any kind, with the exception of a mechanical arrangement to increase or decrease the issue of gas to rise or descend, and increase or decrease the speed. There is no steering gear, the steering being done by means of the valves in the cylinder. The action of the cylinder also secures stability for the aeroplane by creating an artificial air cushion."

If we are to progress on these lines, I can see the day, not far off, when a pilot will loop the loop on a syphon of soda-water.

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At a meeting of the Bridlington Town Council recently a petition was received from the local clergymen and ministers referring to the proposed flying exhibitions at Bridlington during the coming summer. The petitioners requested, in the interests of religion and morality, "that a clause should be entered in the agreement that there should be no flying on Sundays under any circumstances." The petitioners felt confident that the Council would comply with their request, "especially with a view to the protecting of our young people from the moral perils of Sabbath desecration." I take no side with regard to Sunday flying. I have my own opinion on the matter; but if any towns feel that they do not wish it to take place in their vicinity they have every right to do their best to prevent it. I do, however, like consistency in things of this description. If the powers that be in Bridlington are so conscientious that they take objection to Sunday flying for the reasons that they put forth, I take it that they are people who wish to influence the young people to lead entirely upright, straightforward lives, and to do nothing that would prevent them looking back on their past lives and saying they had always done the right thing according to their light. It is simply the principle of the thing that I am concerned with. It would be interesting to learn how these good people of Bridlington can reconcile the above with the following.

> "The Parliamentary Committee recommended the appointment of a local man as building inspector. Mr. Stuart, a member of the committee, said a Halifax applicant had the best credentials and would probably have been appointed had it not been for political, or chapel, or outside influences. He said that as a Liberal, and the majority of the committee were Liberals. How could they criticise their opponents if they acted as the resolution recommended?"

That's right! Mr. Stuart, if your big men are going to take unto themselves pedestals, let them be worthy.

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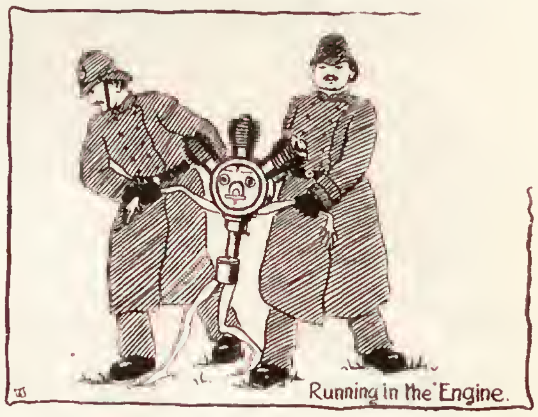
It is strange, even in these days of knowledge of matters aeronautical by the general public, what queer things one sometimes overhears at aerodromes. At Hendon the other day Marty was giving his engine a warm-up at the far end of the enclosure, and as usual there was a rush to the spot. The usual racket and clouds of smoke followed, but meanwhile nothing could be seen of the machine owing to the crowd of people standing round. One lady, evidently much concerned, asked her companion what was the matter, and on being told that it was only somebody "running his engine in," failed to grasp what was meant, but appeared to have thoughts of a running-in of quite a different nature. By the way—I wonder why it is that so few of our pilots give their engine a little turn now before starting away. The general rule now seems to be to come out, swing the propeller and mount at once. I suppose it is all right; but—now that most pilots do what at one time was only done by Hamel, that is, to start a banked turning climb immediately on getting off—if an engine did happen to hesitate, there might be trouble.


Running in the Engine.

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At Hendon, on Saturday last, I heard that cheerful optimist, the megaphone man, make an announcement I had not heard for a very long time: that, owing to the high wind, the speed contest could not be held. It used to be a quite familiar announcement during 1912; but it takes a good deal of wind to stop pilots now. Nevertheless, Saturday was not a day fit for flying at all, and it was quite right to withhold the contest. Yet it sounded rather peculiar for him to announce, practically in the same breath, "passenger flights can now be booked." I don't know that many passengers took advantage of the gale to gain some experience of flying in rough weather; I only saw one go up with Noel, and that might have been a joy-ride. Whether or no, in this particular instance there was quite enough thrill in it for those looking on from the ground. Noel taxied out and turned to face the wind and the sheds. Why the machine would not climb better it was difficult to judge, but he had quite a job to get her much above the sheds. Meanwhile she was drifting horribly, and canted and rolled about in a way not pleasant to see. A sudden left-hand turn with the wind resulted in a ghastly downward side swoop, and the machine was quite near enough to the earth when Noel was able to flatten out and set her to climb again, which, for some unaccountable reason, she did better with the wind than against it. If the passenger was out for thrills he was not disappointed, if he knew enough to realise it. The blowing over of Marty on the Morane-Saulnier immediately on leaving the ground showed the strength of the wind.

"WILL O' THE WISP."

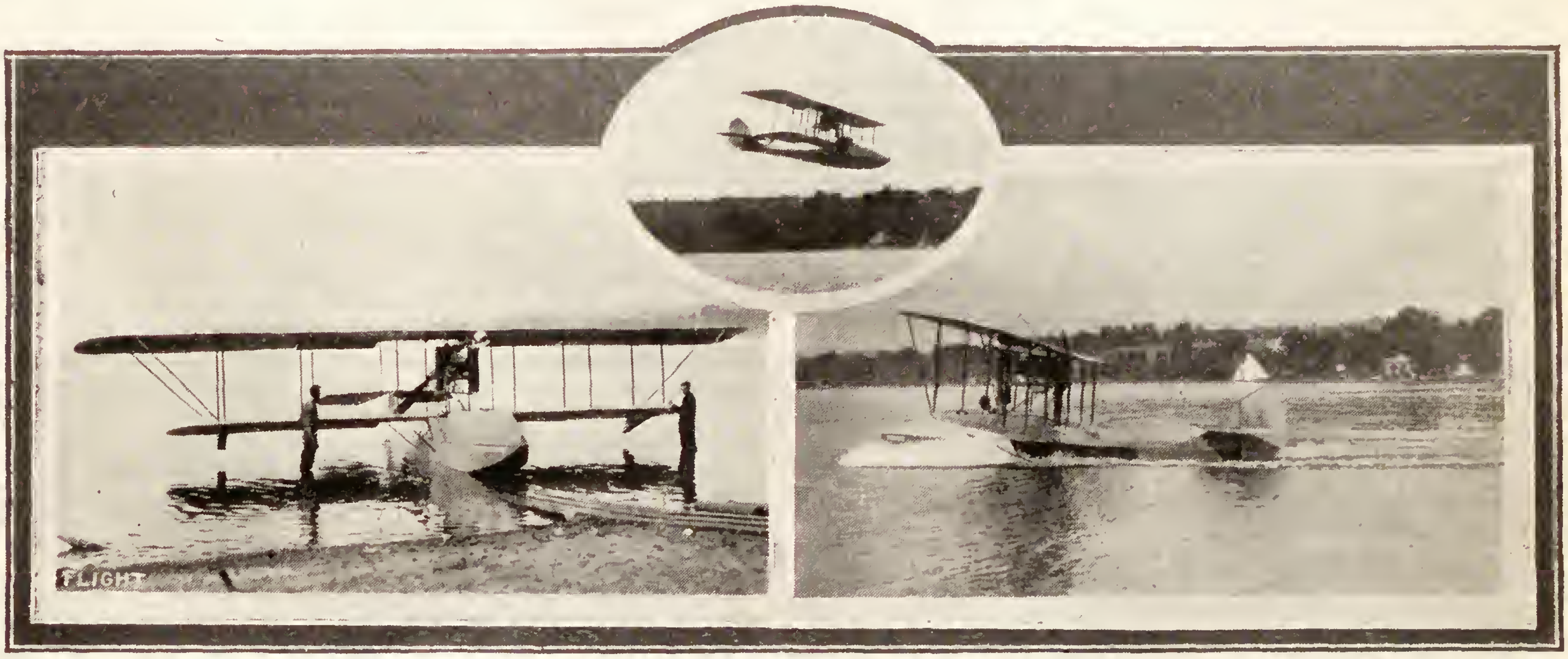
THE THOMAS FLYING BOAT.

DURING the past season the Thomas Brothers Aeroplane Co., of Bath, N.Y., turned their attention to the construction of flying boats with marked success. The biplanes produced by this company in the past have held the American Endurance Record for pilot and passenger, and also the American altitude record for pilot alone (12,575 ft.). It should be noted that the machines used for these flights were standard models.

The flying boat, of which we publish illustrations herewith, has been flown extensively with great success, and has, in the hands of Mr. Walter E. Johnson, chief pilot of the Thomas Brothers Aeroplane Co., proved successful as a pleasure craft for use on inland waters. Mr. Alfred W. Lawson, of New York City, has purchased one of these boats for private use between his residence on the Hudson River and his office in the City.

The body of the boat acts as a combined float and *fuselage*, in which are the pilot's and passenger's seats arranged side by side in a very roomy cockpit. They are well protected against the rush of air, as well as against flying spray when the boat is taxying on the water, by a shield rising from the nose of the boat and extending back to the pilot's seat. The boat consists of a very strong framework of wood, covered in front with a metal skin, and in the rear portion with a specially prepared fabric, the whole being painted with waterproof paint. The rear portion of the boat, which carries the tail planes, may be detached as a separate unit in machines which have to be packed for shipment.

Mounted on strong bearers attached to the struts of the inner *cellule*, is the engine; a 90 h.p. Austro-Daimler directly drives the propeller, which is placed behind the main planes, the rear portion of which are cut away in order to provide clearance for the propeller. As will be seen from the accompanying photographs, the upper plane has a slightly larger span than the lower plane. Lateral balance is maintained by two large *ailerons* of the compensated type, while directional control is effected by means of rudder and elevator of the usual type, carried on the rear extremity of the boat. Two small floats on the tips of the lower plane protect that member against contact with the water. Below we give a table of the leading dimensions of the machine:—



THREE VIEWS OF THE THOMAS FLYING BOAT.—Left: The machine at rest on the water. Right: Starting. Inset: The boat in flight.

Upper plane ...	43½ ft. span	Length of body ...	24 ft.
Lower ,, ...	33½ ,,	Weight, empty ...	1,180 lbs.
Chord	5½ ,,	Useful load ...	400 ,,
Gap	5½ ,,		

Speed with 2 people and 3 hours' fuel: 60·1 m.p.h.
Alighting speed: 40–45 m.p.h.

THE ROYAL FLYING CORPS.

The following appointments were notified in the *London Gazette* of the 3rd inst.:—

R.F.C.—Military Wing.—Capt. Archibald C. H. MacLean, the Royal Scots (Lothian Regiment), is advanced from Flying Officer to Flight Commander, on appointment to the Central Flying School as an instructor, *vice* Major J. D. B. Fulton, C.B., Royal Artillery, dated December 18th, 1913.

Special Reserve of Officers.—Second Lieut. (on probation) Robert W. R. Gill resigns his commission. Dated January 27th, 1914.

Second Lieut. Victor Annesley Barrington-Kennett, from unattached list, Territorial Force, to be Second Lieutenant. Dated February 4th, 1914.

The Calshot Naval Air Station.

FOLLOWING the procedure adopted in connection with the Isle of Grain station, the Admiralty has given orders that the coastguard station at Calshot is to be appropriated for the Naval Wing of the Royal Flying Corps as part of the Calshot Naval Air Station, and from the 10th inst. the coastguard buildings will be occupied by the Air Station Staff.

More Shorts for the Naval Wing, R.F.C.

THE equipment of the Naval Wing of the Royal Flying Corps has received an addition in the shape of three new seaplanes, designed and built by Messrs. Short Brothers. A fourth machine of similar type commenced its official trials last Saturday.

SOME NOTES ON THE PRINCIPLES OF STEERING AND STABILITY IN AEROPLANES.

By MAURICE J. DODD, Assoc.M.Inst.C.E.I.

THE warp *cum* rudder system of steering has come in for such severe criticism in recent Press articles and pronouncements that I am encouraged, once more, to make an effort to put even a small nail in its coffin.

I think it was on reading in the first or second issue of FLIGHT a comparison of the Wright and Voisin machines that I first became impressed with the necessity of improving on that system, if serious progress were to be made in flying. It was stated, on the authority of Wilbur Wright himself, that the machine was held in the air by the aeronaut, and that it possessed no inherent or natural stability. I became very interested in the subject, and began to study the flight of birds. I shot some rooks, seagulls, jackdaws, &c., and made careful measurements of the wings. At first, the bird's wing was certainly an enigma, but I made a careful study of every detail, and slowly, one by one, the reason and object of each peculiarity that I noticed revealed itself, each one filling me more and more with admiration for the marvellous excellence and efficiency and beauty of the whole design. In the early part of 1910 I had a fairly well-established sense of the natural system of controls, and in June of that year I patented controls based on the principles of the bird controls. At the same time I patented a type of "bird wing," which I believed, and still believe, to have quite remarkable natural stability. I made some endeavours to introduce the subject to manufacturers—my receptions were sometimes courteous, sometimes not, but always frigid. Manufacturers are naturally shy of new theories, no matter how impressive, that have not been proved in actual flight. That proof I was not in a position to give them. Circumstances militated against any further attempts to develop the matter; but in the light of recent evidences of the trend of opinion, I venture to submit the following notes.

For convenience of reference, I propose to number my paragraphs consecutively. I feel that apology is needed for what may appear to be a too pronounced dogmatism, but I hope it will be sufficient to say that these notes represent conclusions at which I arrived rather than arguments or assertions of absolute fact. I am a poor controversialist, but I shall deem criticism a favour.

1. Steering by vertical and horizontal rudders, *i.e.*, organs set at a distance from the main supporting surfaces and working through considerable leverage, is bad in principle.

2. The effect of such organs is to force the machine on to a path other than the natural path, which is determined by the *static* conditions underlying its design.

3. A machine flying in an established path has considerable inertia. The forcible alteration of the path by the use of a horizontal rudder of big leverage, suddenly pulled into the full air blast, momentarily increases the pressure on the planes to an extent that is extremely difficult to measure.

4. In a machine designed to fly at an angle of, say, 5°, a very slight movement of the elevator is sufficient to increase the angle by, say, 2½°. The pressures increase by 50 per cent., and coming with such rapidity the effect, as of a live load, may be taken to be doubled; so that at the moment the pressures on the planes have been increased by something like 100 per cent.

5. Shocks of this character are bad for lightly-built structures, such as aeroplanes, and militate against efficient design.

6. The amount of success already achieved by the use of warp and rudder controls demands more delicate handling and more concentration on the part of the pilot than is safe or wise to expect.

7. Rough or too sudden use of the elevator results either in stalling or diving—either is dangerous.

8. It is part of the system that the pressure reaction on the elevator or rudder is used to force a change of the attitude of the machine: *i.e.*, the method is *kinetic*; the efficiency of these organs, therefore, depends on the speed.

9. Both vertical and horizontal rudders lose all their power on such critical occasions as when a "stall" occurs. The aviator is left perfectly helpless, and unless he is high enough, and has nerve and skill enough to follow Pégoud's plan, a bad smash must result. The same applies in a lesser degree to the cases of starting and finishing a flight. Where quick responsive control is of the most importance horizontal and vertical rudders are less effective.

10. These facts are gradually coming to be recognised by aviators and those who have made a scientific study of flight:—"If a study be made of the enormous number of fatalities during 1913, one is struck by the extraordinary number of unexplained nose dives and cases of pilots being thrown from their machines while in flight." (Gordon-England, FLIGHT, November 1st, 1913).

11. The horizontal rudder produces two rotations, stalling and diving. "Of the two a stalling rotation is more dangerous for two reasons, (*a*) because the pressure angle is increased, which increases the resistance, and, unless the thrust of the screw is increased proportionally, the speed is decreased. This is always dangerous, and many accidents have been due to stalling; (*b*) if the angular velocity of a stalling rotation is high there will be a rapid increase of pressure per square foot on the supporting surfaces, and this sudden strain may cause the machine to collapse. Several deaths have been due to this cause. . . . If the angular velocity of the diving rotation is too high a *downward* pressure is produced upon the supporting surfaces which may cause their collapse downwards."—(Merrill, FLIGHT, November 15th, 1913.)

12. These results are independent of those produced by variation of the positions of pressure centres following variations of the angles of incidence. They are, as a matter of fact, magnified when considered in this connection—but these latter results are properly considered under the head of stability.

13. "Thus it is that when an aeronaut acts to initiate a *vol plané*, or to set his machine for a very rapid descent, especially where high velocity is intended, that the greatest danger from catastrophic instability is to be feared. It seems that there should be some check or limit prescribed to the turning downward of the tail members."—(Lanchester, FLIGHT, November 8th, 1913.)

14. "When at a height of about 300 feet he was observed to be descending at a very steep angle. Shortly after this he fell out and was killed. . . . There was practically no wind at the time of the accident. . . . When examined after the accident all the controls were found to be in order. . . . The Committee is of opinion that the accident was due primarily to the pilot forcing the aircraft down at too steep an angle, resulting in his falling forward on his control and accentuating the steepness of the descent."—(Accidents Investigation Committee's report on the accident to Major Merrick, FLIGHT, November 1st, 1913.)

15. "As in all other phenomena connected with flight, the time element is a factor which determines the nature of the result which follows the use of the rudder. In a machine in which the moment of inertia about the longitudinal axis is greater than the moment of inertia about the vertical axis, too quick a rotation about the vertical axis will spin the machine without giving it time to bank, and skidding will result."—(Merrill, FLIGHT, November 15th, 1913.)

16. This is the case with the great majority, if not all, the machines in use at the present time. The weights disposed round the longitudinal axis (wings, stays, &c.) are placed wide, while the weights disposed round the vertical axis (engine, pilot, chassis, &c.) are placed at or quite close to that axis.

17. "There are other means for producing banking rotations. The one most commonly used was first reduced to practice by the Wright Brothers, and it consists of warping the supporting surface in a manner such that the pressure angles at the tips are unequal, the larger angle being at the tip which must be raised. . . . While machines using this system fly, and fly well, in the hands of good pilots, there is a fundamental error in this system which increases the danger of flying. Since the pressure varies as the square of the speed, it is evident that to change the angle of a tip, which must be raised, in such a way as to reduce its speed, will produce a result the opposite of what is desired unless some offset is introduced. . . . . It is at this point that the rudder comes into play as an offset. The rudder is turned so as to prevent any rotation about the vertical axis, and hence keeps the tip speeds equal, then the difference in the pressure angles produces a banking rotation. . . . With lateral stability, as with longitudinal stability, flying machines are designed so badly that a dangerous couple that should not exist has to be offset with another couple controlled by the pilot. The horizontal rudder has to be used to prevent stalling, and the vertical rudder has to be used to prevent the disastrous effect of the warp alone."—(Merrill, FLIGHT, November 15th, 1913.)

18. "It would seem that in aeroplane construction designers have refused to employ anything but controls acting *differentially*; that is every time one particular organ of control had to fulfil a definite function, it has been so designed, with the greatest ingenuity, as to fulfil precisely the opposite function as well. Sometimes even—and especially with the warp on large span machines—this opposite effect preponderates and must be overcome by bringing another organ into play. But in any case, the differential action of the controlling organ compels the designer to make its dimensions unnecessarily large. . . . The warp therefore acts differentially, so that in large span machines, where the drag is considerable, its detrimental effect has to be counterbalanced by an opposite effect obtained through the use of the rudder. The necessity for operating the warp in conjunction with the rudder, therefore, only results from a defect in the method of warping, which as known at present

is a barbarous method."—(Duchene, quoted by Merill, Flight, November 15th, 1913.)

19. To obtain a clear conception of the problem, it is necessary to investigate briefly the physical laws governing motion in a circle.

20. A body in motion tends to preserve its motion in a straight line. It will not and cannot move in a circle unless there is a deflecting force urging it towards the concave side of a circle.

21. There are only three elements in the problem. These are (1) the deflecting force; (2) the velocity at which the body moves; (3) the radius of the circle in which it moves.

22. These elements are co-related, and the conditions necessary to preserve circular motion are represented by the formula $f = \frac{v^2}{r}$, where f is the deflecting force, v the velocity, and r the radius of the circle.

23. We, therefore, see that the deflecting force must be directly proportional to the square of the speed and inversely proportional to the radius.

24. With constant velocity, therefore, the radius of the path taken depends on the deflecting force only, and is inversely proportional to that force. Translated into flying terms, this means that the sharper the turn the greater the amount of banking required, and *vice versa*.

25. A very good illustration of the conditions obtaining when an aeroplane is turning is the simple but classical experiment of the stone at the end of a string swung in a vertical circle. The tension on the string when the stone is in the lowest position consists of two parts—(1) the weight of the stone, which may be represented by mg if m represents the mass of the stone, (2) the deflecting force necessary to prevent the stone from flying off along the horizontal tangent at that point, and which may be represented by the symbol $m\frac{v^2}{r}$. When the stone is at the highest point, gravity reduces the tension on the string, which is now the difference between the two forces, viz., $m\left(\frac{v^2}{r} - g\right)$. Circular motion is, therefore, only possible when the velocity is such as to make $\frac{v^2}{r}$ greater than g, otherwise the stone will fall in towards the centre of the circle.

26. Applying these results to the case of an aeroplane it will be seen that danger becomes imminent when the deflecting force becomes greater than the speed and the radius of the curve demand.

27. A first principle is, therefore, that the deflecting force must be kept under careful control, and all movements or elements tending to produce reactions directed towards the centre of the circle must be carefully watched.

28. A second principle is that as the magnitude of the deflecting force, which may be applied with safety, is proportional to the square of the speed, the greater the speed the greater the margin of safety. Any system of steering which involves considerable loss of speed when turning is bad in principle.

29. Let us now investigate the warp and rudder principle as applied to turning in the horizontal plane. In turning the use of the vertical rudder initiates a spin round the vertical axis of the machine.

30. Banking is thus caused owing to the different speeds of the wings.

31. This banking, being *kinetic* in origin, is cumulative in its effect so long as the rudder is held over, and must be continually checked by the pilot. When the rudder is brought to the normal position the bank disappears and the turning movement is stopped.

32. This explains the oscillating motion so noticeable in turning by this system.

33. The warp is an inefficient method of checking a bank, as it can only be effective when the speeds of the wings remain the same or thereabouts.

34. This result can only be achieved by bringing the rudder into action against the turning movement itself.

35. It is clear, I think, that the bank is caused and maintained by *kinetic* conditions, *i.e.*, by power absorbed from the engine, so that speed must fall off and the controls at once lose some of their effectiveness. The very use, therefore, of these controls begets inefficiency. Resistance is increased on both sides, speed drops, and altitude is lost.

36. Loss of speed when turning is always dangerous, and loss of altitude is dangerous when flying low.

37. In looking for those elements which produce reaction directed towards the centre of the circle, the first element that occurs to us is the "bank." Curiously enough the value of the "bank" as a deflecting force is exactly proportional to the square of the speed and inversely as the radius. The "bank" by itself, therefore, is not dangerous; on the contrary, it gives exactly the deflecting force required to produce the turn in safety, and, other considerations apart, the machine will turn in a circle, the radius of which bears a strict proportionality to the amount of "banking." It should be noted, too, that in machines where the centre of gravity coincides with the centre of pressure of the planes projected along the longitudinal axis, the deflecting force of the "bank" is applied directly to the centre of gravity, that is without the intervention of a lever arm. There is, therefore, no tendency to produce rotation or "spin" round the vertical axis.

38. The second element is naturally the rudder. It has been noted that the effect of the rudder is to produce rotation or "spin" round a vertical axis, which passes through the centre of gravity; a movement which at once adds a very considerable part of the propeller thrust to the sum of the deflecting forces. This is a most important consideration, to my mind. Any reaction working through a powerful lever arm tending to produce inward spin is very dangerous: the powerful thrust component may suddenly and easily prove too great for the forces tending to preserve circular motion, and in this case an inward fall becomes inevitable. It would be the case of the stone on the string again. It must never be forgotten that so long as we mount our propellers at a distance from the centre of gravity of the machine, the thrust must take up a lateral component when turning, for the simple reason that a straight line cannot coincide with a curve. For safety it is essential that the thrust line shall remain tangential to the curved path followed by the c.g. of the machine. It is not possible to ensure this when the turn originates in vertical axis spin. The moment the thrust line cuts through the curve, danger is imminent: the machine may be out of control before the pilot has realised his position. This danger could be obviated by mounting the propeller at the centre of gravity —a plan which presents considerable constructional difficulties.

39. The warp on the inside wing also as tending to produce inward spin is inherently dangerous—if used at all, it should be used to retard the *outside* wing when the rudder is also used. The warp counteracts the spin produced by the rudder, and leaves the bank free to do the turning.

40. This system of turning by ruddering in and warping the outside wing, originated, I think, by the late M. Lefebre, is a safe turn, if there is plenty of room to drop. As, however, there is a very considerable loss of speed, the system is inefficient.

41. Speaking generally, the combination of warp and rudder tending to produce spin and increased head resistance, which means loss of speed, is bad in principle.

Stability is a *static* problem: *kinetic* controls as now used simply outrage the *static* principles on which stability depends.

42. The very extraordinary feats of Hamel and Chevillard will, I believe, if analysed, show that their success is due to the fact that the machine is banked to such an extent that the rudder effect is eliminated and the turn is done by the banking alone.

43. We cannot expect all our aviators to be Hamels and Chevillards—progress would be slow if we were to wait for that, and in any case it might not always be convenient to make the short-radius "stunts" that they do.

44. Permanent negative pressure tips reduce efficiency and speed, and are not in practice necessarily conducive to stability, as gusts are often known to touch one part of the wing only. They may strike either the positive part or the negative part; to bring stabilising reactions into play, the gust should strike the wing evenly. A gust coming in from the side would first depress the tip and might prove dangerous. The "bird's wing" type, different forms of which have been patented by Mr. José Weiss, Mr. Handley Page and myself, is, I believe, as stable as anything can well be made. The late Lieut. Parke, in writing of the Handley Page wing, said:—"Now as regards her inherent stability: her lateral stability is as near perfect as I can imagine; she just simply floats about quietly, quite regardless of *remous*, propeller draughts, &c.: you can feel them hit her and her consequent 'automaticing,' but it does not worry her at all."

The stability of this particular wing is derived, I believe, from the bluff entering edge, the varying chord and camber, and the "hump" on the wing; not from the negative tips.

45. Negative warping of the inner wing, causing as it does an inward spin, is most dangerous. A "centrifugal couple" tending to reduce the banking cannot be relied on, as this would be quite negligible when compared to (*a*) the powerful lateral component of the propeller thrust, (*b*) the increased lift of the outside wing owing to the relative increase in speed, which would be very great indeed if the extreme tip of the opposite wing were to be warped negatively.

46. In gliding, birds change their direction by banking alone. The banking is produced by retiring the inside wing; the retirement is accompanied by a movement giving the wing a slight downward dihedral set.

47. The tail is not used as a rudder. In flapping flight the tail is usually folded. In gliding flight it is always expanded, and is in almost constant oscillatory motion. It is used, in fact, as an adjustable vertical fin. If a bird is looked at in side elevation, it will be noticed that the "keelplane," by which I mean the projection of the wings and body on the plane of symmetry, is, so to speak,

concentrated and balanced round the bird's centre of gravity. The "hump" on the wing balances the downward curve of the body. This means that when the tail is folded a bird has no "weathercock directional stability"; a gust of wind striking the bird sideways would therefore tend to bring the bird with it. When flapping, the bird instinctively corrects this by the power of the wing alone. In gliding, however, the expanded tail oscillates so as to convert itself into a vertical fin, which tends to hold the bird into the wind and preserve direction.

48. I shall now describe briefly the controls which I advocate.

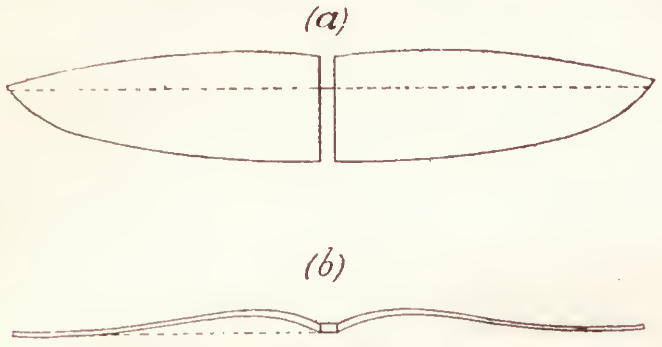


Fig. 1.

Fig. 1*a* shows in plan form wings of the character suggested, while Fig. 1*b* shows a section through the single spars or arms on which the wings are mounted. The wings are mounted on central spars which can rotate round a horizontal axis, so that the angles of incidence of the wings may be decreased or increased at will. In my early models the wings were mounted independently, but as the result of more recent experiments I now connect them so that alteration of the angles of incidence is simultaneous for both wings. In plan form, the entire trailing edge is roughly a semi-ellipse struck on a major axis equal to the span selected and a semi-minor axis carefully proportioned to the span. The leading edges of the wings are parabolic curves struck on bases equal to two-thirds of the span commencing from the tip of each wing. The two vertices are, therefore, one-third of the total span from each tip. The heights of the parabolæ are also carefully proportioned to the span. The spars are centred along the dotted line shown in the figure, or at one-third of the chord measured from the leading edge at the vertices of the parabolæ. The lower line of the section of the spar (Fig. 1*b*) is for the lower or under surface of the wing the line which connects the points situated highest in all the transverse sections of the wing. In other words, it is the line of the highest points in the camber.

It will be seen, therefore, to commence with, that on the under side there is no camber at all at the root of the wing, that the camber rapidly increases until a point is reached just short of one-third of the length of the wing—in fact, it is little more than two-ninths; that from that point the camber is slowly decreased until it disappears altogether at a point at or about two-thirds of the length of the wing, and that the remaining third is perfectly flat, or so slightly curved that the pressure movements are practically identical with those on a flat plane.

By examining and comparing the plan and section, it will be found that sections of maximum camber and chord coincide at the point already indicated, and that the centre of area of the whole wing is not far removed from this region. All points on the perimeter of the wing are on the same plane except just on the body side of the vertices of the parabolæ, where the leading edge is slightly arched upwards so as to give a greater angle of incidence here than at any other part of the wing. In fact, everything that contributes to lifting effect is at a maximum just at this point.

The entering edge is bluff near the body, tapering towards the tip. The line of highest points on the top camber is close to the leading edge at the body-end of the wing, but gradually recedes to the middle of the wing near the tip. The details of top and bottom camber, &c., as described, are designed with the object of fixing, absolutely, the position of the centre of pressure so that disturbing effects cannot arise with variations of incidence within the limits of ordinary flying angles.

The tail is a large area non-lifting tail of short leverage, capable of being oscillated after the manner of a bird's tail. I also provide means for up and down movement, as with ordinary elevators, but I believe that this will no longer be necessary when the machine has passed the experimental stage.

The manner of operating the wings for the purposes stated above—viz., to maintain stability, to steer and to vary the speed of flight—will now be described.

The spars on which the wings are mounted are connected to the body by an articulated joint so that they may be moved forwards and rearwards by rotation in the plane of their incidence to the wind; in other words, when moved forwards they get a slightly upward dihedral set, and when moved backwards they get an inverted dihedral set. This fore and aft motion is independent of the motion by which the angles of incidence are varied. Fig. 2 (*a*) shows the plan form in ordinary flight; (*b*) shows the position in which the wings are placed for ascent, and (*c*) for descent, while (*d*) illustrates in plan form the position which would be taken to make a right-hand turn.

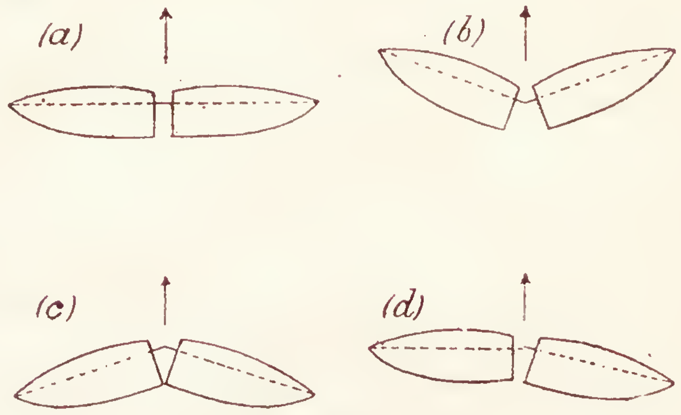


Fig. 2.

In the same way, for a left-hand turn, the left wing should be retired. In (*b*) both wings have been advanced, and, as already explained, they have, therefore, a slight upward set. The centre of upward pressure has been brought to a position in front of the centre of gravity; as well as this, the centre of resistance has been raised without being increased. These combined results cause the machine to ascend. In (*c*) the reverse has taken place—the wings have been retired, at the same time getting a downward set so that the machine is caused to descend. In (*d*) the right wing has been retired without alteration of the angle of incidence. This operation results firstly in causing the machine to bank owing to the shortening of the lever arm through which the upward pressure acts, and secondly in lowering the keel-plane in relation to the longitudinal axis of rotation and in moving it backwards in relation to the vertical axis of rotation. These results are most advantageous when turning. The machine, deflected by the "banking" which changes the direction of the aero-dynamic reaction on the planes, turns to the right. The rapidity of turning can be increased or decreased to any degree required by a corresponding retirement of the inside wing. Stability, both lateral and longitudinal, is controlled in the same way. If the machine be dipping, both wings are advanced; if rising, both wings are retired. If the machine be canted to one side the wing on the rising side is retired, and so on.

49. In comparing this system with the warp and rudder system I should like to point out that:

(*a*) In all the movements described, the *static* conditions which govern stability are maintained unimpaired.

(*b*) In turning on the wing control principle the inside wing is retired, which has the effect of shortening the pressure arm on that side, so that the centre of pressure moves towards the outer side of the curve; the machine, therefore, tilts over until the c.g. is directly under the new position of the c.p. The "bank" is now, therefore, both caused and maintained by *static* conditions, and the method would be equally effective if all speed were lost, and the machine were dropping vertically through the air. The effect is not cumulative in tendency, and absorbs no power from the engine. The turn is not made round a permanent centre fixed at the c.g. of the machine, but round a virtual or instantaneous centre on the line of the pressure produced, so that practically speaking the two wings move at equal speeds. It should also be noted that as the curve is generated by the translatory motion of the centre of gravity, and by that alone, *the line of the propeller thrust must always remain tangential to the curve.*

(*c*) In changing direction upwards or downwards, the static conditions are also preserved. Direction is changed not by *kinetic* violence, but by a slight movement of the wings, which changes the relations of pressure and gravity—the weight of the machine acting through a tiny arm of a few inches is the agent that now changes the direction. It is clear, I think, that there can be very little violence or shock here. The machine gently swings into her new path. The system consists in readjusting the conditions of stability so that she automatically takes up a new position, in which she is just as stable as she was in the old one. Contrast the graceful movements of the birds with the jerky oscillatory turns usually made by aeroplanes even in the hands of the most expert aviators.

50. Remembering the balance of the keelplane round the centre of gravity, the upward and downward set of the wings which accompany advance and retirement respectively become of importance. In turning in what is called "still air," danger may come

from a gust suddenly arising and coming in from the outside of the curve. This would have the effect of suddenly increasing the deflecting force to a degree perhaps beyond what the velocity and radius demand. The downward movement of the wing has the effect of bringing the centre of the keelplane below and to the rear of the centre of gravity, through which the various axes of rotation of the whole system pass. A gust coming in from the convex side would now, therefore, have the effect of reducing the bank, and holding the machine into the gust, both movements tending to safety. In turning into the wind a sudden gust would have the effect of increasing the bank, and holding the machine into the wind. The increased amount of banking would automatically increase the deflecting force, thus preserving the necessary conditions for circular motion. A sudden cessation of the wind would have the effect of decreasing the bank and giving an outspin for safety. In turning down wind, the conditions are identical with those arising when an inward sweeping gust suddenly arises in "still air," and which I have already referred to.

51. I have already observed that not one of these movements increases head resistance to flight; on the contrary, I believe that in practice the velocity will be found to increase when turning. It will be obvious that the banking reduces the lift of the wings, and a loss of altitude would in the ordinary way result—the loss of lift is, however, converted into a centripetal force which when compounded with the propeller thrust may give increase of speed sufficient to counteract the loss of lift. Nothing but actual test, however, can show whether such a result is obtainable. I have often noticed birds turning, not only without loss of altitude, but with apparent gain.

52. When gliding, birds always retire the wings for descent at angles steeper than the ordinary gliding angle and advance them for ascent. Birds fly without any apparent difficulty in a *cabré* attitude, the reason being that the raised wings raise the centre of the keelplane, and so counteract the effect of the low tail. In any case, the absence of a rudder or anything in the nature of a vertical fin near the tail reduces the danger of the *cabré* attitude. Such a result in an aeroplane would mean that the machine might safely climb *cabré*, and so avail of the full power of the propeller thrust.

53. Further than this, the fact that incidence could be altered in flight would obviate the necessity for the machine to take the *cabré* attitude, in order to obtain support, in the case of a failing engine.

54. When flying obliquely across a regular wind, the windward wing may be retired; this holds the machine into the wind and corrects for drift without increasing head resistance. Correction by rudder increases head resistance. I have frequently seen rooks gliding in this way at tremendous speeds right across a gale of wind.

When extra weight is taken, such as a passenger or more, the balance of pressure and gravity can at once be adjusted by advance or retirement of the wings, thus enabling the machine to fly always under the most favourable conditions. Greater liberty for disposing of loads is also allowed—once in the air the pilot can immediately bring the machine to a level keel. This is the plan the birds adopt when carrying food, &c.

55. The investigation of the problem of turning in the air has been confused by a false analogy, drawn from the case of steering a boat. Because the rudder and bows reaction produces spin, it is thought proper to follow the same plan. There is a true analogy in this—that the naval architect makes use of *kinetic* force to deflect his ship; this must be the case either in the air or on the water from the very nature of the laws of circular motion; but for stability he depends on *static* conditions. The plan must also be followed in the air.

56. In considering and comparing systems used by birds with systems which may be safely adopted on artificial flying machines, it must not be forgotten that birds get propulsion from their wings, *i.e.*, the thrust is applied directly to the centre of gravity, whereas in artificial flying machines the thrust is applied directly to the face of the propeller blades, which is usually situated at some distance from the centre of gravity, and hence capable of taking up a lateral component.

57. It follows, therefore, there are certain movements used by birds which cannot be imitated on aeroplanes. I believe birds do sometimes depress the inside wing tip, as described by Dr. Hankin, and possibly give the tip a negative angle of incidence, but, I believe, that this is a nicety of control into which we cannot follow them. Birds have not got a shrieking propeller thrust to deal with—we have.

58. When all controls are exercised by the the wings, and by the wings only, the machine must follow a natural path determined by the attitude of the wings. With independent rudder and elevator, the machine may be and almost invariably is in practice forced into a path other than that which the wings lay down for her to follow—a proceeding naturally attended with great risk. The *vôl piqué*, for instance, would be an impossibility with wing control. Quick descents could, of course, be made, but they would be a consequence of the alteration of the natural gliding angle of the machine.

It has been suggested to me that there are certain constructional difficulties in the way of building a full-sized machine on the lines I have described. Speaking as a practical engineer, I can say that I have designed a full-sized machine with a factor of safety of eight in all the component parts; that the weight is not above the average, and that a considerably higher factor of safety could be allowed without making the weight excessive.

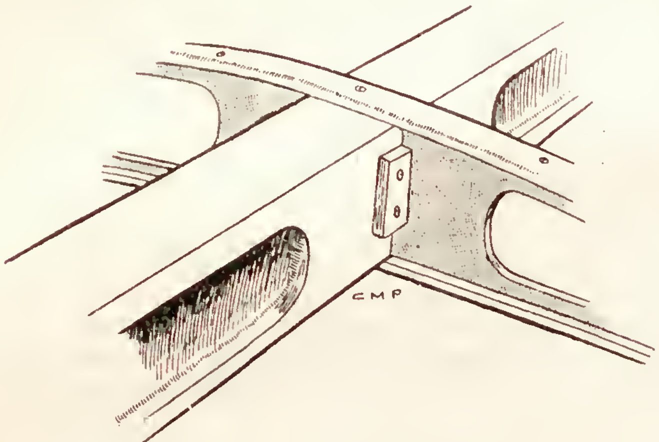
* * *

Photos by Mr. E. L. N. Leveson Gower.

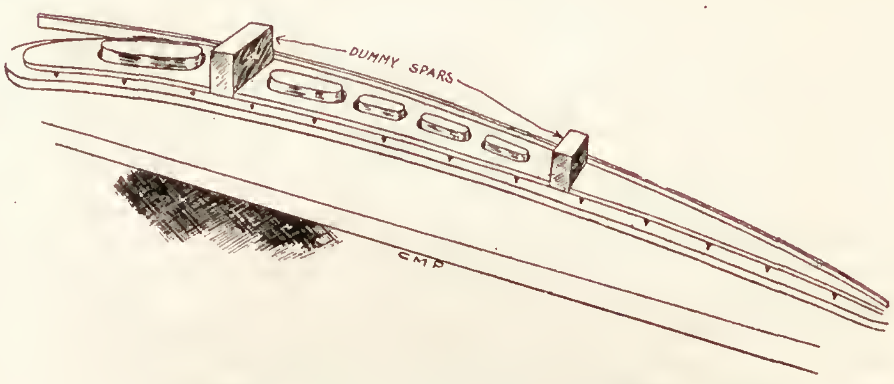
The above snaps are of considerable historical interest from the fact that they show the scene at Buc upon the occasion when Pegoud for the first time "looped the loop" on his Bleriot. On the left Pegoud is seen pointing out to those concerned the exact spot where he intended to make his first loop. In the centre picture is the late M. Perreyon, and in the right-hand picture from right to left MM. Pegoud, Domenjoz and Perreyon.

AN AEROPLANE IN THE MAKING.

In these days of aerial locomotion when the sight of an aeroplane flying overhead is such an everyday occurrence as to excite comparatively little interest, one is, perhaps, a little apt to overlook the enormous amount of work and the forethought and care devoted to the production of a modern aeroplane. For this reason we think that the majority of our readers will be interested in a description of the different stages of evolution which a machine passes through from the time the designs leave the draughtsman's table until it is ready for the air.



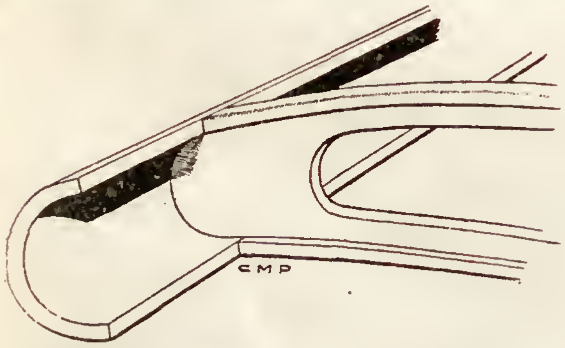
Attachment of ribs to spars.



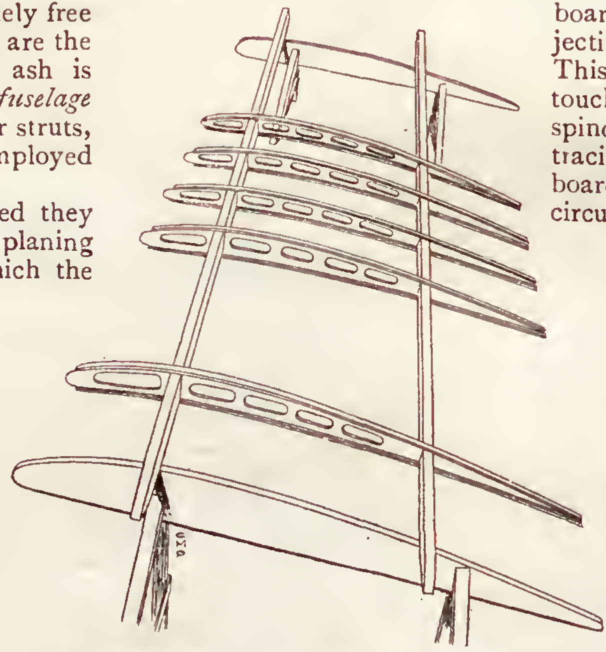
Sketch showing method of assembling ribs.

We are indebted to the Sopwith Aviation Co., Ltd., for their courtesy in giving us every information and in placing their extensive works at our disposal for the purpose of obtaining the necessary notes and sketches. It would have been difficult to find a more representative firm, for at their works at Kinsgton, where the Sopwith Aviation Co. employ some 150 workmen, in addition to a large staff of draughtsmen, all the most up-to-date machinery and latest labour-aving methods are employed, whilst the workmanship of their machines has already established for them an enviable reputation, equalled only by the excellence of their design.

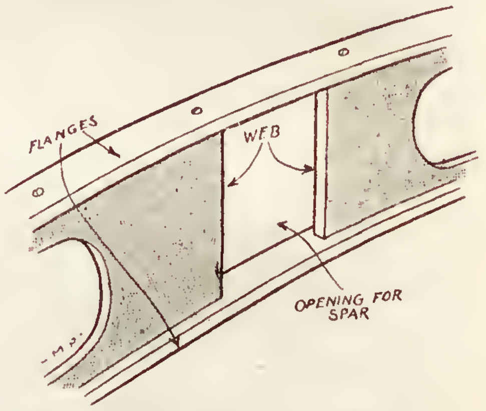
As wood is the material mostly employed in the construction of the majority of aeroplanes a start will be made with the wood working department. It is almost needless to point out that all the wood used for aeroplane construction must be of the very best quality, air dried, well seasoned, and absolutely free from knots and shakes. Spruce, ash and poplar are the woods most generally employed, and of these ash is generally used for the longitudinal members of the *fuselage* and for the wing spars, whilst spruce is used for struts, ribs, cross-members, &c. Poplar is frequently employed for the webs of the ribs.



The hollow leading edge and its attachment to rib.



The ribs are slid along spar, beginning with centre one.



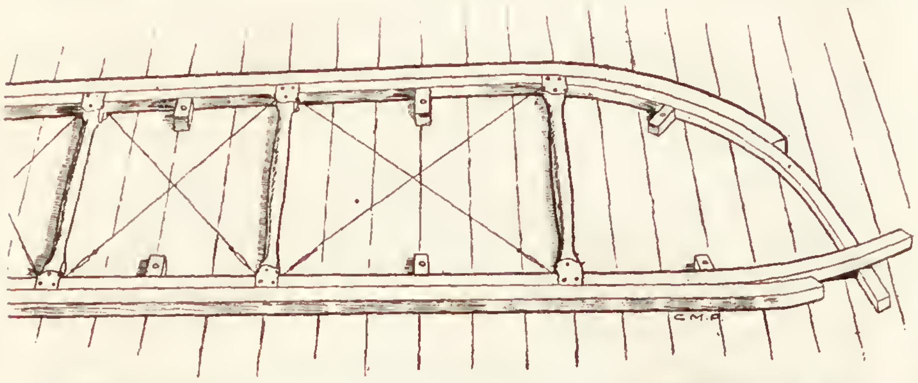
Sketch showing opening in rib through which the spar passes.

When the planks have been thoroughly seasoned they are sent to the shop in which are the saws, planing machines, spindle machines, &c., by means of which the rough wood is converted into ribs, struts, skids, spars, or in short, all the finished parts that go to make up an aeroplane. They then go to the different machines to be shaped into form according to the purpose for which they are intended.

The wing spars are first sawn out of a plank of approximately the desired thickness. If they are not of exactly rectangular shape they pass through the spindle machine, which, briefly speaking, consists of a table or platform through which projects a vertical shaft revolving at a very high speed (about 5,000 revolutions per min.). This shaft carries the knives or cutters by means of which the parts are given the desired form, and which are interchangeable, so that by substituting a different set of cutters the same spindle machine may be used for a variety of purposes. In these spindle machines the spars are given their final form with the spaces between the ribs cut down to an I section for the sake of lightness. The spars are now sent to another department to have the ribs fitted. These latter have in the meantime passed through various stages as follows: The planks from which the ribs are to be made are first sawn out to a thickness slightly greater than the desired thickness of the webs. These thin boards are then planed down to exact size on the planing machine. Before proceeding to describe the manufacture of the ribs, it is as well to call attention to the fact that the webs of the ribs are divided into three pieces. The front portion runs from the leading edge to the front spar, the second part runs from the rear side of the front spar to the front side of the rear spar, whilst the last piece continues from the rear spar to the trailing edge. These three parts of the web of the rib are held together by two thin flanges screwed into the edges of the web.

The method of manufacturing the different parts of the webs is as follows: A template of exactly the same size as the particular section of the web is placed on top of the thin boards from which the webs are cut and their outline is traced by means of some sharp instrument such as an awl. The man who performs the tracing or marking off then passes the boards on to the man in charge of the jig saw, who cuts out the individual webs, taking care to leave about $\frac{1}{16}$ of an inch all round the tracing line. The webs are now cut down to their exact size on a spindle machine. This is done by nailing the rough web to a board of the same shape as the web but projecting about $\frac{1}{4}$ of an inch outside the web. This projection is of such a width that when it touches the circular guide on the table of the spindle machine, the cutters will just touch the tracing line, so that by pushing the carriage board to which the web is attached along the circular guide, which is concentric with the spindle, the webs are cut to the correct size and shape and, as the carriage board used is the same for all the webs, it follows that they will all be cut to the same size.

From the wood working department the webs are sent to the erecting shop where the flanges are screwed on and the ribs finished off ready to go on the spars. The method of assembling the ribs is as follows: The three parts of the webs are placed on a former of the same shape as the finished rib, and having two short pieces of wood attached to it to represent the spars. The web pieces are butted against these dummy spars, and the flanges are put into place and held temporarily in position by tacks nailed along the former at certain intervals. The flanges are then secured to the webs by means of small screws, and the ribs are passed along to another man who chamfers off the edges of the webs with a spokeshave, after which the ribs are ready to be put on the spars. Their position having been marked off on the spars, which are placed on two trestles, the ribs are put into place by sliding them along the spars, beginning with the centre ones. This operation is carried out by two men whose business it also is to see that the different steel clips and sockets are put into place between the proper ribs. The leading edge is then secured to the ribs by means of screws, and the trailing edge, which in the Sopwith machines consists of a flattened steel tube, is attached by means of thin aluminium clips. The diagonal cross bracing of the wings is then tuned up, care being taken to keep the ribs at right angles to the spars (in the plan view) and after being varnished the wings are ready to be covered.



Sketch showing method of building up *fuselage* on the floor.

The fabric used for this purpose is sold in comparatively narrow widths. It is cut off in lengths sufficient to go from the trailing edge round the leading edge and back to the trailing edge again These narrow strips of fabric are first stitched together until a sufficient width is obtained to reach from the root to the tip of the wing. The fabric is applied by securing one end of it to the trailing edge, passing it round the leading edge and back again to the trailing edge where the other end of it is attached. As most of the dopes used for the purposes of rendering the fabric air- and water-proof possess a certain amount of contractility the fabric is not applied very tightly to the wings, in order to allow for the tightening up by the dope. If the fabric were put on too tightly the dope would contract it to such an extent that the wings might be warped out of shape. After three or four coats of dope have been applied with several hours interval between each the wing is ready to be mounted on the *fuselage*.

The method of constructing the *fuselage* is similar to that employed in building up the wings. The *longerons*, struts and cross-members are all cut to shape on the spindle machines, and, this being done, they are taken to the erecting shop, on the floor of which are secured some thin strips of wood bent to the shape which it is desired to give the *fuselage*. The *longerons* are placed on the floor, and kept to the desired shape by wood blocks pressing them against the strips on the floor. The struts with their respective sockets are then put in place, and the two sides of the *fuselage* made rigid by means of diagonal cross-bracing. Each of the bracing wires has incorporated in it a wire strainer in order to allow of each bay being tuned up separately. When the two sides are thus finished they are raised up on edge and connected by the cross-members and by diagonal bracing, and the whole structure is then adjusted, or, as it is called "tuned up." The next job to be done is that of putting the engine bearers, tank supports, pilot's and passenger's seats, controls, &c., into place, and when this is accomplished the *fuselage* is ready to be covered with fabric. In the Sopwith machines, this is done by cutting the fabric to shape and, passing it around the *fuselage*, lacing it along one *longeron*. The fabric is then doped similarly to the wings, and the *fuselage* is ready for the wings.

(*To be concluded.*)

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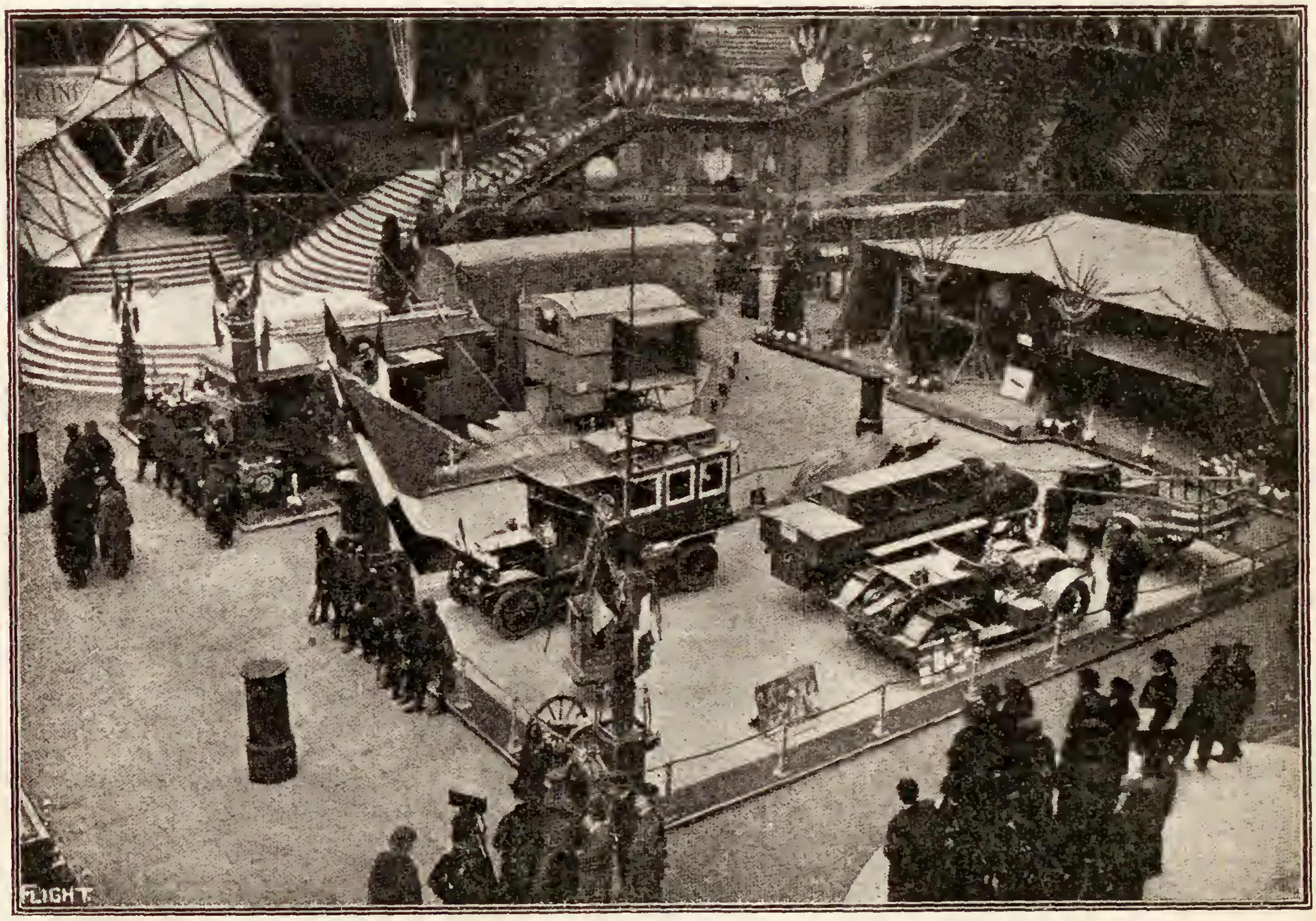


THE GOVERNMENT MILITARY STAND AT THE PARIS AERO SALON.—FLIGHT photographer, when innocently endeavouring to take a photograph of this stand, found himself, when he emerged from under the focussing cloth, surrounded by French military, and came near to having his camera and all his plates "scrapped" under the conditions. Merely looking at the photograph and what was on the stand, it would appear as if red-tapeism had been bereft of its senses to behave in such a remarkably childish manner. There was nothing staged on the stand full particulars of which could not be obtained with the greatest ease from the constructors of the various repair wagons, &c.

FOREIGN AIRCRAFT NEWS.

World's Record Duration Flight.

Starting from Johannisthal on Tuesday at 8 a.m., Langer, on a biplane, made a flight which it is claimed beats the world's record of 13 hrs. 18 mins. made by Fourny on a biplane in September, 1912. After flying round the aerodrome for a couple of hours he went off and made cross-country flights, reappearing at Johannisthal in the evening, and landing at 10.15 p.m.

An Italian Height Record.

During a flight which lasted 27 min., and which took place at Vizzola-Ticino on the 29th ult., Emile Pensuti, on a Gnome-engined Caproni monoplane, beat the Italian height record by getting up to 3,850 metres.

A World's Record with Six Passengers.

At Chartres on Saturday last, Garaix, on a Savary biplane, beat the world's height record for pilot and six passengers by climbing to an altitude of 1,750 metres during a flight of 27 mins.

Long Flight on a Farman.

Returning to his station on Monday, Sergeant Quennehen, on his Farman biplane flew the 320 kiloms. from Etampes to Epinal in 2 hrs. 50 mins., while his average altitude was 2,000 metres.

Maurice Farman's Week-end Trip.

Accompanied by Senoucque, Maurice Farman on Monday flew from Buc to just by Orleans, and after taking lunch with the well-known French sportsman M. Georges Leys at the Chateau d'Alloc, returned to Buc by way of Etampes and Rambouillet.

Gilbert Returns to Paris.

On his Rhone-engined Morane-Saulnier machine, Gilbert, on the 27th ult., returned from Mourmelon to Villacoublay in two hours.

A Morane for Japan.

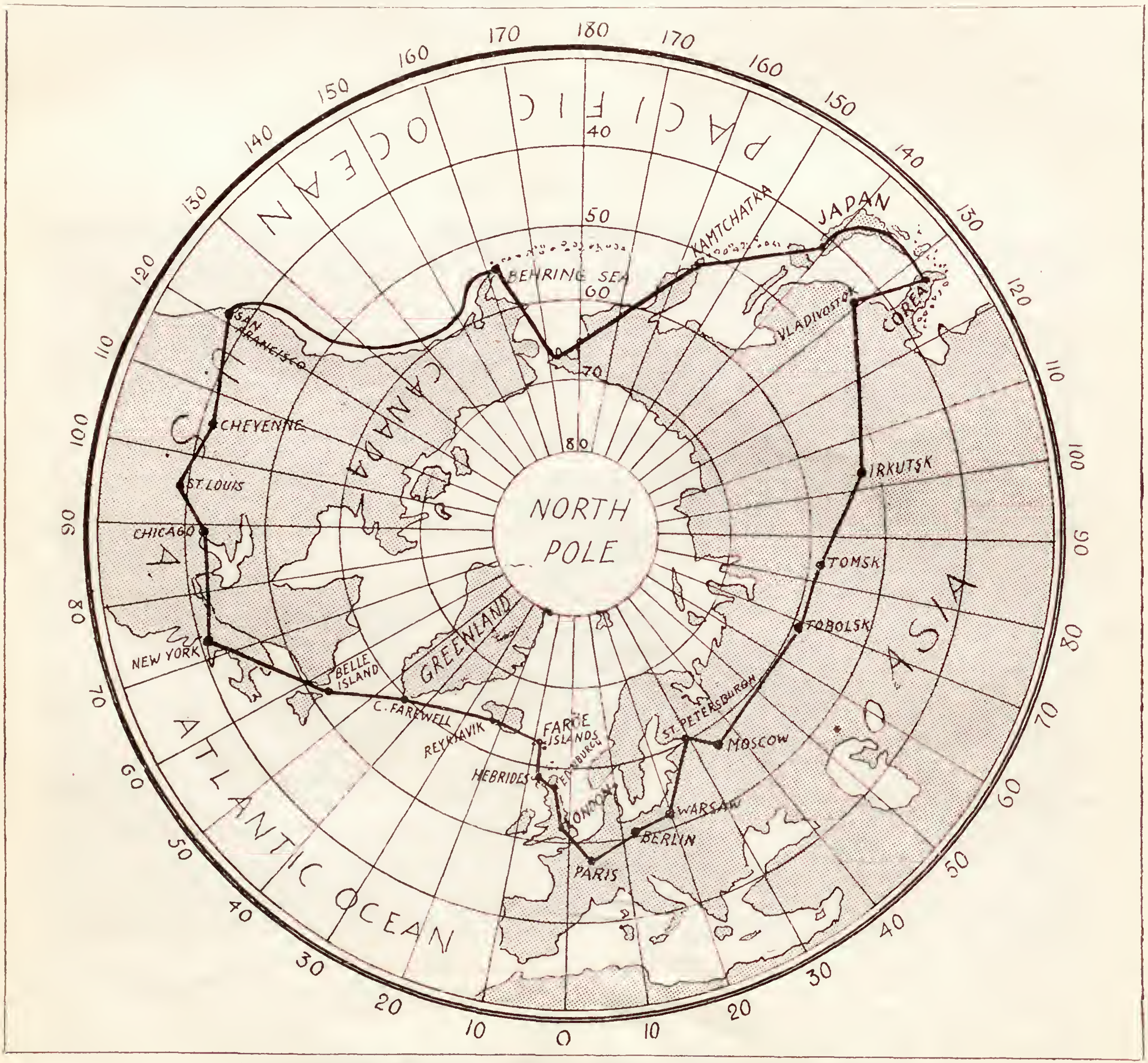
Liger, the *chef-pilote* at the Morane-Saulnier school at Villacoublay, will leave France for Japan shortly. He will take a number of military machines with him, with the object of selling them to the Japanese Army.

A Grand Prix for Pegoud.

Once again the French Academie des Sports has awarded its Grand Prix of £400, founded three years ago through the generosity of M. Deutsche de la Meurthe, to an aviator, the fortunate recipient this year being Pegoud. The two previous recipients of the prize were Beaumont and Garros.

A New Farman Looper.

At Evreux on Sunday week, Poiree, on a Henry Farman biplane, looped the loop, and also flew for a comparatively long distance with the machine upside-down.



ROUND-THE-WORLD FLIGHT.—Sketch map of the proposed route.

Pourpe Back at Cairo.

Marc Pourpe arrived back at Cairo on his 80 h.p. Gnome-Morane-Saulnier on Tuesday, when he completed the 500 kilom. stage from Menshad, where he had arrived on Friday of last week from Luxor. The distance represented by the double journey from Cairo to Khartoum and back is about 4,500 kiloms.

Guillaux Leaves for Australia.

On Friday of last week, Guillaux left Marseilles for Australia, where he intends to give demonstrations of looping the loop in the principal cities and towns. He also contemplates making a flight from Sydney to Melbourne before he returns to France in July.

Two French Officers Killed.

An accident which occurred at the flying ground near Bourges, on Monday afternoon, cost the lives of two French officers—Lieut. Delvert and Capt. Niquet. The former was piloting the biplane at a considerable height, when it seemed to collapse, and fell to the ground.

German Machine Across the Frontier.

Not quite so much excitement was aroused by the landing on Tuesday of a German aeroplane near Croismare, about four miles from Luneville and about six miles from the frontier, as was aroused by the landing of the Zeppelin quite close to the same place exactly ten months previously. The two officers, Lieuts. Priesten and Gomer, set out on a biplane to fly from Strassburg to Metz, but after passing Saarburg they lost their way in the fog and on landing to make inquiries found themselves in France. They immediately reported themselves to the French civil and military authorities. Later in the day they returned to Metz by train, their machine having been dismantled.

A German-Danish Waterplane Contest.

The Danish Aeronautic Society, with the co-operation of the German Society, is proposing to organise a competition for hydro-aeroplanes, to be held during the month of August. The suggested programme is: August 15th, Warnemunde to Copenhagen, 160 kiloms.; August 16th, Copenhagen to Aarhns, 175 kiloms.; August 18th, Aarhns to Skagen, 160 kiloms.; August 29th, Skagen to Laurvig (Norway), 160 kiloms.; August 23rd, Laurvig to Christiania, 120 kilogs.

Farmans for Austria and Sweden.

At Etampes, on the 29th ult. Bille, in testing a Henry Farman built for an Austrian pilot, with a load of 507 kilogs. climbed 300 metres in 4½ mins. Later, on a similar machine purchased by the Swedish Army, he rose 500 metres in 6 mins., the load in this case being 300 kilogs. Subsequently, Capt. Sunstedt took over this machine, and made a long flight over the surrounding country.

Cold Suspends Flying in Italy.

At the end of last week an order was issued by the Italian military authorities suspending all flying at the military aerodromes for one month. The reason officially given for this action was the cold weather, but not unnaturally the order has called forth many protests from the pilots.

Swiss Army to Buy Machines.

Following on the decision of the Swiss Government to organise a flying corps, a commission of four Army officers, with Oscar Bider, the Swiss pilot, as expert adviser, set out from Berne last week-end to visit the aircraft works and aerodromes at Mulhouse and Berlin.

Parmelin to Cross the Alps.

Parmelin has arrived at Geneva with a Rhone-engined Deperdussin monocoque, with the object of making an early attempt to fly from Geneva across the Alps to Turin.

Flying Meetings in Egypt.

A series of flying displays are to be given at Heliopolis from the 19th to the 22nd inst. It is stated that arrangements have been made with Chevilliard with his Farman, and Pegoud with his Blériot, to give demonstrations of looping the loop, etc., several times daily. It is also hoped that other aviators will take part in the meetings.

Rigid Airships for Italy.

Although no details are available, it is reported that the Italian military authorities have decided upon the construction of four rigid dirigibles, each of 30,000 cubic metres capacity.

A ROUND-THE-WORLD RACE.

In connection with the San Francisco Panama Exhibition, which opens next year, the authorities propose to organise a race for aeroplanes round the world, and sanction has been given to the scheme by the Aero Club of America. It is proposed that the start should be during May, 1915, while a time-limit of 90 days will be set for the competitors to complete the flight of about 22,000 miles.

The first prize will be £20,000, the second £6,000, the third £4,000, while it is expected that there will be a balance of about £60,000 to be divided among the other competitors. The course proposed is indicated upon our sketch map of the top of the world, and will be across the United States to New York, and thence to Belle Isle. From this point the Atlantic will be crossed by Cape Farewell, Greenland, and Iceland to Stornoway in the Hebrides. From there Europe will be traversed by way of Edinburgh, London, Paris, Berlin, Warsaw, St. Petersburg, Moscow, and the Trans-Siberian Railway will then be followed through Manchuria to Vladivostok. Korea will be the next point, from whence crossing to Kobe and passing over the Sea of Japan, the course will be north to Kamchatka, in Siberia, and on to East Cape. The competitors will then cross the short stretch of water to Alaska, and finally reach San Francisco by way of Vancouver and Seattle.

ROYAL FLYING CORPS (MILITARY WING).

War Office summary of work for week ending January 31st:—

Flying Depôt. S. Farnborough.—The officer pilots were out daily during the week, and experimental work and repairs were continued as usual.

No. 2 Squadron. Montrose.—Reconnaissance training was recommenced in the squadron since the move to the new aerodrome is now completed.

No. 3 Squadron. Netheravon.—Machines were out nearly every day of the week.

No. 4 Squadron. Netheravon.—The Officer and N.C.O. pilots of the squadron made numerous flights during the week, and some experimental work was carried out.

No. 5 Squadron. S. Farnborough.—Several machines were out during the week, with a total of 27 hrs. 14 mins., and a total mileage of 1,709 miles was flown.

No. 6 Squadron. S. Farnborough.—This squadron is now being formed and organised by Capt. Becke.

Royal Patronage for Olympia Again.

His Majesty the King has once again shown his practical interest in the aviation industry by graciously extending his patronage to the forthcoming International Aero, Marine and Stationary Engine Exhibition, which is to be held at Olympia in March from the 16th to the 21st inclusive.

A 21-Mile Glide by an Avro.

Following up his fine flight at Brooklands on Sunday of 1 hr. 5 mins., during which he went up to 11,500 ft., F. P. Raynham on Tuesday on the 80 h.p. Gnome-Avro, with Mr. Harold Blackburn as passenger, climbed to 15,000 ft., and, with the engine and propeller stationary, glided the 21 miles to Hendon, arriving at Hendon at an altitude of 5,000 ft. There was a strong following wind. The British height record stands to the credit of Hawker and the Sopwith machine at 11,450 ft. Raynham's climb was not officially observed, but he hopes to repeat it next week, under official observation. The return journey to Brooklands was made late during the afternoon.

Bolstering up Advertisement Pages.

Our contemporary the *Aeroplane* in last week's issue draws attention in a paragraph, of which the following is an extract, to what would appear to be a most reprehensible practice:—

> "A Word to Advertisers.
>
> "One regrets to find that those responsible for a certain paper concerned with aircraft are reduced to padding out their advertisement pages with advertisements which appear contrary to the instructions of the advertisers, or of a size greater than that stipulated by the advertisers. Documentary evidence to this effect is in our possession. One would remind manufacturers and potential advertisers in general of a commercial axiom which says that advertisements which cost nothing are worth precisely what is paid for them. Also, there can be but little satisfaction in ordering and paying for that which one knows other people get for nothing. One would not draw attention to this point but for the fact that the practice to which reference is made above gives a spurious air of affluence to a paper and is calculated to deceive new advertisers as to the respective values from an advertiser's point of view of the various papers dealing with aircraft."

Personally we have no evidence or data upon which to say whether our contemporary is correct in its statement or not, but we need hardly say that if such systematic and deliberate bolstering up of advertisement pages, as is suggested, has been resorted to, as to warrant this otherwise very libellous statement, the sooner the facts receive the light of day the better, so that it may be generally known with whom such a practice rests.

CORRESPONDENCE.

The R.A.F. and the Industry.

[1833] It is certainly about time this heated question was settled; and the first matter is to define the position and to state exactly what is wrong. People talk of the industry as if the various firms were one and all absolutely similar, but such is far from being the case.

They are divided roughly between the two extremes of what one might term the "Designers" and those who build to R.A.F. designs, *i.e.*, the "Designees."

Mr. Walton Newbold, in his new book "The War Trusts Exposed," condemns the present policy of the country paying for the upkeep of the R.A.F. for the benefit of the private industry, *i.e.*, those whom I term the "Designees.". Naturally those at the other end, *i.e.*, the "Designers," do not want the R.A.F. at all, and so on with the various grades between these two extremes.

The present complication has arisen because there has never been a clear and definite statement as to the official R.A.F. policy. Is the R.A.F. to design and incidentally to guard the country's interests in the purchase of aeroplanes, or is its position to be that of technical expert to the War Office and, incidentally, to carry out experimental work? Again, are we to look to it at all for the supply of our machines?

The R.A.F. appears to be doing a bit of everything, which always proves fatal, for it invariably ends up in no job being satisfactorily performed.

If we want to encourage the very best in aeroplanes, most people will be agreed that we must buy in the open market. Nobody can object to the Government having a body of technical experts to attend to this buying, and the R.A.F. are quite able to see to this; but if the R.A.F. is to have the slightest control in the buying, then they must not design or make aeroplanes. I cannot imagine any man, or body of men, so wanting in human nature that they did not consider their own production to be the best. If I were a designer and entered my design in a competition, I would think you very foolish indeed to make me the judge.

I think the above sums up the position, and has the advantage of leaving out the unnecessary trimmings.

If the War Office will thoroughly overhaul and rearrange the present constitution of the R.A.F. and its duties without any further delay, it would bring this very unpleasant feeling to an end before it becomes very much worse.

February 3rd. "OCTOPUS."

Stability of Aeroplanes.

[1834] I have been reading with very great interest in your valuable journal the paper by Mr. Bairstow and the discussion on it, and it seems to me that Mr. Bairstow's definitions of stability are about the best yet evolved. I do not understand even yet why inherent stability is not preferable to automatic stability. In the former the self-righting qualities are "the nature of the beast," and contrary to popular superstition, not detrimental to its controllability; in the latter they depend on some mechanically operated device and will disappear if the device breaks down.

Mr. Bairstow apparently favours inherent stability, but he sets out to obtain it by the use of fins and deep bodywork, if I understand him aright. But, if the functions of the fins, &c., can be fulfilled with less than their weight and resistance, then they are unnecessary, and I suggest that it would be best to use the Dunne V form of wings with down-rolled front edges at the tips, or some equivalent form. This type needs no tail, and no more bodywork than a Farman-type biplane. The Dunne machine from all accounts entirely satisfies the definition of inherent stability. It has made many uncontrolled flights; two, a straight and a circular one of about 1 min. duration each, if I remember rightly, under R.Ae.C. observation; another in which the pilot wrote a sentence on a piece of paper, leaving the machine to run its own course, and then the flight at Hendon, when Com. Félix tinkered with the engine. Another advantage is that it is a propeller machine, not a tractor like the H.P. or Etrich types, and so is much better suited for military purposes. Also, I believe that the Dunne principles of stability as applied in that machine are, unlike those of the H.P. type, not conducive to, and do not involve, any rolling to speak of, even in fairly gusty winds. Then there is the bogey of uncontrollability to be laid. People often think that a Dunne for instance cannot manœuvre so well as, say a Blériot. But, though I have no acquaintance with the Dunne machine except from what I have seen published about it, the fact seems to be that it is particularly easily controlled, however much the reasons assigned may be contested. Most of the opinions regarding inherent stability that I have read seem to show this prejudice about uncontrollability, which practical experience demonstrates to be totally unfounded. Experiments also show, and Mr. Dunne is reported to have stated expressly before the Aeronautical Society, that his machine does not roll when near the ground, so there is no need to "switch off" the stable qualities when landing or taking off. When Com. Félix left the controls locked for so long what prevented the machine from playing all sorts of awkward and perhaps disastrous tricks but its inherent stability? If he had left the controls unlocked, it would be like leaving a boat's tiller to bang about unlashed, which is not good for it. The Dunne turns into the gusts if left alone and so causes the sustentation to become equal under both wings. On this account it can be accused of bad directional stability with regard to its compass course, and justly so. But this entails no more mental labour than the steering of a boat by compass or otherwise in a rough sea does. The analogy is quite correct, because the Dunne cannot side-slip, &c., any more than a boat can, though it does not roll about like a boat. As for efficiency, which is the better: an efficient pair of wings dragging a large body and tail, or a slightly less efficient pair without these encumbrances? Again, I believe that the latter wings have been shown by experiment to be no handicap. Practice shows that in the Dunne machine the undeniable facts are: that it is not stiff or tricky in manœuvring, does not side-slip, nose dive, stall itself or pancake, and that it does not roll when near the ground. What more does anyone want but a reliable engine? I might add that Mr. Bairstow's definition is satisfied completely by Dunne gliders cut from notepaper with no bodywork, in calm and wind, and that they do not roll or buck about in any way.

Apologising for trespassing on so much of your valuable space.

Dublin, February 2nd. W.F.G.

Safety Aeroplanes.

[1835] With regard to the question of the dihedral system of planes raised by your correspondent B², letter No. 1820, I fail to see that the reply thereto set out in letter No. 1831 is any argument against the development of the pronounced dihedral angle.

The end losses referred to can easily be utilised with advantage, as in the case of the finest inherent stability machines of the present time where the pronounced dihedral is a leading feature, the wing extremities being curved sightly downwards. It will be seen that the upward deflection of the air means a uniform concentrated lift at the plane ends; this I consider is of great importance to the "even keel" theory. Furthermore, side gusts would tend to deflect the windward wing, assisted, of course, by a low fuselage surface.

I also do not agree with your correspondent when he says that "No well designed aeroplane will glide upside-down unless held so by the use of the controls by the pilot." Accidents of late have proved that planes possessing little or no dihedral are quite capable of landing gently on their backs, with or without the pilot on board.

Battersea, S.W., February 2nd. JOHN W. ROBINS.

A System for the Classification of Aeroplanes.

[1836] Although the science of aviation continues to make rapid strides, the advent of a fixed system for the classification of aeroplanes appears to be as far off as ever.

The object of any method of classification should be to produce a system as comprehensive as possible with the least possible amount of change in the terms in general use. It should take into consideration not only the forms at present in regular use, but also possible changes which may arise in the future, which, if unprovided for, would in due course break down the system.

The first classification of aeroplanes was naturally based on the number of sustaining surfaces. Thus machines were divided into monoplanes, biplanes, triplanes, &c. As the number of different types increased, it was soon found necessary to subdivide these divisions in order to make exact description easier.

One system adopted was limited to biplanes, and was based upon the position of the screw by which the machine was driven—namely, whether it was a "Propeller" or a "Tractor." This method is exceedingly weak, as it is possible to have machines practically identical in construction driven by either tractors or propellers. For example, the D'Artois biplane, which, whilst belonging to the "Tractor" type of construction, must be classed as a "Propeller" biplane, as it is driven by a propeller at the extreme tip of its tail. Now the "Propeller" biplanes include the Henry and Maurice Farman machines, which bear no resemblance whatever to the D'Artois biplane, which obviously belongs to the same main type as the Avro and Breguet. Again, the Caudron biplane, which falls within the "Tractor" class, is of an entirely different type of construction to the Sopwith and B.E. 2, which also belong to this class. The inefficiency of this method of classification was shown when Messrs. Short Brothers produced a biplane driven by one propeller and two tractors. This has resulted in the mere statement that a machine is of the "Tractor" type or "Propeller" type being insufficient to convey an exact idea of its appearance without a detailed description being added.

Another form of classification, which is common to both monoplanes and biplanes, is based on the position of the directional surfaces relative to the main planes. In most types these are at the rear extremity of the machine, and the term "Canard" has been adopted to describe an aeroplane in which the usual order is reversed.

Some time ago the writer suggested an alteration in the system of classifying biplanes, based on the form of framework used to connect the directional surfaces to the sustaining surfaces. This was the use of the terms "Fuselage" and "Outrigger" as distinctive names for the two chief types of biplanes. The time, however, was hardly ripe for a change, as the number of types was not so great as at present, and design in general was more unsettled.

It is the object of this letter to suggest a more comprehensive scheme of classification than has yet been attempted. Briefly, it consists of the adoption of the four terms "Fuselage" "Outrigger," "Canard," and "Pendulum" in conjunction, so as to produce a number of subdivisions which will cover practically every type of machine. The first three terms are already in general use and need no explanation. The term "Pendulum" was suggested in connection with the controversy that at one time raged around the Train monoplane, and others of a similar type, in which the pilot is seated beneath the sustaining surfaces, which were supposed to be unstable on account of the "pendulum action" set up when turning. The word is used to denote a machine built on this principle. With these four terms it is possible to make six subdivisions which can be applied alike to monoplanes or biplanes.

Taking the biplanes first, they are as follows:—(*a*) Fuselage biplane; (*b*) Pendulum-Fuselage biplane; (*c*) Canard-Fuselage biplane; (*d*) Outrigger biplane; (*e*) Pendulum-Outrigger biplane; (*f*) Canard-Outrigger biplane.

Probably the best method by which to show that these subdivisions cover all classes of aeroplanes at present in existence is to supply a few illustrations of each type.

(*a*) Fuselage biplane (a biplane in which the rudder and elevator are attached to a *fuselage*):—Avro, B.E.2, Breguet, Sopwith.

(*b*) Pendulum-fuselage biplane (a "Fuselage biplane" in which the seating accommodation is beneath the lower plane. This type is at present only represented amongst hydro-aero craft, and is commonly called an "air boat"):—Lévêque, Denhaut, Curtiss, Benoist.

(*c*) Canard-fuselage biplane (a "Fuselage biplane" flying "tail first"):—Voisin canard, Pont.

(*d*) Outrigger biplane (a biplane in which the rudder and elevator are attached to the main planes by means of outrigger booms):—Henry Farman, Maurice Farman, Caudron, Champel.

(*e*) Pendulum-outrigger biplane. (An "outrigger biplane" in which the seating accommodation is beneath the lower plane.) This type is at present only represented amongst hydro-aero craft:—Sopwith bat-boat, Radley-England.

(*f*) Canard-outrigger biplane. (An "outrigger biplane" flying "tail first"):— . . . . (?)

It will be seen from the above examples that only one of the classes appears to be unrepresented at the present moment.

Taking the monoplanes, they are as follows:—

(*a*) Fuselage monoplane (a monoplane in which the rudder and elevator are attached to a *fuselage*):—Blériot, Bristol, Morane-Saulnier, Nieuport.

(*b*) Pendulum-fuselage monoplane (a "Fuselage monoplane" in which the seating accommodation is beneath the wings):—Vinot, Morane-Saulnier ("Parasol").

(*c*) Canard-fuselage monoplane (a "Fuselage monoplane" flying "tail first"):—Blériot canard.

(*d*) Outrigger monoplane (a monoplane in which the rudder and elevator are attached to an outrigger):—Mersey, Borel "warplane."

(*e*) Pendulum-outrigger monoplane (an "Outrigger monoplane," in which the seating accommodation is beneath the wings):—Blackburn (early), Demoiselle, Moreau (automatic stability), Train.

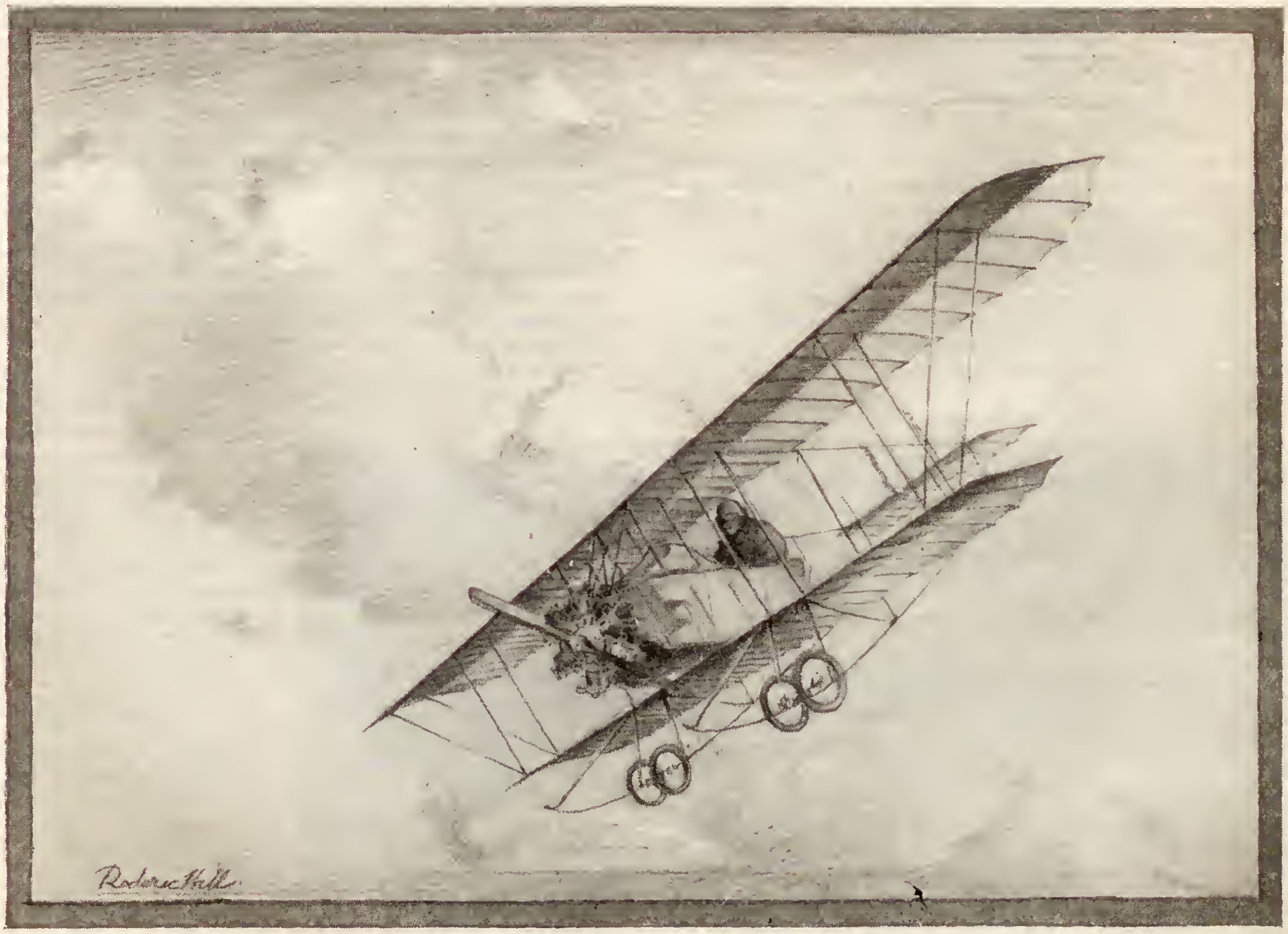
(*f*) Canard outrigger monoplane (an "Outrigger monoplane," flying "tail first"):—Valkyrie.

For the sake of abbreviation in print, the initial letters only of the distinguishing terms might be used. Thus a Train monoplane would be a type "P.O." monoplane, and the Voisin canard a type "C.F." biplane.

It will be noticed, by comparing the examples given under each type, how naturally machines in which the main constructional details are alike fall into the same class.

The only exception which I have been able to discover up to the present time is the Dunne machine. As this has no elevator or rudder, in the ordinary sense, it is quite impossible to class it under this system.

Vincent Square. C. Nicholson.



From an original drawing by Mr. Roderic Hill.

Edward Baumann's "return from the stars" on his 60 h.p. Caudron biplane at Hendon Aerodrome.

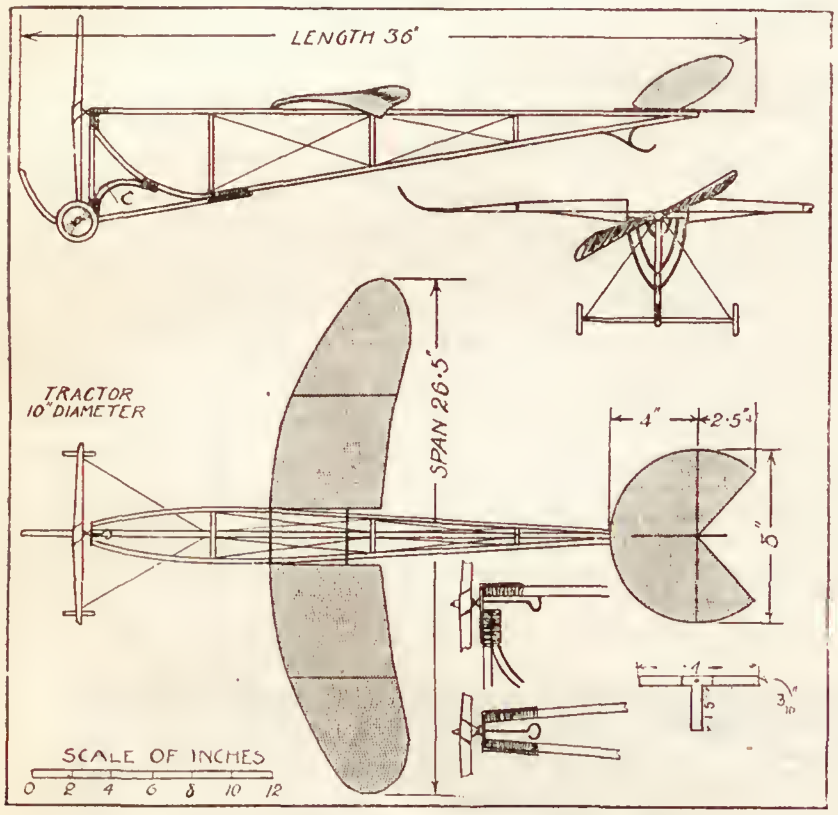
Models

Edited by V. E. JOHNSON, M.A.

A Simple Tractor Monoplane.

The accompanying scale drawings and the following particulars of a small model tractorplane are sent us by Mr. R. Pinniger. The main planes are constructed of 18 s.w.g. piano wire, and the tail and rudder of 20 s.w.g. The *fuselage* is made from $\frac{3}{16}$-in. poplar, with $\frac{3}{16}$-in. by $\frac{3}{16}$-in. bamboo for the struts.

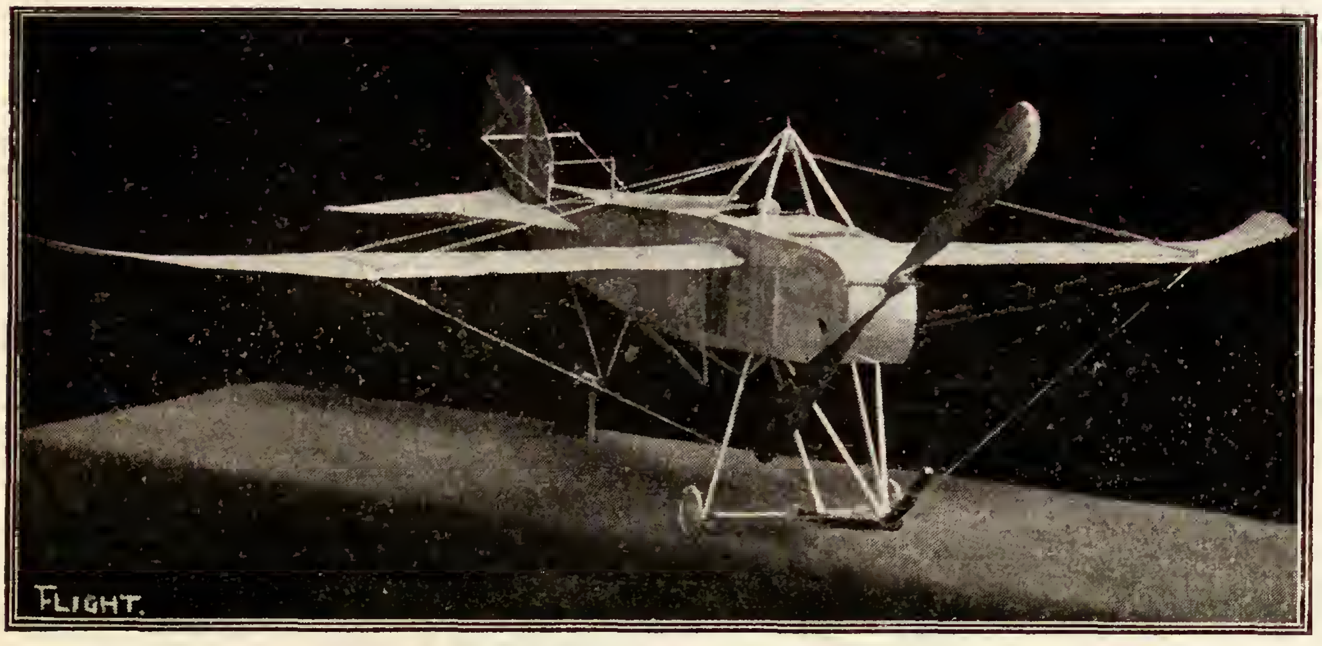
The landing chassis consists of a skid of hickory, to which a vertical strut is attached by means of a T-socket, which is also bound higher up to the bearing and one of the longitudinals. Further, a piece of bamboo is attached as shown at C, and the axle is fixed rigid on to the skid. The wheels are 2 ins. in diameter, and were obtained from Messrs. J. Bonn and Co.



Mr. R. Pinniger's tractor monoplane.

The bearing is constructed from a T-piece of brass, as shown in the drawings. The tractor screw is 10-in. diameter and 18-in. pitch.

The reason why an opening is left in the central part of the trailing edge of the main plane and the join-up is made towards the leading edge is that it leaves the trailing edge more flexible, and enables a small angle of incidence to be given to the main plane if desired.



Mr. R. V. Tivy's steam-driven model.

Mr. R. V. Tivy's Steam-Driven Model.

We give this week an illustration of this model, a brief account of which appeared in our last monthly report under The Bristol and West of England's Aero Club's model notes, p. 129. Mr. Tivy, in his communication accompanying the photograph says: "The loading will probably strike you as being quite abnormal. However, the machine rose at quite a low speed when it was driven by a rubber motor, the loading then being 17·6 oz. per sq. ft. At the time of leaving the ground fully half of the wing was at a negative angle. As mentioned in the report, the speed at which the model will leave the ground with the engine on board has been found to be about 20 m.p.h. My contention is that for a given engine power a 'Weiss' wing will carry about double the loading employed on the power-driven machines of the present day, and I do not think that the experiments with a full-size 'Weiss' machine which are, I believe, to be conducted will disprove my assertion.

"The difficulties I have experienced so far with my steam plant have been entirely concerned with my lamp, and I must ask you to keep an open mind (as I am trying to do) as regards the possibilities of a plant of this kind, until my experiments have proceeded a little further."

Referring to our correspondent's last statement, we do not quite understand it. If the inference is that we are asked to keep an open mind *re* the possibilities of this type of plant in general, and not our correspondent's in particular, then there is no necessity for us to do so at all, because the writer has in his possession a blow lamp which is perfectly satisfactory and efficient. We quite understand Mr. Tivy's difficulties in this respect: it is the crux of the whole problem, and it took, we believe, Mr. H. H. Groves some three years to solve it experimentally; but the problem is a solved one, and Mr. Groves has published the results of his experiments, with respect to which Mr. Tivy is at liberty to take the fullest advantage.

Mr. Tivy adds that he hopes to exhibit the model at Olympia; we trust that he will do so, and that we shall have an opportunity of seeing the plant running (in the annexe, say). Something of this kind would greatly add to the interest of the Show in general.

Mathematical Formulæ for Model Workers.

"For some time past it has appeared to me," writes Mr. A. E. Wollard, "that, in spite of the fact that many model makers are experimenting with regard to shape of planes, aspect ratios, cross sections, &c., it has been extremely difficult to take advantage of the data so gained.

"To be able to make proper use of this data, I contend that it is necessary to put the deductions into correct mathematical formulæ. Also, if the world is to benefit by the model makers' experiments, it is absolutely necessary to arrive at some definite basis on which to make any calculations that may be required.

"It would doubtless be an easy task for an experienced mathematician to compile formulæ, but although I know that there are many aeromodellists who have studied mathematics, the absence of formulæ in connection with model work—and I should judge that from Mr. Handley Page's recent lecture that the same formulæ would be applicable to full-sized machine work—suggests that they are either non-existent or are of such an incorrect and inconsistent character that it would be unwise to publish them.

"In writing this I know that I am laying myself open to criticism, and perhaps some will think, even though they do not voice their remarks, that for all formulæ required why not use those compiled by Eiffel, Lanchester and other experts. My answer to this is that model makers want to find out for themselves the basic principles, and even if the results should prove the same as those supplied by the authorities on the subject, they will be understood more fully than any amount of reference work.

"Personally, I have no suggestion to offer as to how this is to be accomplished, but I hope that by bringing this point forward, some help may be derived from any subsequent discussion."

[We shall be glad to hear what any of our readers have to say on this subject.]

Report of Experiments with the Shorter Monoplane.

By L. G. RYLEY (The Coventry Aero Club).

Trials with the above type of machine (described in FLIGHT, November 22nd, 1913) were carried out a few weeks ago, and for the benefit of other readers who may be considering the question of constructing a similar machine, I am sending these results. Mr. Shorter is very busy at present, and the writer, who was present at the above, has been asked to write the report. I need not weary the reader by describing how we searched for a suitable slope, but I must describe the "aerodrome" itself. It consisted of a small "knob" in the middle of a somewhat small and "squashy" field. For a glider with good ash skids it would not have been so bad, but our 12" "pram-wheels" were continually sinking in. However, in due course, a fairly suitable Saturday arrived, and we transported ourselves and machine along. The monoplane being now erected, Mr. Shorter (minus hat, coat, and other weighty material) entered the pilot's seat, and two 10" [10'?] ropes were attached, one to each wing tip. One enthusiastic individual sprang forward and swung the propeller in fine style, and when the speed of same had increased somewhat, we started off down the hill.

Unfortunately the wind was only blowing 7 m.p.h., and the slope was on the flat side, with the result that the machine refused to rise. I had a faint idea of what towing was like, but I did not think it was as tough as this. On returning we noticed the wheel tracks down the hill, which explains why we could not get up sufficient speed for the machine to rise. The second trial, however, was more successful, for we ran much faster, and when about halfway down the slope the machine (with pilot aboard) made a few hops at about a foot off the ground. Several more hops were indulged in, but the duration could not be increased. The monoplane was then tried minus pilot and some good towed flights were obtained. During one of the latter the detachable joint in the *fuselage* gave way, when the machine landed heavily and so put an end to the sport. Nevertheless, I believe we all felt better for our 2½ hours' exercise in the open. Now for the conclusions. Readers will gather from the above that the narrow "pram-wheels" sinking in the ground was the cause of the trouble all along. The machine was originally intended to be tried on a smooth track (in fact the very first trial was carried out at such a place). With regard to the leather belt, this worked excellently up to a certain speed, but when Mr. Shorter endeavoured to go "all out" a slight slipping was perceptible.

However, as soon as the propeller speed decreased slightly, the belt again took up the drive excellently. When it was first decided to construct this machine the writer obtained a couple of bevel gears and the constructor the chain wheels, &c., but so many of those "know-all-about-it" folks kept advising us to use a belt that to satisfy our own curiosity as well we gave it a trial. Hence the experiment. With regard to the question of fitting a "freewheel" (FLIGHT, November 22nd, 1913), I think it an advantage to leave this out, as any momentum the propeller does possess could be used to assist the cranks over the "dead centre." However, Mr. Shorter firmly believes that if he built a second machine possessing more area, using the same propeller and an efficient chain drive, it is possible to do a few hops on level ground against a slight breeze.

Personally I think a machine of this type should be constructed similar to a rubber-driven model, *i.e.*, the controls should be fixed, or nearly so, as this would enable the pilot to give more attention to the pedalling. When a model is launched the extra power or "burst" of the "motor" makes the machine climb, and when the rubber "runs out" the machine automatically glides down. Now if a cycleplane could be constructed similar to this, and the pilot strapped in *à la* Pégoud, he (the pilot) could govern the height by the speed. All the pilot has to do is to travel "all out" along the track, and if the speed increases sufficiently the machine will rise automatically; if it does not, then alter the angle of the elevator slightly and try again.

[This suggestion certainly seems founded on common sense.]

Upturned Wing Tips.

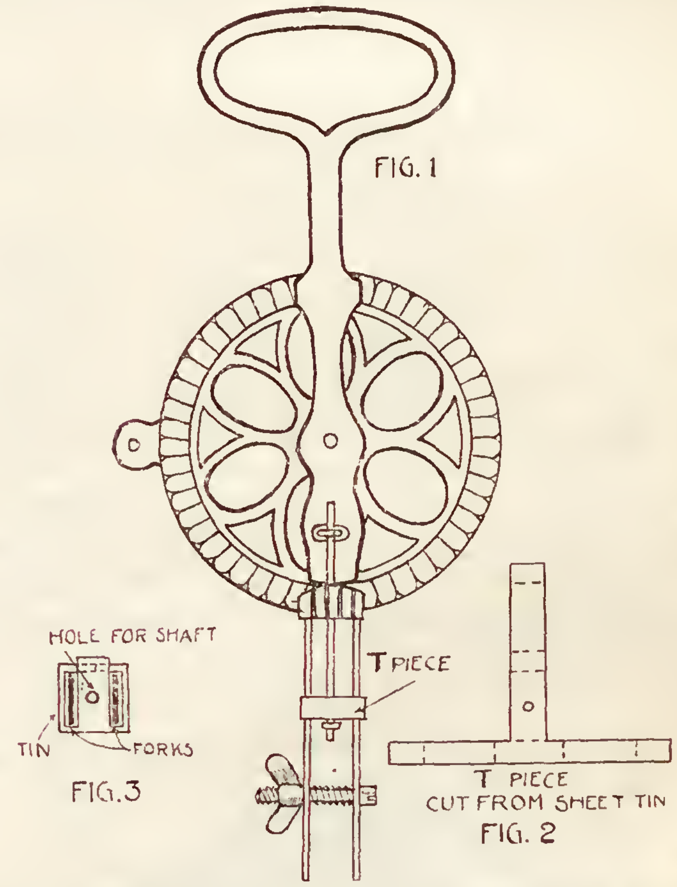
Many aeromodellists will have read with especial interest Mr. W. E. Somerville's account of his full-sized experiments with upturned wing tips, as given in January 31st issue, pp. 108–109. For purposes of lateral stability, and more especially for prevention of side-slipping, the value of such have long been known to model workers, and some of the best known flyers have used them in one form or another in their machines for years. In the case of full-sized machines, there of course always arises the question of the personal control of the pilot to complicate the simpler questions of either inherent stability or a stability obtained by automatic means. A bicyclist naturally prefers a bicycle as it is, unstable naturally, he neither desires a machine stabilized by means of a gyroscope or any such mechanical device, even supposing such could be added to the machine without increase of weight, or the necessity of employing extra power.

And to a certain extent one can fully appreciate a pilot's feeling in the matter, any stabilizing device must undoubtedly be of such a character as not to in any way interfere with the pilot's free control of the machine; nor must it, if possible, in gusty weather add to his discomfort by giving him greater stability at the expense of a considerable increase in pitching and rolling; for such a system, however, favoured by inventors, will certainly never be used by those who have the actual flying of machines.

How far the system of upturned wing tips fulfils these conditions is a matter with respect to which probably considerable difference of opinion exists. So far as upturned tips *v.* dihedral angle is concerned, from the very large number of model experiments that I have seen on this point, I have no hesitation in saying that upturned wing tips is by far the better system of the two.

How to Make a Simple Winder. By J. E. ROGERS.

Procure an ordinary egg-beater, remove the bottom part of the same, and the small cog with its shaft furthest from the big cog, so that it is left as shown in Fig. 1. Next cut out a piece of tin T-shape, bore a hole and bend at the dotted lines, so that it looks like Fig. 3, slip on the forks, make a groove round the shaft, put a copper wire ring in it and compress it tight. Solder the T-piece in position as in Fig. 1. Next procure a screw and wing nut. Drill a hole in each fork three-quarters of an inch from the bottom, pass the screw through the holes, and solder the head to the fork, and you have the winder complete.



Bamboo.

It is probably not too much to say that every practical experimentalist in aeronautics has at some time or another used bamboo in some part or another of his machines. It has been used (and smashed) in the case of man-carrying gliders probably more often than any other wood. For full-sized work, or, indeed, in any case where the "tube," be it large or small, is employed *entire*, it is not a success, and undoubtedly more than one fatal accident has happened through its use, but when employed in a proper and scientific manner, it is undoubtedly very hard to beat. It is an ideal substance for model work, but only the very best portion of the wood must be made use of. First of all a tube (the larger the diameter the better) should be procured of some convenient length, say 4 ft. This should be sawn from end to end in strips, a quarter to half an inch wide, according to the size of the tube and the width of strip desired. These strips should next be planed on both sides, the soft inner pith all removed, ditto the knots and the hard outer shell. When this is done we have left a wood of great strength and also flexibility, most useful for skids and chassis on larger models, for the wing spars of smaller models (when some ⅛ inch wide), and for many other purposes. A wood which can be readily bent by the dry hea process to practically any desired shape. It is not, of course, suitable for motor rods, or any purpose where rigidity is required. Years ago one employed small (entire) bamboo tubes for the motor rods of models, but these have long been superseded by the built-up and correctly proportioned and tapered hollow spar motor rods of the present day, of minimum weight and maximum strength where most needed.

Model Club for Burton and District.

Mr. Charles G. Lamb, 156, Shobnall Road, Burton-on-Trent, informs us that a model aero club has been formed, to be called the Burton and District Aero Club. Flying meetings are being held every Wednesday and Saturday afternoon, and meetings at the Y.M.C.A. the first Monday in the month for business, papers and discussions. Col. R. F. Ratcliffe, M.P., has kindly consented to become president, and a large membership is expected. Anyone wishing to join the club will be supplied with every information by applying to the secretary at the address given above.

An American Appreciation.

The following letter has been received from Mr. Charles R. Courtney (Chicago, U.S.A.), correspondent of the Illinois Model Aero Club:—"I have been reading FLIGHT, especially the Model Section, for about a year, that is since I first heard of it, and I think it is the best magazine containing a model section in the world—second to none." We are much indebted to our correspondent for his appreciative note, and we shall always be very pleased to receive from him any American aeronautical news of a model character.

❋ ❋ ❋ ❋

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver	85 secs.
Twin screw, do.	Distance	R. Lucas	590 yards.
	Duration	G. Hayden	137 secs.
Single screw, rise off ground	Distance	W. E. Evans	290 yards.
	Duration	W. E. Evans	64 secs.
Twin screw, do.	Distance	L. H. Slatter	365 yards.
	Duration	J. E. Louch	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance	C. C. Dutton	266 yards.
	Duration	J. E. Louch	91 secs.
Do., off-ground	Distance	C. C. Dutton	190 yards.
	Duration	J. E. Louch	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter	60 secs.

Aero Show.—Will all intending exhibitors forward at once their entries to the hon. sec., so that it can be seen if the estimated space allotted for models will be sufficient?

Club Stands.—The Aero Models Association (Northern Branch) have reserved a stand, increasing club stands to eight.

Challenge Shield.—The handsome club challenge shield—presented by Mr. Thomas Farrow, Chairman of Farrow's Bank—is to be known as the Farrow's Bank Shield, and will be for competition among the affiliated clubs. It is hoped that every club of any note will compete for this. Photograph appears on this page. The size is 3 ft. high by 29 ins. wide.

The Farrow Shield.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (N. Branch) (27A, SEDGEMERE AVENUE, EAST FINCHLEY, N.)

FEB. 7TH, flying at Finchley 3 p.m.; Feb. 8th, 10 a.m.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

FEB. 8TH, flying Wanstead Flats 10 a.m. If wet, meet at clubroom.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

FEB. 7TH, flying at Sudbury. Competitions for show models.

UNAFFILIATED CLUBS.

Ilford Model Ae.C. (83, ENDSLEIGH GARDENS, ILFORD).

FEB. 8TH, flying as usual at Newbury Park (weather permitting).

Liverpool Aero Research Club (62, CEDAR GROVE, LIVERPOOL).

FEB. 13TH, general meeting at 8 p.m. In view of the programme that the club is endeavouring to put forth for the coming season, the hon. sec. will be glad to hear from persons interested in the Liverpool, Bootle, and Wallasey districts. Particulars of membership on application. Particulars will shortly be announced regarding the Aero Research Trophy competition.

Edinburgh Aero Club.

OWING to a disagreement between the senior section and the model section of the Edinburgh Aeronautical Society, the majority of the model members have resigned their membership and have formed a new club, which will in the future be known as the Edinburgh Aero Club. All communications regarding the new club should, in the meantime, be addressed to the secretary at 13, Hermand Terrace, Edinburgh. Meetings of the new club are held at Mr. Harrison's Studio, 46, Torphichan Street, on Thursday evenings, at 8 o'clock; all interested are cordially welcome.

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A Sunbeam for the Government.

IT is gratifying to learn that the War Office, through the Royal Aircraft Factory, have intimated to the Sunbeam Motor Car Co., Ltd., of Wolverhampton, that they are purchasing the 150 h.p. 8 cylinder Sunbeam aviation engine, which during the past few months has undergone some severe tests in the factory.

Nieuport Developments.

COMMANDER DELAGE (general manager of the French Nieuport works), M. Henri Kapferer, and M. Bazaine were in London at the beginning of this week in connection with the first board meeting of Nieuport (England), Ltd. We understand that some important constructional developments may be looked for shortly, and in the meantime it is interesting to learn that the armoured machine which attracted a considerable amount of attention at the Paris Salon has given very satisfactory results in its first trials at the hands of Dr. Espanet.

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PUBLICATION RECEIVED.

Calendar, 1914. Kelvin Bottomley and Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.

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Aeronautical Patents Published.

Applied for in 1913.

Published January 29th, 1914.

10,216. SOC. ANON. L'AERA AND A. WUNDERLICH. Beating-wing mechanisms.
17,380. L. J. BERGDOLL. Aeroplanes.
22,124. SIEMENS SCHUCKERTWERKE GES. Airships with sub-divided inner chambers.
22,467. LUFTSCHIFFBAU-ZEPPELIN GES. Airship shed.

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FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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CONTENTS.

Editorial Comment: PAGE

The Proposed Atlantic Flight 157
Risks that are Taken 158
Men of Moment in the World of Flight: Mr. W. Ridley Prentice ... 158
Flying at Hendon 160
Aero Engines at the Paris Show 162
Royal Aero Club. Official Notices 164
From the British Flying Grounds 165
Eddies. By "Will o' the Wisp" 167
An Aeroplane in the Making 168
Further Developments of Military Aviation. By Lieut.-Col. F. H. Sykes 170
Foreign Aircraft News 175
Models. Edited by V. E. Johnson, M.A. 176
Correspondence... 179

EDITORIAL COMMENT.

The Proposed Atlantic Flight.

At the present moment a main topic of discussion among people directly interested in aviation is the proposed Atlantic flight and the possibility of its being achieved this year. For our own part, we have been inclined to favour 1915 as more likely to see the crossing made, rather than 1914, but there are others who apparently are now more sanguine of the present year being the one which is to mark this further notch in aviation history. On balance, indeed, we think that there *are* possibilities of its being accomplished before the end of the coming summer.

In arriving at this conclusion we have been largely influenced by what we have learnt of the organisation of the attempt with which Lieut. Porte will be associated, financially backed by Mr. Wanamaker. In the light of recent performances in the air, it must be at once admitted that there is nothing physically impossible—we had almost said there is nothing particularly difficult—in a sustained flight of the distance between Newfoundland and the Irish coast, but then this Atlantic flight is a rather different proposition to mere circuit flying. All sorts and conditions of meteorological changes have to be reckoned with, and all sorts of contingencies taken into account which are not likely to arise in the average case, and which, even though they were to arise, would not have the serious consequences that are bound to ensue if they take place in mid-Atlantic. That being so, there is absolutely nothing that can be left to chance. The machine on which the attempt is to be made must be of the best in every detail; things must be calculated with a scientific accuracy quite unnecessary in another case; the men must not only be skilled aviators, but navigators of more than average attainments; and, above all, there must be the money behind it all in sufficient quantity to make certain that nothing, down to the last detail, has had to be neglected for want of funds. In the case of the one announced attempt which is so far to be taken seriously, that which is being financed by Mr. Wanamaker, every one of the essentials has been provided. There is unlimited money behind the attempt. The Curtiss air-boat is a most suitable craft in every way. Lieut. Porte, who is to have charge of the actual flight, is an aviator of long experience, in addition to which he will probably have as his colleague an American naval officer, who has yet to be chosen. Humanly speaking, the organisation will be as perfect as knowledge and experience can make it. So far as is possible, therefore, all the elements of success are there, and, barring accidents, we believe that success may be achieved.

We have recently seen Lieut. Porte, and talked over the proposed flight with him. He is quietly confident of being able to accomplish the projected flight. According to what we gathered from him in the course of our interview, the machine will actually be ready some time in June, but it is not anticipated that the actual flight will take place before the middle of August, when the weather conditions are usually more favourable than at any other time of the year. He expects to accomplish the journey—if it is to be done at all—in a single day, and without alighting. So much for the details of the flight as far as they have been arranged.

One point that is worthy of passing notice is that it has been seriously proposed in America that the conditions of the flight for the *Daily Mail* prize should be modified so as to admit of there being an actual race across the Atlantic between several machines, and that the Governments of Great Britain and the United States should be asked to provide a warship patrol of the route. There is something in the idea in the abstract, but we really do not think that any good cause has been shown why the existing conditions should be altered, at any rate yet. As we conceive it, the prize is offered to encourage serious aviation, and it would be in no way in accord with the spirit of the thing to encourage risky experiments. As we have pointed out, success can only come with perfect organisation, which entails the expenditure of money. In fact, the conditions of such a flight are so onerous as to their preparation that even supposing the prize to be won, the man behind it will find himself out of pocket at the end. So far, there is only the one project extant which complies with these requirements. The people concerned are going into it with their eyes open, and prepared to accept the conditions as they stand. Therefore, at the moment there seems to be no reason for modification in order to let in those who are prepared to take extraordinary risks in the hope of a lucky fluke enabling them to score a success.

It would be impossible to leave the subject without paying a tribute to Mr. Rodman Wanamaker, who is finding the money for the projected flight. He is doing it from a purely public-spirited motive, that being, as he says, to develop aerial navigation, and incidentally, to celebrate the centenary of Anglo-American peace. It is to men such as Mr. Wanamaker that aviation is under a deep debt of gratitude for, had it not been for the generous way in which wealthy patrons of the science have come to its assistance, the stage of development to which it has arrived would in all probability not have been reached for years to come.

* * *

Risks that are Taken. We have recently had sent to us for our inspection a sprocket which had been used for driving the magneto on a Gnome engine. Apparently the sprocket in question was one originally intended for the rear wheel drive of a bicycle, and had been adapted (!) to drive the magneto. The manner in which this had been done was interesting, though appallingly crude. As many of our readers will doubtless remember, the spindle of the Bosch magneto is tapered to take up the drive and, with a properly fitting sprocket, is most perfectly satisfactory. In the case under notice the taper was ignored altogether—the hole through the boss was over an inch in diameter and screwed inside. Across the face of the sprocket was rivetted a strip of thin iron, the two "rivets" used being ordinary French nails. In the centre of the strip a square hole was cut, to take an ordinary black iron carriage bolt with a square shoulder, screwed into the magneto spindle, which had been drilled and tapped for the purpose.

It may be that this was in the nature of a roadside makeshift and had been carried out to enable someone to get home for a permanent repair, though nothing is said as to this. The most that can be said is that, if it were in the nature of a temporary job, it reflects more credit upon the ingenuity of the one who carried it out than on his judgment. It needs scarcely pointing out that the aviator whose machine depended upon so crude an arrangement was taking an appalling risk in its use and we cannot too severely deprecate the use of such shifts, except under urgent emergency. There is no sense in increasing the risks of flying by the use of such devices as this—it is simply asking for a catastrophe. We sincerely trust that this is an isolated incident and that not many of our airmen are seeking trouble in the way the genius who perpetrated this "repair" went out to look for it.

W. RIDLEY PRENTICE.

Although coming little before the public notice, the subject of our portrait this week, Mr. W. Ridley Prentice, has for the past three years been very closely associated with aviation, and has had a varied experience. Becoming very interested in the subject of aerial navigation, he decided after nine years' navigation experience in the Merchant service, to turn his attention to practical flying. He joined the Grahame-White school at Hendon in January, 1911, and first learned to pilot a Henry Farman machine. A feature of his tuition was the race as to who should have the first *brevet* with Lewis Turner under the new figure eight regulations. As a matter of fact, Mr. Ridley Prentice finished second, his ticket being numbered 67. He then went on to the Blériot machine, but had only reached the "straight" stage when he took an interest in the Aeronautical Syndicate, Ltd., eventually becoming manager of the Co. In the following August and during the year he flew the different Valkyrie machines successfully. Unfortunately he terminated a flight on the racer one day with a steep dive from a height of 300 or 400 ft. with the Gnome engine running all-out. Mr. Ridley Prentice had a miraculous escape, being thrown clear, but sustaining concussion of the brain; the effects of this were felt for several months, and eventually led him, much to his disappointment, to retire from active flying. In 1912 he had some interesting technical experience when assisting Mr. H. Barber in his capacity as Aeronautical Adviser to Lloyd's, while in the autumn of that year the commercial field of the industry was again entered, Mr. Ridley Prentice joining the General Aviation Contractors, Ltd., of London and Milan, as director and general manager. In January of this year he further became managing director of both the British Anzani Engine Co., Ltd., and of the British Emaillite Co., Ltd., and was largely instrumental, in cooperation with Mr. D. Lawrence Santoni, in the formation of the "Savoia" Co., Milan, holding the Italian rights for the famous Henry and Maurice Farman machines.

THE HAWK.

Raynham Beats the British Height Record.

On Tuesday, Mr. F. P. Raynham, accompanied by Mr. R. MacGeagh Hurst, succeeded in beating the British height record for pilot and passenger, of 12,900 ft., made by Mr. H. G. Hawker on the Sopwith biplane last June. Mr. Raynham, during a flight of one hour and twenty minutes, took the 80 h.p. Avro to a height which is given unofficially as 14,420 ft.

Beating the World's Duration Record.

Splendid as was Langer's duration record, to which reference was made in FLIGHT last week, it was completely put in the shade by the performance by Ingold on a Pfeil biplane on Saturday last. Setting out from Mulhausen at 7.35 a.m., he landed at 11.55 p.m. near Fuerstenried, so that he had been in the air for 16 hours 20 mins., during which he covered a distance of about 1,700 kiloms. Langer's record was 14 hours 7 mins. The Aviatik-Pfeil biplane used is fitted with a 6-cyl. Mercedes motor.

Legagneux's Height Record.

The Commission Sportive Aéronautique has passed the height record made by Legagneux at Frejus on December 27th as 6,120 metres, so that it beats Perreyon's old record of 5,880 metres by 240 metres.

Records with Four and Five Passengers.

Following up his excellent performance in taking six passengers to a height of 1,750 metres, as recorded in our last issue, Garaix on the Paul Schmitt biplane at Chartres, on the 4th inst., took five passengers up to 2,250 metres, while two days later he took four passengers up to 2,750 metres. These two records beat those of Sablatnig, which stood at 890 and 2,089 metres respectively.

MEN OF MOMENT IN THE WORLD OF FLIGHT.

MR. W. RIDLEY PRENTICE.

FLYING AT HENDON.

Thursday of last week was such an exceptionally fine day that it is hardly surprising such a large number of people turned up at the aerodrome and that they witnessed some very good flying. From 3 o'clock until dusk, nine Hendon pilots put up numerous exhibition and passenger flights, whilst at one time there were seven different machines in the air together. The flight of the afternoon was made by F. W. Goodden on the 45 h.p. Caudron. He executed some wonderful "stunts," which reminded us of Chanteloup. Philippe Marty, almost quite recovered from his accident the previous Saturday, was flying again on the 80 h.p. Morane-Saulnier, and took up several passengers, including a gentleman from Ceylon, who made his first trip in an aeroplane. The Grahame-White tractor one-and-a-half plane "Lizzie" made its reappearance, piloted by R. H. Carr; this remarkable little machine has been in hospital for some time, due to an accident when landing after a passenger flight. Other pilots who contributed to the flying were E. Baumann on the Caudron, G. M. Dyott on the Dyott monoplane, Marcus D. Manton and L. Strange on G.-W. biplanes, Louis Noel on the Maurice Farman and J. L. Hall on his Avro biplane.

There was a great change in the weather on Saturday, the wind blowing at about 35 or 40 m.p.h. A cross-country handicap had been arranged for the February meeting on this day, but once again the elements necessitated a change of programme, in fact only one flight was made. This was put up by Louis Noel, who pluckily kept up the reputation of Hendon by ascending with a passenger on the Maurice Farman.

At about 3.30 p.m. he taxied out to the far end of the aerodrome, turned head to wind, and literally leapt into the air. For nearly ten minutes he fought with the wind, being blown about in a manner that made one hold one's breath, especially when he drifted over the sheds out of the aerodrome. Eventually, however, he made an excellent landing, and the machine was returned to its shed. The wind increasing rather than diminishing, it was decided to make no further flights that day. Sunday was not quite so windy, but rain came in its place, and thus prevented any flights from being made at all.

A record list of proposed events has been announced by the London Aerodrome management for the coming season, including several interesting meetings, as will be seen from the list which we give herewith. Several improvements are to be made to the aerodrome itself, so that everything seems to indicate an exceptionally successful season.

Mar. 19.	Thursday.	Desoutter Benefit Meeting.	
Mar. 20.	Friday.	Hendon Aerodrome Dinner and Presentation of Trophies.	
Mar. 21.	Saturday.	Aero Show Speed Contest.	
April 9.	Thursday.	Easter Holidays. Opening of the Hendon Summer Season. Seventh London Aviation Meeting (five days).	
April 10.	Good Friday.		
April 11.	Saturday.		
April 12.	Sunday.		
April 13.	Bank Holiday.		
April 23.	Thursday.	(3 p.m.) Speed and Altitude Tests. (8 p.m.) Illuminated Night Flying and Firework Display.	
May 9.	Saturday.	Suggested date for Hendon–Paris–Hendon Air Race.	
May 23.	Saturday.	The Aerial Derby (for the *Daily Mail* Gold Cup).	
May 30.	Saturday.	Whitsun Holidays. Eighth London Aviation Meeting (three days).	
May 31.	Sunday.		
June 1.	Whit-Monday.		
June 11.	Thursday.	Aerial Fête and Battle of Flowers.	Anglo-American Centenary Celebrations.
June 12.	Friday.	Preliminary Tests for the Anglo-American Trophy.	
June 13.	Saturday.	Speed Contest for the Anglo-American Trophy.	
June 14.	Sunday.	Anglo-American Sunday.	
June 20.	Saturday.	Entente Cordiale Meeting.	
July 4.	Saturday.	Ladies' Day.	
July 18.	Saturday.	Hendon–Brighton–Hendon Air Race.	
July 25.	Saturday.	Blériot Meeting (Fifth Anniversary of the First Cross-Channel Flight).	
Aug. 1.	Saturday.	August Holidays. Ninth London Aviation Meeting (three days).	
Aug. 2.	Sunday.		
Aug. 3.	Bank Holiday.		
Aug. 20.	Thursday.	Aerial Fête and Battle of Flowers.	
Sept. 17.	Thursday.	(3 p.m.) Speed and Altitude Tests. (8 p.m.) Illuminated Night Flying and Firework Display.	
Sept. 19.	Saturday.	Colonial Meeting.	
Sept. 26.	Saturday.	Naval and Military Meeting.	
Nov. 5.	Thursday.	(2.30 p.m.) Speed and Altitude Tests. (8 p.m.) Special Illuminated Night Flying and Firework Display.	

Dates to be announced later:—

Oxford *v.* Cambridge.
Lancashire Meeting.
Territorial Meeting.
International Air Tournament (eight days).
All-British Meeting.
Demonstrations of "Looping the Loop" and Upside-down Flying.
Public Schools Meeting.
Children's Day.
London Day.

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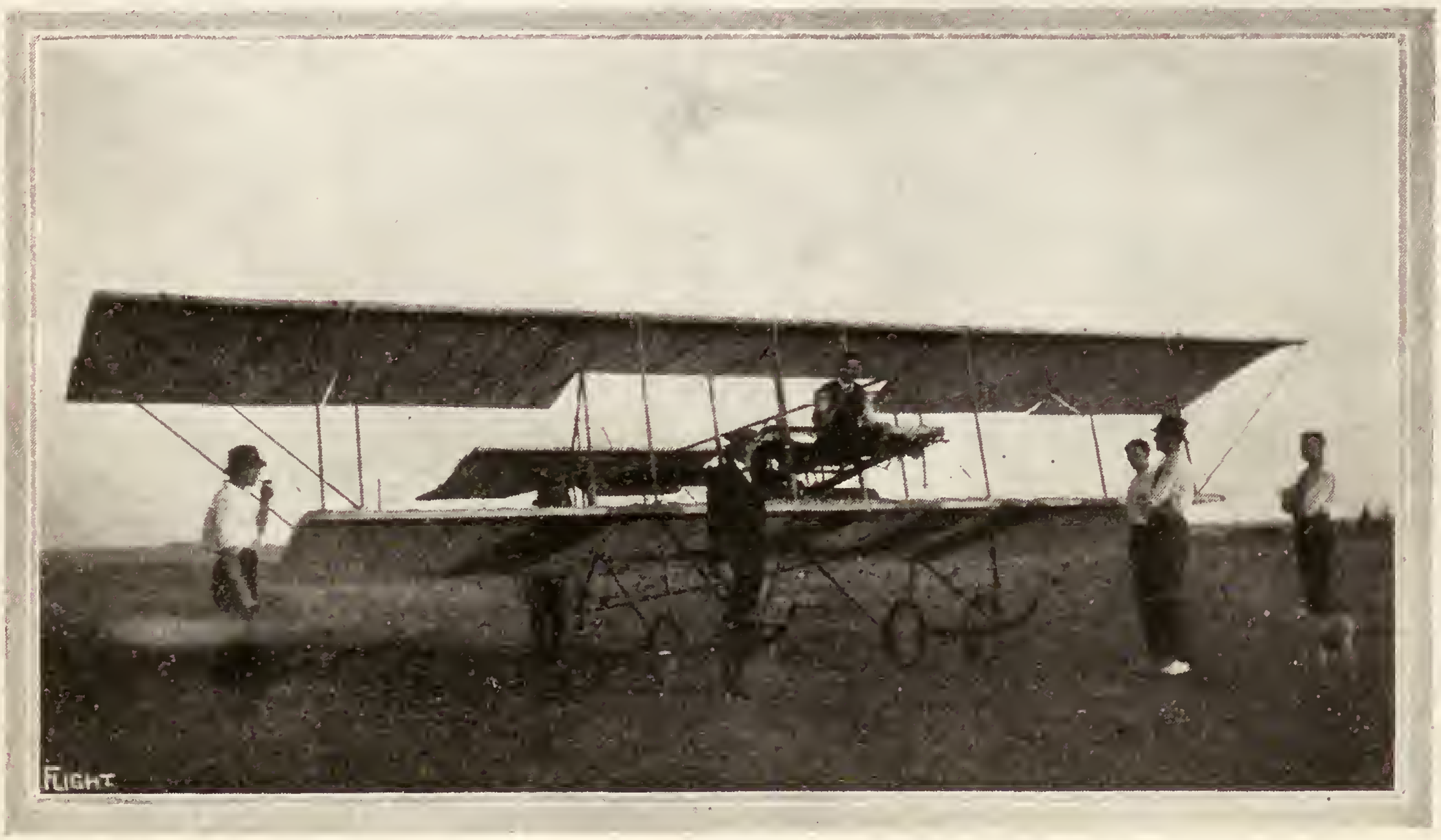
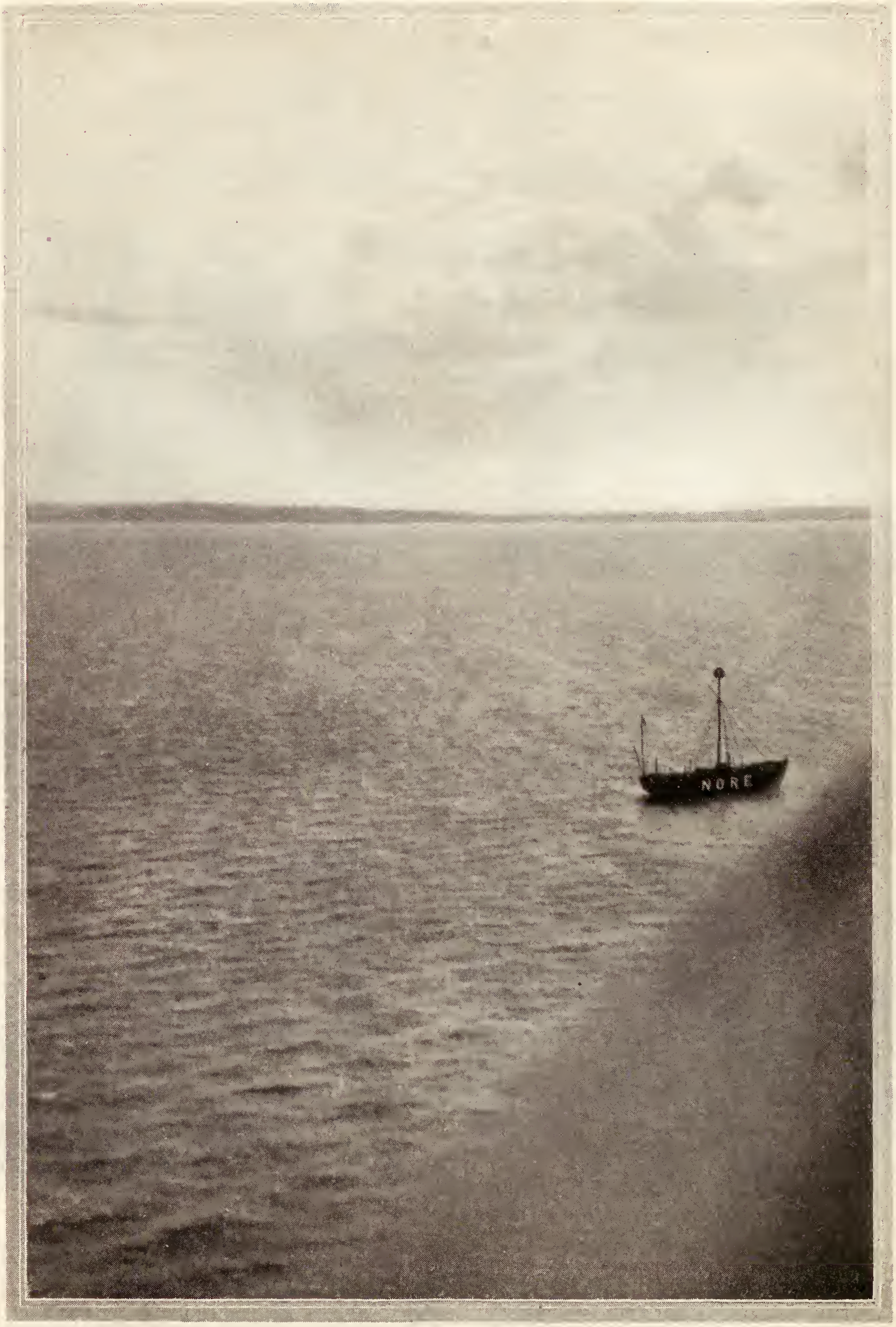


A SOUTH AFRICAN-BUILT BIPLANE.—In the pilot's seat is seen Mr. Compton Paterson, the designer and pilot, and standing on his right is Mr. H. Carpenter, the constructor.



" THE MAN AT THE NORE."—As seen from Squadron-Commander Seddon's Maurice Farman waterplane when flying over the mouth of the Thames last September. The photograph was taken by Mr. W. J. Casey.

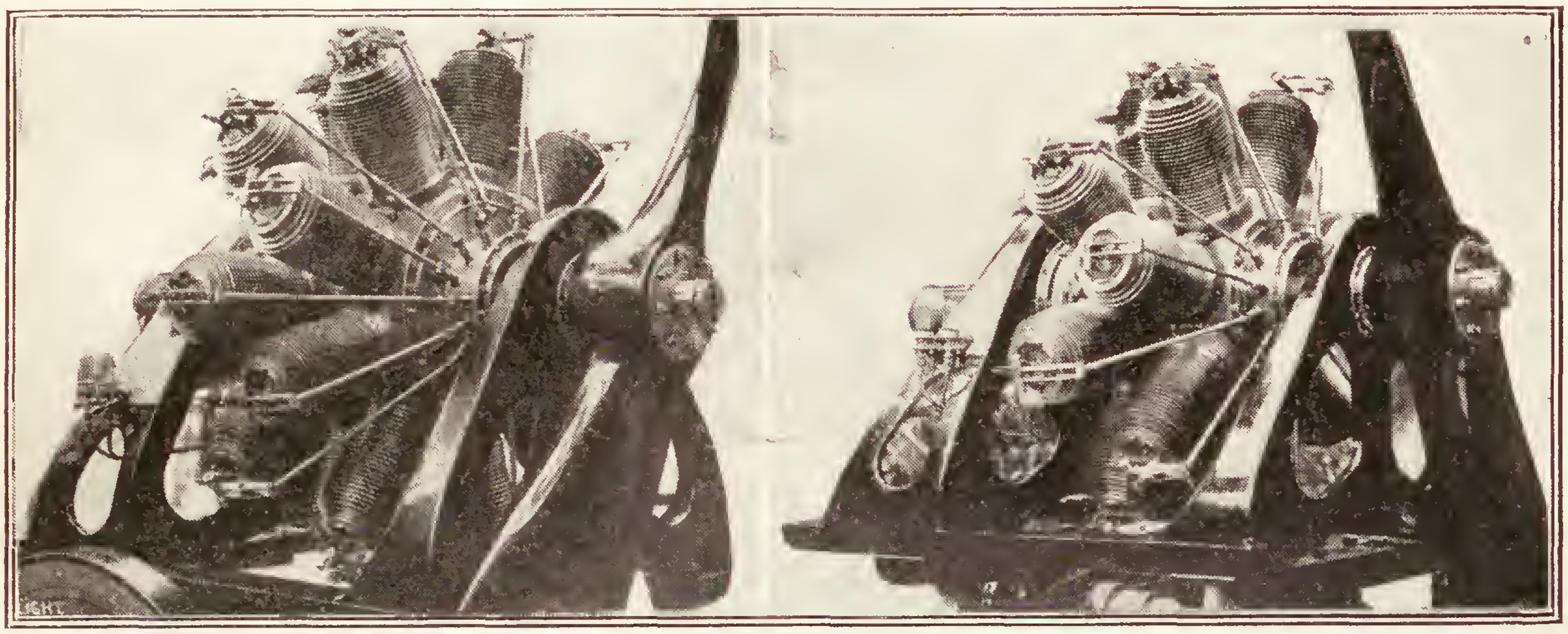
AERO ENGINES AT PARIS SHOW, 1913.

(*Continued from page* 137).

Gnome.

It is hardly necessary to make more than the briefest reference to the engines of the older types exhibited on this stand, since they are so familiar to all our readers as to render a detailed description superfluous.

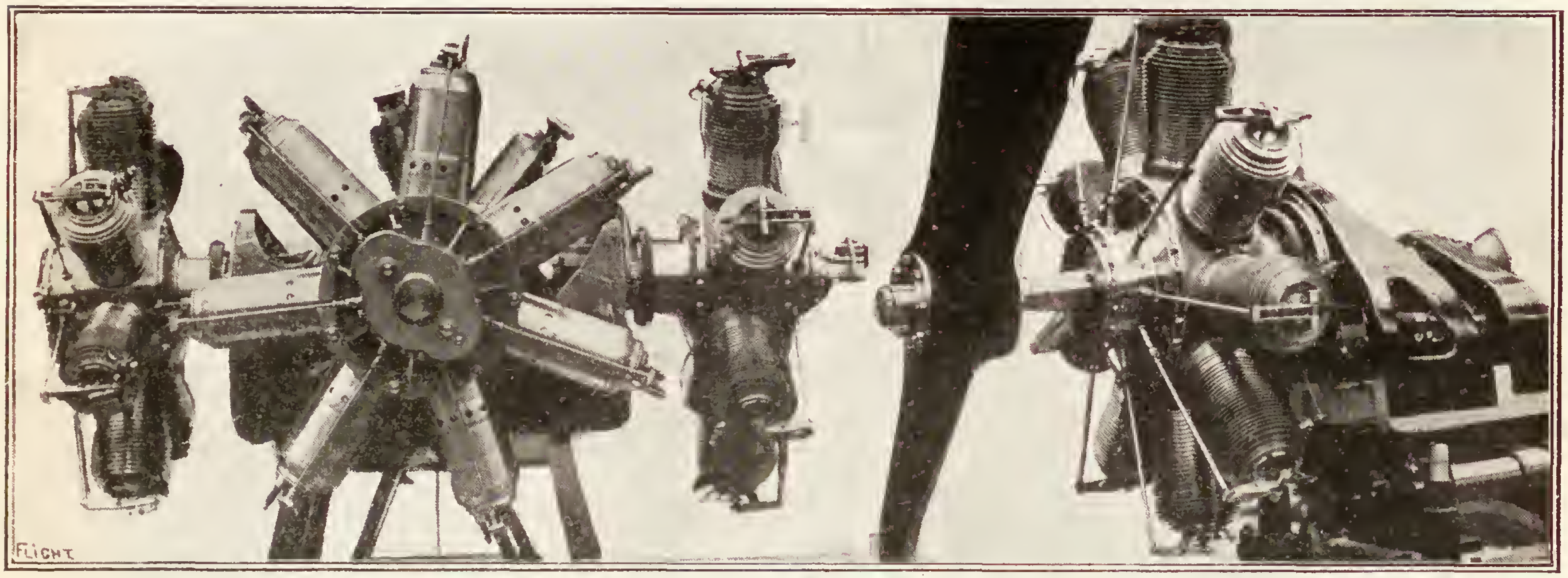
The engines exhibited are given in the table, from which it will be observed that this firm have now three 100 h.p. models—the new 9-cylinder 124 mm. by 150 mm., the new "mono-soupape" 9-cylinder 100 mm., and the earlier 14-cylinder 110 mm. by 120 mm. The weights of the "mono-soupape" engines are not quoted, but it will be noted that the 9-cylinder has an advantage in weight of 11 lbs. only over the 14-cylinder engine. The first-mentioned engine made its first appearance on Borel and Deperdussin monoplanes at Monaco in April last, but did not take part in the competitions. The 200 h.p. engine, which was also introduced this year, is composed of two sets of nine cylinders, all the cylinders forming each group being co-planer, as on the 100 h.p. engine, but the valve gear has been transferred to one end of the engine.



The 200 h.p. 18-cylinder Gnome engine on left, and on the right the 160 h.p. 14-cylinder Gnome.

The "mono-soupape" engines are distinguished from their predecessors by the suppression of the inlet valve, as such. The formation of the charge in the cylinder is effected by mixing a quantity of pure air admitted through the exhaust valve, which is caused to remain open after the period of exhaust and during a portion of the induction stroke, with a rich mixture passing through ports formed in the lower portion of the cylinder barrel communicating with the crank-case. The gas entering by the porting is but a small proportion of the total charge, the air serving merely as a vehicle for the petrol. It is claimed that the extremely rich mixture contained in the crank-case precludes any possibility of firing back, owing to its inflammability, and that the pure air entering *via* the exhaust-valve has a beneficial effect by reducing its temperature. A special control is fitted to these engines which allows of the variation of the lift of the exhaust-valve to be effected.

Another interesting exhibit on this stand was a group of engines, each of which represented a stage in the development of the Gnome engine from its commencement.



Group of Gnome engines, showing various stages in its development, and on the right the 100 h.p. engine.

Laviator.

The four engines exhibited by this company included two engines working on the two-stroke cycle and the other two, Dansette Gillette engines, on the four-stroke cycle.

It will be noted from the table that the dimensions of the two two-stroke engines are the same, but a slightly higher speed (1,300 revs. per min.) is permitted on the water-cooled than in the air-cooled engine that runs at 1,200 revs. per min. The cylinders are equally spaced around the crank-case and have two bores, that which is most remote from the crank-shaft having the smaller diameter and constituting the working cylinder, while the innermost and larger diameter portion forms a pumping cylinder. The pumping cylinder of each set is connected by external piping to the working cylinder, which is 120 degrees in advance of it, in the direction of rotation, and by other pipes to the boss of the crank-case. Ports are formed through this boss, so that as the crank-shaft, which is hollow and in communication with the carburettor, rotates, the opening in the surface of the shaft registers successively with the conduits leading to the pumping cylinders. Hence, the charge is first drawn into the pumping cylinder and then completely discharged into the working

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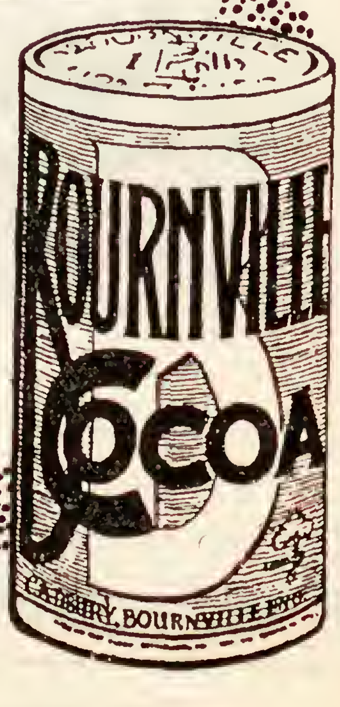
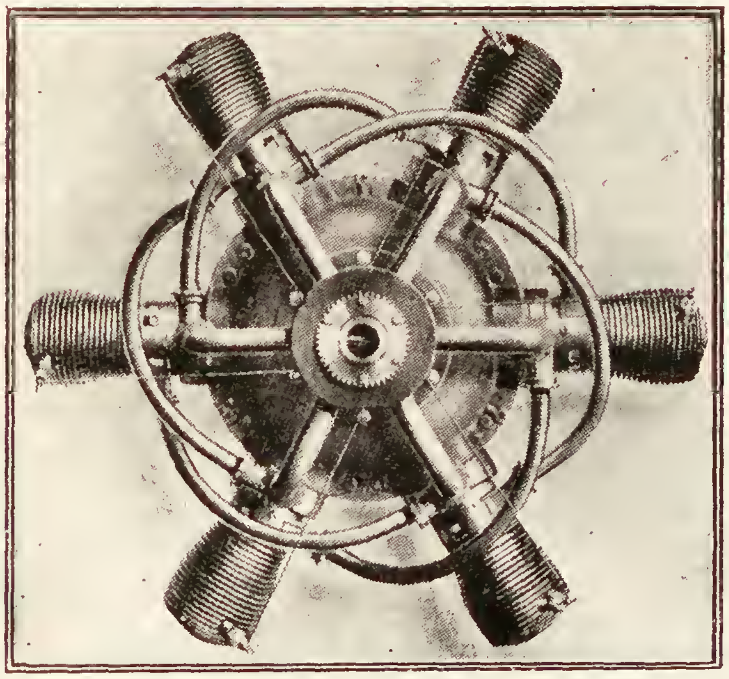


cylinder, which it is intended shall receive it (namely, that which is 120 degrees in advance), when the crank is in a position relative to the latter cylinder of about 60 degrees past the outer dead centre. The introduction of this fresh charge scavenges out the inert products of combustion from a previous stroke, through exhaust ports formed at the base of the working cylinder. This engine is rated at 50 h.p. as a rotary engine and as a 65 h.p. engine when fixed.



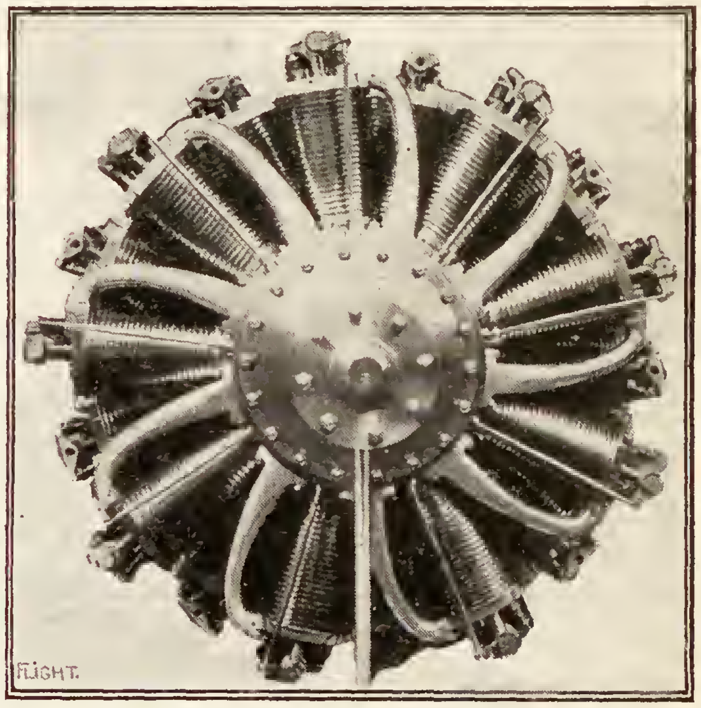
60 h.p. Laviator two-stroke engine.

In the water-cooled two-stroke model the engine is so placed that two opposing cylinders are horizontal, and the water enters the jacket of the left-hand lowermost cylinder at the head, passes out at the base of that jacket to the inner end of the water casing of the next cylinder, and so on round the various casings, until it is finally discharged from the head of the jacket of the right-hand lowermost cylinder. The jackets are held in position and leakage prevented by shrinking steel rings over the inner end.

The two four-stroke engines are of the 8-cylinder vee water-cooled type, and have mechanically operated valves. These valves, which are of a concentric design placed in the cylinder head and made of nickel steel, are actuated by levers and push rods from a single camshaft in the centre of the vee between the cylinders. The concentric type of valve has been tried many times by different manufacturers, but has usually been discarded. It is stated, however, that experience in the past with this model has given very satisfactory performances, and has led to its continuance on these engines. The cylinders are made separately of steel with a cast inlet and exhaust connection attached to the heads, which are not water cooled. Each group of four is supplied with gas from a separate carburettor, which may be either of the Zenith or the Claudel pattern. A single magneto is fitted, having an automatic advance and retard. The oil and water pumps, as well as the magneto and carburettor, are fitted at the end of the engine remote from the propeller.

Le Rhône.

These engines, which are of the air-cooled rotary type, are constructed entirely of steel, and, as usual in this type of engine, the explosive mixture is drawn through the crank-case, which runs upon ball-bearings fitted on the crank-shaft. In the 7, 9, and 11 cylinder engines there is one crank to which all connecting-rods are attached, and the cylinders are arranged in the same plane, but on the 14 and 18 cylinder motors two cranks are fitted, making 180° with each other, and the cylinders are in groups of 7 and 9 respectively for the two engines.



160 h.p. 18-cylinder Le Rhône engine.

Both valves are mechanically operated, one rod actuating the two valves in each cylinder through the rocking-lever, supported on ball-bearings, placed in the head. There are but two cams for operating the valves, each of which functions for the exhaust as well as the inlet, the order of firing in the 7-cyl. engines being 1, 3, 5, 7, 2, 4, 6. The exhaust valves are arranged on the leading side of the cylinder in the direction of rotation so as to receive the greatest cooling effect from the air, and the inlet piping, which communicates with the interior of the circular steel crank-case, is placed on the rear of the cylinders. It is claimed that by the use of this external inlet piping, troubles from a back fire to the crank-case are avoided. The cooling ribs on the flat head of the cylinder, which are made of steel, lie in the direction of rotation, and a cast-iron sleeve is forced into the interior of the cylinders when heated, to reduce the friction at the piston.

(*To be concluded.*)

AIRSHIP NEWS.

Two Hour Trip by "Adjudant Vincenot."

On the 5th inst. the "Adjudant Vincenot," piloted by Capt. Choix, and having nineteen passengers on board, made a cruise of over two hours' duration in the neighbourhood of Issy and Monthlery, &c.

Fine Trial by New Zeppelin.

The latest Zeppelin—"Z 7"—built for the German army, successfully made her first long voyage on Saturday, from the Zeppelin works at Friedrichshaven to her new station at Potsdam. Commencing at 4.15 a.m., the trip occupied 8½ hours, the last 75 miles, by the aid of a following wind, being covered in an hour. The "Z5," which was stationed at Potsdam, has been transferred to Johannisthal for some time.

Long Cruise by Italian Dirigible.

On the 5th inst., the Italian military airship "P4" made a trip of 7½ hours' duration, going from Campalto by way of Milan to Turin, where a landing was effected on the Mirafiori aerodrome. The distance covered was 475 kiloms., so the average speed worked out to 64 k.p.h.

The "Schutte-Lanz" on Trial Again.

The new Schutte-Lanz airship built to replace the one wrecked last summer has commenced her trials. The new airship has a cubic capacity of 24,000 cubic metres, has three motors aggregating 550 h.p., and there are five cars.

The R.F.C. Parseval Re-appears.

The Parseval airship, acquired by the British Government for the Navy, made a re-appearance at Farnborough on Tuesday. Since her last appearance the airship has undergone reconstruction, and the envelope is now considerably larger than it was, while it has been covered with aluminium paint so as to render it less visible against the sky.

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

Election.—Mr. F. R. Harford has been elected a Member of the Society.

Meeting—The seventh meeting of the present session will be held on Wednesday, February 18th, at 8.30 p.m., when Major-General R. M. Ruck, C.B., R.E. (ret.) will preside. Mr. F. H. Bramwell, B.Sc., A.F.Ae.S., of the National Physical Laboratory, will read a paper, to be followed by a discussion, on "Propellers."

B. G. COOPER, Secretary.

The British Army D.F.W. at Farnborough.

On Tuesday the D.F.W. biplane ordered by the War Office was flown from Brooklands to Farnborough, where it will undergo its official tests before being taken over by the Military Wing of the Royal Flying Corps.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

ANNUAL DINNER.

THE ANNUAL DINNER will take place at the ROYAL AUTOMOBILE CLUB, PALL MALL, LONDON, S.W., (by kind permission) on FRIDAY, FEBRUARY 27th, 1914, at 7.30 for 8 o'clock.

In order to facilitate the arrangements, Members are requested to notify the Secretary as early as possible, if it is their intention to be present.

Members may be accompanied by Ladies.

Tickets (exclusive of Wines and Cigars) 12s. 6*d*. each.

The following presentations will be made during the Dinner :—

Britannia Challenge Trophy to Capt. C. A. H. Longcroft, R.F.C.

British Empire Michelin Trophy No. 1 and £500 to Mr. R. H. Carr.

The Marquess of Tullibardine, M.V.O., D.S.O., M.P., the Chairman of the Club, will preside, and The Rt. Hon. Winston S. Churchill, M.P., First Lord of the Admiralty, has honoured the Club by accepting its invitation.

There has so far been a great demand for Tickets, and the list will be definitely closed as soon as a sufficient number is reached. In order to save disappointment, members are therefore requested to make early application.

Special General Meeting.

Notice is hereby given that a Special General Meeting of the Club has been convened by direction of the Committee pursuant to Rule 30 of the Club Rules and will be held at 166, Piccadilly, London, W., on Tuesday, February 17th, 1914, at 5 p.m.

AGENDA.

1. To consider Rule 9 of the Club Rules, which reads as follows :—

> "Invalid Ballot Papers—No ballot paper which is signed or on which the number of candidates voted for is more than the number of vacancies or which is received by the Secretary later than 12 noon on the day preceding the Annual General Meeting shall be valid."

and if deemed desirable to alter such rule by adding the words "or less" between the words "is more" and the words "than the number" in such rule so that the same may read as follows :—

> "Invalid Ballot Papers—No ballot paper which is signed or on which the number of Candidates voted for is more *or less* than the number of vacancies or which is received by the Secretary later than 12 noon on the day preceding the Annual General Meeting shall be valid."

2. New Club premises.
   To report result of circular to Members.
   To invest the Committee, if deemed desirable, with power to act in the event of an opportunity arising.

By order of the Committee,
HAROLD E. PERRIN, Secretary.

Annual General Meeting.

The Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Tuesday, March 24th, 1914, at 4 o'clock, at 166, Piccadilly, London, W.

Notices of motion for the Annual General Meeting must be received by the Secretary not less than twenty-one days before the meeting, and must be signed by at least five members. Wednesday, March 4th, 1914, is the last day for the receipt of notices of motion.

Committee.

In accordance with the rules, the Committee shall consist of eighteen members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the committee are :—

Col. J. E. Capper, C.B., R.E.
G. B. Cockburn.
Major J. D. B. Fulton, C.B., R.F.A.
J. T. C. Moore-Brabazon.
Com. C. R. Samson, R.N.
A. Mortimer Singer.
T. O. M. Sopwith.
The Marquess of Tullibardine, M.V.O., D.S.O., M.P.
Roger W. Wallace, K.C.

Col. J. E. Capper, C.B., R.E., does not offer himself for re-election.

Any two members of the club can nominate a member to serve on the Committee, having previously obtained such member's consent. The name of such member so nominated, with the names of his proposer and seconder, must be sent to the Secretary in writing not less than fourteen days before the Annual General Meeting. Wednesday, March 11th, 1914, is the last day for the receipt of nominations.

Members are reminded that a ballot paper for the election of nine candidates to seats on the Committee of the Club will be forwarded to them at least seven days before the date of the Annual General Meeting.

The International Aero, Motor Boat, Marine and Stationary Engine Exhibition at Olympia.

The International Aero, Motor Boat, Marine and Stationary Engine Exhibition held by the Society of Motor Manufacturers and Traders, supported by the Royal Aero Club, will open on March 16th, 1914, and terminate on March 25th.

In connection with this Exhibition, a section for models will be organised by the Kite and Model Aeroplane Association, under the patronage of the Royal Aero Club. The Royal Aero Club will offer prizes amounting to £50 in this section. Full particulars can be obtained from the Secretary of the Royal Aero Club.

Members of the Royal Aero Club will be admitted free to the Exhibition on production of their membership cards.

International Races.

Gordon-Bennett Aviation Race.—Entries close on the 24th inst. The following entries have been received :—

A. V. Roe and Co., Manchester.
Sopwith Aviation Co., Kingston-on-Thames.
British and Colonial Aeroplane Co., Ltd., Bristol.

Jacques Schneider Maritime Race.—Entries close on the 24th inst. The following entry has been received :—

Sopwith Aviation Co., Kingston-on-Thames.

Airship Pilot Certificates.

(*Fédération Aéronautique Internationale.*)

The Sporting Authority governing aeronautics in each country represented on the F.A.I. can alone grant Airship Pilot Certificates to candidates, of at least 21 years of age, and coming under its jurisdiction.

1. To candidates of the same nationality as the club.
2. To foreigners belonging to a country not represented on F.A.I.
3. To foreigners of a country represented on the F.A.I. ; but in this case the certificate can only be delivered with the authorisation of the Sporting Authority of the candidate's country.

The Royal Aero Club of the United Kingdom will grant certificates in accordance with the regulations of the Fédération Aéronautique Internationale to candidates who have complied with the following rules :—

RULES.

1. A candidate, holding an Aeronaut Certificate, must make 20 ascents in an airship on different dates.

Aeronaut Certificates are issued when the following tests have been accomplished :—

(*a*) Five ordinary ascents in a free balloon.
(*b*) One solo ascent of at least one hour's duration.
(*c*) One night ascent of at least two hours' duration between sunset and sunrise.

2. A candidate, not holding an Aeronaut Certificate, must make 25 ascents in an airship on different dates.

3. On five of the airship ascents the candidate must pilot the airship during the whole of the flight, with a certified pilot on board, who must report on the candidate's proficiency.

4. During the five ascents, the airship must have :—
   (*a*) attained a height of 2,000 feet on at least one occasion.
   (*b*) accomplished a flight of at least two hours' duration on at least one occasion.
   (*c*) been taken out of its shed or other shelter and replaced after flight under the command of the candidate on at least one occasion.

5. The candidate must be able :—
   (*a*) To answer simple question on map reading.
   (*b*) To lay off a course on a map or chart, and give compass bearing with the necessary allowance for wind.
   (*c*) To explain principles of forecasting weather.
   (*d*) To explain rules regulating the navigation of aircraft.

6. The Royal Aero Club declines all responsibility for any accidents, or any damage that may occur to the pilots, their airship, or to any third parties during or in connection with the qualifying tests of the candidate.

7. Candidates must make application on a form provided for that purpose, and this form must be sent to the Royal Aero Club prior to the tests being made. Any expenses incurred must be borne by the candidates.

8. Foreigners belonging to a country represented on the Fédération Aéronautique Internationale can only receive a certificate from the Royal Aero Club with the consent of their national Sporting Authority. A certificate may be granted to a foreigner whose country is not represented on the Fédération Aéronautique Internationale.

9. The Committee of the Royal Aero Club will decide if the candidate has qualified for a certificate, but reserves the right to refuse the same or withdraw the same at any time without giving reasons.

10. The decision of the Committee of the Royal Aero Club in all matters connected with the tests is final and without appeal.

HAROLD E. PERRIN, Secretary.

166, Piccadilly, W.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

MONDAY, last week, Lieut. Briggs on Blériot 39, 80 h.p. Gnome. Com. Samson up on No. 3 at a great height. Later he was up on S. 10, 100 h.p. Gnome, making a long and high flight, and also a short trip on Dep. 7, 80 h.p. Gnome. Lieut. Peirse on Avro 16, 100 h.p. Gnome, for a long cross-country flight, with Lieut. Osmond, R.N., as observer. Lieut. Rainey numerous flights on H. Farman 31, 80 h.p. Gnome, he handling her in fine style. Lieut. Marix a long and high trip on Caudron 40, 80 h.p. Gnome. Lieut. Collett on S. 65. Capt. Kilburn on S. 65. Usual pilots making aerodrome flights. Telegraphist Stirling a high flight on Bristol 24, 50 h.p. Gnome.

Tuesday, Lieut. Briggs making some long flights on Blériot 39. Lieut. Marix piloting Sopwith 104 with Lieut. Davies as observer. Telegraphist Sparks piloting S. 63 for two or three circuits, Lieut. Rainey making a long flight on Bristol Tractor 43. Capt. Kilburn on S. 62. P.O. Andrews on Avro 41. Lieut. Rainey on Bristol Tractor 43 left with some oil for a pilot who had landed near Southend, but when nearing his destination he fell from about 50 ft., completely wrecking his machine, but escaping serious injury himself.

Wednesday morning the stranded pilot returned from Southend, after having had oil sent from the School. Lieut. Briggs made height-flight on the Blériot. Lieut. Marix piloted the Sopwith 104, with Lieut. Peirse as passenger on a long flight to Grain and Chatham. Com. Samson flying Dep. 7 at a great height. P.O. Andrews on Avro 41. Other pilots making aerodrome flights. Lieut. Lyttleton two good flights on Dep. 36, 80 h.p. Anzani.

On Thursday Com. Samson made two long flights on a new M. Farman, Lieut. Briggs flying well on a cross-country flight. He was forced down at Minster on a ploughed field owing to engine trouble, but did no damage to the machine. Lieut. Marix made some good flights on Caudron 40 and Sopwith 104. Lieut. Lyttleton also flying well on Dep. 36. Lieut. Collett on Avro 41. Lieut. Young on Avro 41, when coming down after a short flight, was hit in the face by something, his goggles being smashed. A search all over the machine revealed no loose or broken wires, and there was nothing to account for the mysterious blow. P.O. Andrews made a fine high flight on S. 63. Lieut. Davies some good flights on Sopwith 27. Lieut. Osmond on S. 63, and Capt. Kilburn on same. Other pilots making numerous flights lasting till quite dusk.

On Friday Lieut. Marix was making some fine flights in high wind on Sopwith 104. Asst.-Paymaster Finch Noyes on H. Farman 31. S. 63 was in use in the afternoon, piloted by different pilots. Lieut. Briggs returned from Minster, where he had been hung up for two days. Saturday was blowing an absolute gale. Lieut. Marix, accompanied by Capt. Kilburn, made a long flight, sometimes remaining stationary in the wind. Lieut. Briggs was up on Blériot 39. A Short biplane was standing on the grounds waiting for the pilot, when a sudden gust picked her up about 6 ft. high, when she looped the loop and landed on her back pretty badly broken up. Lieut. Lyttleton went up on S. 63 for a long flight across country, with Lieut. Ireland as observer, returning in the afternoon.

Civilian Flying.—Early Monday morning last week, Mr. Gordon Bell was up on the new Short Tractor 100 Gnome. After a short preliminary flight, he steered straight for the Isle of Grain, where he made a safe landing with a mechanic as passenger.

Brooklands Aerodrome.

Monday last week, the wind varied between 5 and 37 miles an hour. Pupils at the Vickers and Bristol Schools accomplished a lot of useful work. Mr. Dukinfield Jones was out on the Flanders biplane. Mr. Hamel left for Windsor with his mechanic on the Morane-Saulnier monoplane for the demonstration before His Majesty The King. Mr. Raynham made a number of flights on the 80 h.p. Avro biplane. In the afternoon, Mr. Hamel returned from Windsor. Mr. Raynham was again out on the 80 Avro, carrying one of the Vickers pupils (Mr. R. MacGeagh Hurst) as a passenger, remaining in the air for 65 minutes, an altitude of 11,500 ft. being reached. Mr. R. Kemp arrived on B.E. 249 biplane with Lieut. Adams of the Reserve as a passenger.

Rather less wind Tuesday, the variation being between 2 and 23 miles an hour. Mr. Dukinfield Jones was flying well for an hour on the Flanders biplane, climbing to nearly 4,000 ft. Mr. J. Alcock flew to Hendon with a passenger on the Maurice Farman (100 h.p. Sunbeam engine), a landing at Elstree having to be made on account of the misty conditions. The Vickers and Bristol Schools were in full swing. Mr. Barnwell took a passenger up on the Vickers radial biplane for an hour, reaching 3,000 ft. In the afternoon, Mr. Raynham with Mr. R. MacGeagh Hurst, made another fine flight, an altitude of 11,250 ft. being reached, the machine being in the air for an hour and a quarter, thirteen minutes of which was occupied in the downward glide. Mr. Alcock returned from Hendon with his passenger on the Maurice Farman biplane. Messrs. Barnwell and Knight were out on the Vickers radial biplane, and the Bristol School was at work.

Wednesday proved to be a record breaking day, the wind varying between 2 and 21 miles an hour. Mr. Dukinfield Jones made a number of flights on the Flanders biplane. Mr. Norman Spratt (with Mr. R. Kemp as a passenger) arrived from Farnborough on B.E. 2 biplane. Mr. Ronald Kemp flew back to Farnborough on B.E. 249. Mr. Raynham made an altitude test on the 80 Avro. In the afternoon Mr. Dukinfield Jones was again out on the Flanders biplane. Mr. Barnwell took the Vickers-Blériot monoplane up to 7,000 ft. The Bristol and Vickers Schools were fully engaged. But the work of the day was the magnificent flight by Mr. Raynham, who reached an altitude of no less than 15,000 ft. on the 80 h.p. Avro biplane (the previous best having been accomplished at Brooklands on the 31st May, 1913, by Mr. H. G. Hawker, who ascended to 11,450 ft. on an 80 h.p. Sopwith biplane), then shutting off his engine and gliding all the way to Hendon (21 miles) in 25 minutes, arriving there at an altitude of 5,000 ft., and making a fine spiral landing. This performance by Mr. Raynham is truly a testimony to the wonderful climbing and gliding capabilities of the standard Avro biplane, of which its manufacturers may well feel proud. Mr. Elsdon was out on the Vickers-Blériot monoplane. Mr. J. Alcock was further testing Mr. Coatalen's Sunbeam engine on the Maurice Farman biplane. Mr. Barnwell was flying the No. 5 Vickers monoplane.

Thursday was not quite so eventful a day, the wind varying between 2 and 23 miles an hour. In the morning the Vickers and Bristol Schools were at work, Mr. Dukinfield Jones being out on the Flanders biplane. In the afternoon Mr. Dukinfield Jones was again flying the Flanders biplane. The Vickers pupils were busy. Mr. Raynham was out on the 80 h.p. Avro, and Mr. Alcock on the Maurice Farman biplane.

On Friday there was less wind, the variation being between zero and 20 miles an hour. The Vickers School was at work. Mr. Alcock was out on the Maurice Farman biplane. At mid-day on Saturday the rain set in and lasted until the Sunday evening, no flying being possible.

Bristol School.—Halford first made a test, Monday, last week, taking Air-Mechanic Locker as passenger, after which this pupil made several splendid solo flights, but the increasing wind rendered tuition during the remainder of the day impossible.

Lieut. Binney, after making several straight flights and landings with Halford sitting in the passenger seat, on Tuesday, made his first solo, flying quite steadily and landing well. Air-Mechanic Locker then took over the machine, and made several solo straights and circuits. Both Lieut. Binney and Air-Mechanic Locker made further solos before the wind sprang up and terminated the morning's flying. In the afternoon Halford took up Lieuts. Lawrence, Ames and Binney in a bumpy wind.

Wednesday, after making a test, Halford sat behind Lieut. Binney on straights and landings, this pupil then putting in some good solo flying in a slight breeze. Lieut. Lawrence followed with Halford in the passenger's seat, after which he made his first solo, but the wind sprang up, and prevented further tuition being given until late in the afternoon, when Halford took Lieut. Lawrence as passenger. This pupil then made several solos, as also did Air-Mechanic Locker. Halford took Lieut. Binney for straight flights, which finished the day's work.

Halford took Air-Mechanic Locker as passenger Thursday, and then sat behind this pupil on straights, also with Lieut. Binney, but the wind increased, and further tuition was impossible.

Friday and Saturday, no tuition was possible on either day owing to the gale.

Sunbeam Activity.—On Monday, Tuesday, Wednesday and Thursday of last week, at Brooklands, J. Alcock was flying the 100 h.p. Sunbeam-M. Farman, the work on the Tuesday including a trip to Hendon and back with a passenger. A cross-country trip with a passenger was also made on Thursday week.

Vickers School.—Monday, last week, Elsdon and Knight on biplane with Lieuts. Jackson and Prichard, and Crosbie. Barnwell with Mr. Spencer Warwick, Knight with Capt. Ross Hume.

Knight and Elsdon on biplanes, Tuesday, with Lieuts. Prichard, Crosbie and Jackson, and with Capt. Ross Hume and Mr. Spencer Warwick. Barnwell test No. 5 mono, Mr. Webb solo. Mr. Crosbie solo on biplane. Barnwell on biplane No. 26 with Vickers radial engine, for 1 hr. with passenger.

Wednesday, Barnwell, Knight and Elsdon on biplane with Lieuts. Crosbie and Prichard, and with Capt. Ross Hume. Knight with Mr. Spencer Warwick. Barnwell with Mr. Hurst. Barnwell on Blériot mono. to 7,000 ft. Barnwell on biplane with Lieut. Mansergh (new pupil). Messrs. Webb, Morgan, Hinshelwood and Chataway on No. 5 mono.

Thursday, Knight on biplane with Lieut. Mansergh, Capt. Ross Hume, and Mr. Spencer Warwick. Elsdon with same pupils. Barnwell with Lieut. Jackson and Mr. Spencer Warwick. In afternoon Barnwell on biplane with passengers. Knight with Lieuts. Mansergh, Prichard, and Jackson. Barnwell with Lieut. Prichard, Capt. Ross Hume, and Mr. Chataway. Elsdon with Mr. Creagh and Lieut. Prichard, also with Capt. Ross Hume and Mr. Spencer Warwick. Knight with Mr. Farie (new pupil).

Mr. H. A. Cooper, who has just passed for his *brevet* tests on a 35 h.p. Caudron at the W. H. Ewen School at Hendon.

Eastbourne Aerodrome.

On Saturday last Mr. Hamel gave an exhibition of looping the loop in a strong wind and rain, and intended doing so again on Sunday, but was prevented by the downpour of rain that continued throughout the day. On Monday the weather fined up, and in the morning Mr. Hamel took up three passengers, including one lady. He then went up solo and did some of his wonderful banks and loops. In the afternoon he was out passenger-carrying again, doing four glorious stunts. Gassler had the E.A.C. 'bus out, and was followed by Hunt. Fowler was also up, taking the lady pupil, Mrs. Salmon, for two or three circuits. Mrs. Salmon then took control, with Fowler in the passenger seat. Fowler then did a solo, and at about 1,000 ft. remained stationary above the 'drome for several minutes, pegging away against a 45 mile wind.

On Tuesday morning Mr. Hamel was out again, taking a passenger for a stunt over the sea, *vol planing* with his usual marvellous skill from about 4,000 ft. back into the Aerodrome.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School. — Monday, last week, Messrs. J. Graham, Parker, Eldridge-Green straights, with Instructor Manton in passenger seat. Mr. Strange circuits.

Messrs. North, Barrs, Piercy, Grahame, Cowley, straights with Instructor Manton in passenger seat, Tuesday. Messrs. Bjorkland, Lillywhite, Howarth circuits, figures of eight, &c., afterwards Mr. Bjorkland going in for and gaining his pilot's certificate. Mr. Clarke solo straights.

Wednesday, Messrs. Lillywhite, Howarth, Clarke solo circuits, &c. Messrs. Parker, Moore straights, with Instructor Manton in passenger seat.

Friday, Messrs. Clarke, Parker, Moore, Piercy, Cowley, Barrs straights, with Instructor Manton in passenger seat. Messrs. Howarth, Clarke and Lillywhite solo circuits, &c.

Blériot School.—Two new pupils, Messrs. W. F. Cooper and H. O'Hagan joined the school last week, and on Tuesday, Friday and Saturday they were already doing straights and rolling alone, showing great progress. Mr. Gold made good straight flights.

W. H. Ewen School.—On Wednesday last week, at 4 p.m., M. Baumann made a flight on the *brevet* machine. Mr. F. Goodden test flight on 35 h.p. Caudron No. 1, after which Mr. Bankes-Price did straights and Mr. Curtis rolling practice.

During Thursday morning M. Baumann out on *brevet* machine, after which Mr. Murray did circuits, but the weather was not very good for pupils' practice. During the afternoon Mr. F. Goodden made a fine exhibition flight lasting 50 minutes.

At 9.30 a.m. on Friday, M. Baumann out on *brevet* machine. Mr. F. Goodden instructing Mr. Bankes-Price who was doing straights.

Hall School.—Monday last week, Messrs. D'Arcier, A. Brookes and Allen on Avro cross-country flights at altitudes varying from 1,599 to 3,000 ft., Mr. Hall in charge of controls. Kinematograph picture taken by B. and C. Kinematograph Co. Tuesday morning. In afternoon wind dropped sufficiently for H. G. C. Allen to do straight flights on his recently-acquired 35 Blériot; he made twelve good straights. A. Brookes on Avro as passenger; Messrs. Pinneger and Cini (mechanics) passenger-flights, attending to motor which was not giving usual good power. Wednesday, J. L. Hall took Messrs. Gering, A. F. D'Arcier and Brookes for passenger trips at varying high altitudes. Afterwards Mr. Hall, solo, mounting on Avro very high, executed a *vol plané* of five minutes' duration. In morning, Thursday, H. Gering four straight flights, and A.F. D'Arcier and A. Brookes two excellent straights on No. 2 Caudron before wind rose. Previous to their arrival J. L. Hall was giving instruction to H. G. C. Allen on Blériot, leaving the ground at about 3 ft., Allen showed himself an apt pupil, and should make a good steady flyer. Rest of week too windy for flying; adjustments made to all school machines.

Salisbury Plain.

Bristol School.—Monday, last week, the weather throughout the day was too windy and misty for tuition to be given to pupils.

Tuesday opened windy and misty, and it was not until late in the afternoon that it cleared up, when Jullerot went out for a test flight, and took Lieut. George and Lieut Barrett each for a tuition flight. Voigt also gave tuition to Mr. Stutt.

During Wednesday morning a thick fog prevented any tuition being given, but during the afternoon Jullerot tested the tractor biplane, taking Lieut. Harman as passenger. He then gave tuition to Lieuts. George and Barrett on the school biplane in a bumpy wind, and also to Mr. Stutt.

No tuition was possible Thursday morning owing to the thick mist, but in the afternoon Voigt gave two tuition flights each to Lieuts. Harman and Barrett, and one flight to Lieut. George.

Friday, the mist in the morning and high wind throughout the remainder of the day rendered tuition impossible.

Rain and wind all day Saturday again prevented any tuition being given.

Shoreham Aerodrome.

On Monday and Tuesday of last week good practice was had by the pupils of the Shoreham Flying School, under the instruction of Mr. William H. Elliott. The pupils out doing straights and circuits alone were: Messrs. R. P. Cannon, Purnell, A. Maskall, P. H. Maskall, Hayland-Wilson, Aikman, Midshipman Thompson, R.N., and Lieut. Clemson, R.N.R.

After the pupils had had a whole day's practice on the 45 h.p. Avro biplane, Mr. Clemson, whilst doing a curve, failed to put the machine on the straight for landing, and switched off his engine a number of times while turning near the ground.

The result was that the machine struck the ground sideways, and will now be in the sheds for about two weeks for repairs, a very considerable amount of damage having been done.

EDDIES.

WELL! the days are lengthening now; sometimes when I leave Hendon it is not yet dark. The grass is beginning to look more green, the mud is not quite so watery, and I shall soon be able to cross the footpath from the church without getting bogged. The cars of the aviation "somebodies" are becoming more numerous in front of the Blériot sheds, and the public are more in evidence in the enclosures. Those of us who have lately been taking such a great interest in the interior of the Press Club and the Pavilion can now get out our note-books and our cameras *en route* for No. 1 pylon, and try to appear as though we had been there all the time. The first real meeting of the year is very appropriately fixed for St. Valentine's Day, and things are on the move.

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By air across the Atlantic seems to be shaping into a reasonable, not to say probable, proposition. Lieut. Porte is practically certain to be one of the two pilots in the Glenn Curtiss flying-boat, the other being an American. Mr. Porte is a first-class pilot, and his nautical knowledge will stand him in good stead on the trip. The productions of the Curtiss firm are too well known to need any comment as to the quality, and all that seems needed is a little experimenting and favourable weather for the try. I wish we could have been sure of being more ready with an English machine so that England could have a chance of claiming the honour of having accomplished this history-making flight, but whoever is first seriously to try I hope will win whatever his nationality, in return for having made the effort.

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I should like to have been with Raynham on his glide from Brooklands to Hendon after making his British altitude record of 15,000 feet. Of all the glorious and exhilarating sensations to be enjoyed by flying, I should imagine nothing could beat this 20-mile glide through the air with all noise of engine absent. This seems to me to be flying exactly as we should like it to be. Fancy gliding along through the air without a sound except the singing of the wind through the wires: gliding along over the country with a machine in perfect control, able to turn about where one pleases, with only a loss of altitude as the expense. Could it but go on indefinitely it would be perfect. The view, too, from such a height must be magnificent. I rather envy Harold Blackburn having had that trip.

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Mr. Charles Niles, a young American, must surely have written *finis* to most things that can be accomplished on an aeroplane in the "thrill" direction. He is said to have started out to loop the loop in the ordinary manner, but his gyrations were far from ordinary. At an altitude of 3,000 feet he turned the nose of his machine up to form the circle, but his engine stopped through lack of fuel supply, and the machine slid down tail first for some 1,000 feet. Then it turned over, and dropped a like distance nose first. From this position Niles rescued it only to fall over sideways. Then when only 200 ft. from earth, and flying upside-down, he managed to start his engine again and flew away, still the wrong way up. "He sailed away into the east, where he climbed upwards till he brought his machine into the normal position." I have never seen a pilot get his machine from the upside-down to the normal position by climbing upward, and until I do, or have direct evidence by experienced watchers to the effect that it has been done, I shall continue to think that it is not possible.

It is gratifying to hear that Mrs. Stocks is slowly regaining her health, and we shall all look forward to seeing her once again during the season at Hendon. Miss Trehawke Davies is unfortunately making but slow progress towards recovery from her illness, and has gone away to a nursing home. Both have been ill for a long time, and now there is a chance of better weather prevailing, may they quickly regain their health.

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Next week will see Mr. G. W. Beatty opening his flying school at Hendon, equipped with a fine fleet of machines, represented by three Wright biplanes and a Handley Page monoplane, and Mr. Beatty will also have charge of the Handley Page school pupils. Mr. Beatty's idea of teaching is to take the pupil for flights right from the first, and so they will get their first experience on the Wright machines which have dual control, whereby the pupil, sitting beside the pilot and holding the levers, gets actual flying experience and learns by practice to do what the pilot does by instinct. When the pupils have advanced sufficiently they will be given control of the monoplane, and this machine will be used in obtaining the *brevets*. Pupils will be taken up for fifteen minute periods, and Mr. Beatty contends that this is the best and quickest method of teaching, and taking into consideration his splendid record of pupils passed in America, seems to prove so. Mr. Handley Page and his assistants, with the benefit of his large works and experience in building, will be able to keep the machines always in good condition, and Mr. E. Baumann, chief pilot-instructor at the Ewen school, is joining up with them as chief assistant instructor. Altogether, the school makes a start under excellent auspices.

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Congratulations to Nieuport (England) Ltd., including Mr. A. Picard, the managing director, and Mr. Max Worms, the secretary, on the forming of their company. Everything is now getting into running order, and from February 16th the premises of the company will be at 45, Great Marlborough Street, W. Congratulations also that they have obtained the services of such a fine flyer as Mr. G. M. Dyott, the well-known pilot-constructor, and to Mr. Dyott for having the good fortune to become connected with such a firm. Mr. Dyott is now in Paris practising on the various types of Nieuport machines at Issy, and will most probably fly one over when ready.

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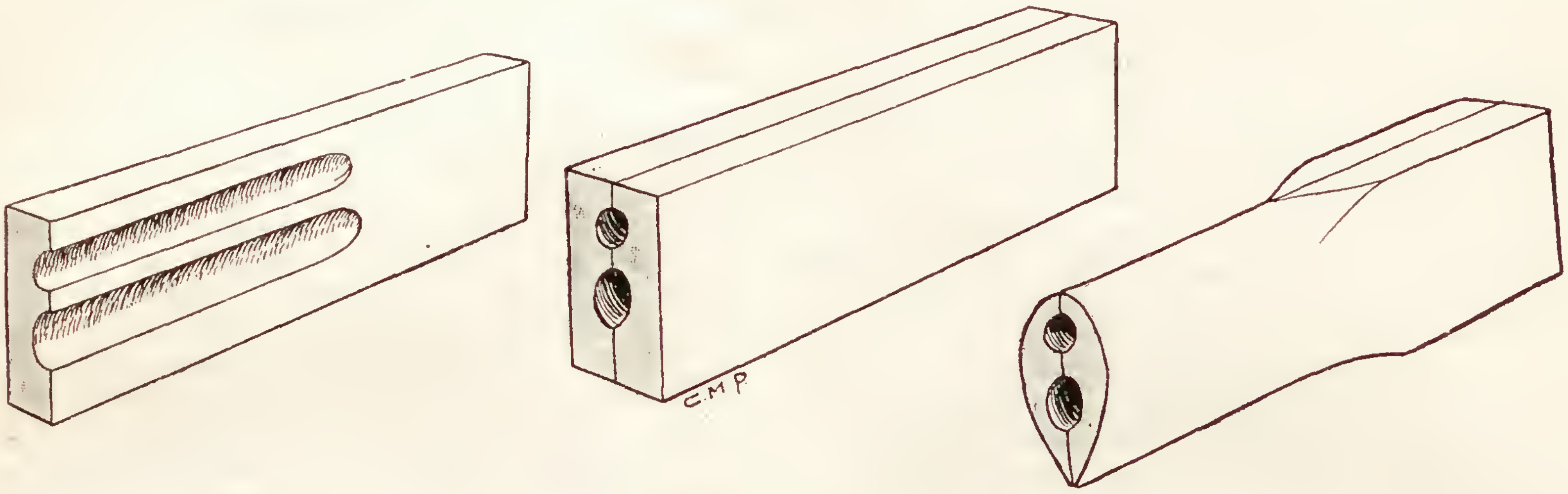
I am sure that one and all, especially those who knew Robert Slack personally, will come forward and help the fund which has been started for the benefit of the widow and the two young children, a girl of seven and a boy of four. The Committee which has the matter in hand comprises Messrs. O. F. Odell, R. P. Baker, A. C. Hunter, John Ames and A. W. M. Ramsay and Mr. F. N. Birkett is acting as Hon. Secretary. Any donations, however small, will be welcomed and acknowledged in FLIGHT and the aeronautical Press, &c. Among the subscriptions already received are: International Correspondence Schools, 20 guineas; General Aviation Contractors, 5 guineas; Mr. J. Withers, £5; Mr. O. F. Odell, 2 guineas; Mr. J. Cates, 2 guineas; Messrs. Chas. Lane, B. C. Hucks, J. Teulade, C. G. Grey, J. C. Dunne, J. H. Ledeboer, Stanley Spooner, 1 guinea each; Mr. Halahan, £1; Mr. Ellis, 10*s*. 6*d*.; Mr. J. Nardini, 10*s*.; Mr. P. R. Ritchie, 5*s*.; Mr. J. H. Bliss, 5*s*. Cheques and Postal Orders should be sent to the Hon. Treasurer, Mr. A. Graham Mattey, Capital and Counties Bank, Kingsway, W.C., crossed "Slack Fund." "WILL O' THE WISP."

AN AEROPLANE IN THE MAKING.

(*Concluded from page* 149.)

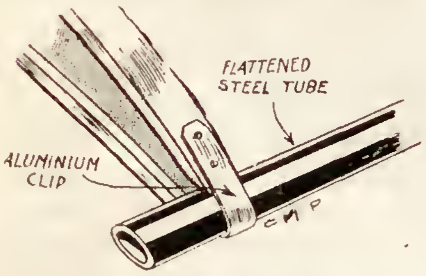
Before turning attention to the manufacture of the metal parts incorporated in the construction of an aeroplane, a few words should be said regarding the procedure followed in building up the inter-plane struts. On the majority of aeroplanes these are hollowed out for the sake of lightness, and whilst the sections vary with the different constructors—some favouring one particular section and some another—the method of hollowing them out is practically the same for all of them. First the wood—generally spruce—is sawn and planed down to a rectangular section slightly wider than the desired width of the finished strut, and having a thickness slightly in excess of half the length of the minor axis of the streamline strut section. These strips of wood are then passed through the spindle machine, where they are hollowed out either so that only a thin shell is left or, preferably, having a transverse web, as shown in one of the accompanying drawings, in order to better resist bending strains. It is, of course, desirable that the webs should run parallel to the minor axis of the elliptical section of the strut, as the tendency is for the strut to buckle transversely.



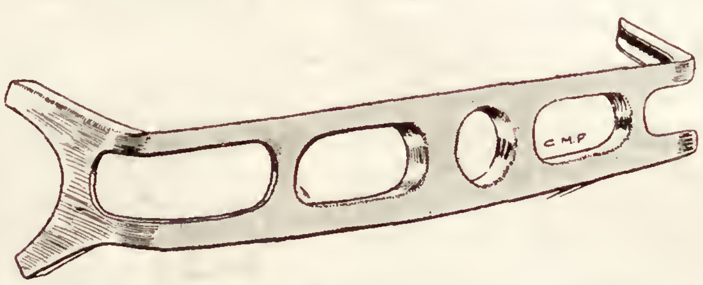
Three stages in the evolution of an inter-plane strut.

When the two halves of the strut have been thus hollowed out, the faces of them are coated with glue, and they are placed in a press consisting of a framework and numerous wedges, in which they are left to dry under a pressure of somewhere about 10 tons. When the glue has set and thoroughly dried, the struts are taken out of the press and sent back to the spindle machine, in which they are machined down to the desired streamline form; and when the two ends have been trimmed down to fit their respective sockets, and they have been varnished, the struts are ready to be put into place between the planes.

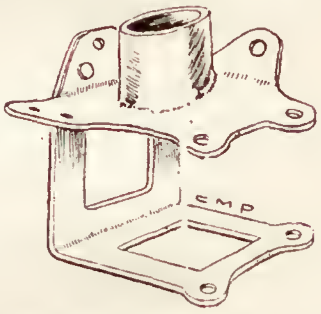
Interesting as the manufacture of the wooden component parts of an aeroplane undoubtedly is, the metal work department is, perhaps, even more so; and although wood forms the greater part of the material employed in the construction of the majority of present-day machines, it is more than probable that in the future steel, or, at any rate metal of some description, will be more extensively used as machines and their component parts become more and more standardised. At the recent Paris Aero Salon it was observed that the general trend of design was towards steel construction, and every year sees one or more aeroplane constructors discard wood in preference to steel for most of the parts of their machines, even if they do not build them of steel throughout.



The steel tube trailing edge.



An engine frame hammered out of a single sheet of steel.



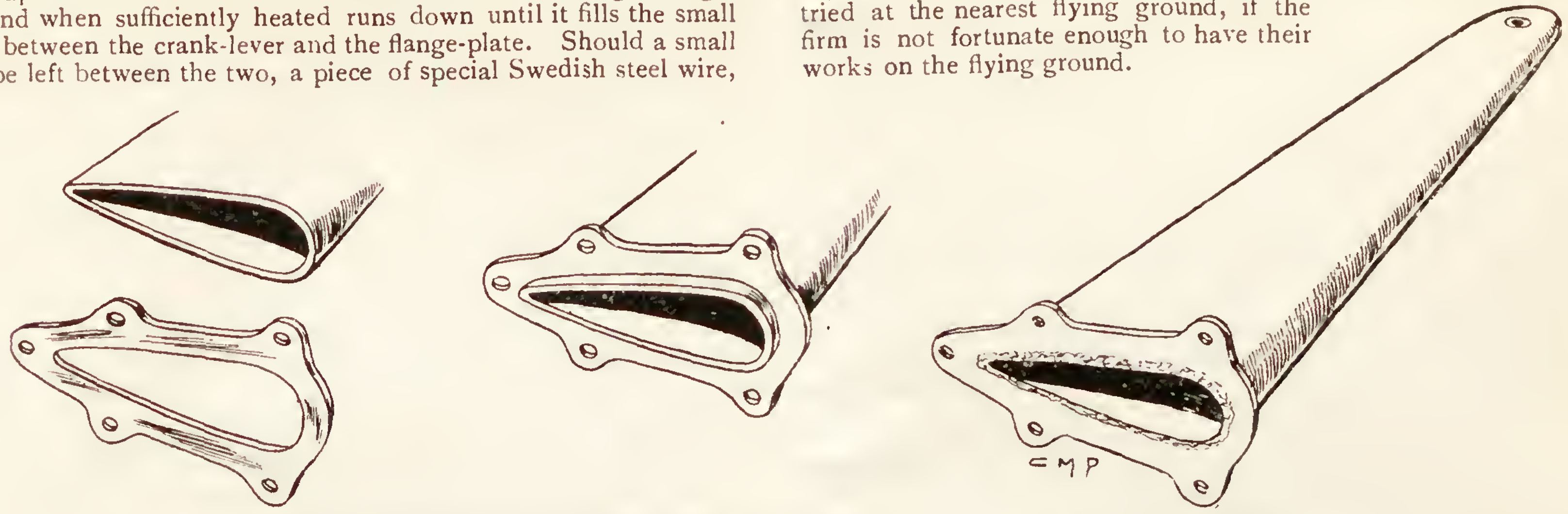
A strut socket made of three pieces. The socket is welded on to the upper plate and the two plates riveted together.

There was a time when aluminium was extensively used for sockets, joints, &c., but lately steel seems to have superseded aluminium for that purpose, most manufacturers contending that weight for weight greater strength is obtainable by the use of steel. Generally speaking, the use of aluminium is confined in most modern machines to engine cowls, wind screens and other parts which do not have to stand any severe strains. The method of forming joints, &c., by means of steel varies considerably, but in modern times welding is extensively employed for the purpose, and when done by the simple oxy-acetylene process, this method seems to give every satisfaction. It may be explained that the oxygen and the acetylene gases are contained in two steel cylinders, and from each cylinder a flexible tube runs to a nozzle in which the two gases are mixed, the proportions being regulated by means of a small adjustable needle-valve. The mixture burns with an intensely hot flame, which is made to impinge upon the metal parts that are to be welded together so that they commence to melt, and this causes them to fuse or amalgamate. Great care must be exercised in doing this, for if the heat is too great the steel begins to run; and if the flame is not sufficiently hot a proper joint cannot be made, as the two parts do not then fuse.

Sheet steel is frequently used for making clips, sockets, &c., and in many cases a socket is made out of a single piece of sheet steel, as illustrated by the sketches. The procedure followed in the manufacture of a socket of this description is as follows: a blueprint of the clip is sent to the works and the workman pastes or glues the blueprint on to a sheet steel plate and then cuts out the various templates from which the clips are made. The lightening holes, if any, are then cut out and the edges filed up to the outline on the blueprint. This template is used afterwards for all subsequent clips of this particular form, and from it are traced on to another piece of sheet steel as many of the clips as are wanted. When the outline of the clips have been traced on to a piece of sheet steel it is sent to the man in charge of the punching machine, who cuts away all the superfluous metal up to the tracing lines. Each blow of the puncher makes a small circular hole in the steel and as the holes overlap slightly, and as it is possible to judge very accurately the distance of the holes from the tracing lines, only about $\frac{1}{64}$ of an inch is left outside the line. This is afterwards filed off, and the clip is ready to be bent to shape.

A variety of clips and sockets are made in this way, and the sketches show some of the more common forms. It will be noticed that in some cases a socket is provided on the side of the flat steel clip to which it is joined by welding. Another illustration shows how the rudder crank-levers are made. A piece of sheet steel of triangular shape is bent to form a streamline shell, rather blunt in front, and with a knife-edge at the rear, where the two edges of the steel are welded together. A small flange plate is then welded to the lower end of the crank-lever for the purpose of forming a means of attachment to the rudder. This plate, as the sketch shows, is slipped over the end of the crank-lever until about one-eighth of an inch of the latter protrudes outside the flange plate.

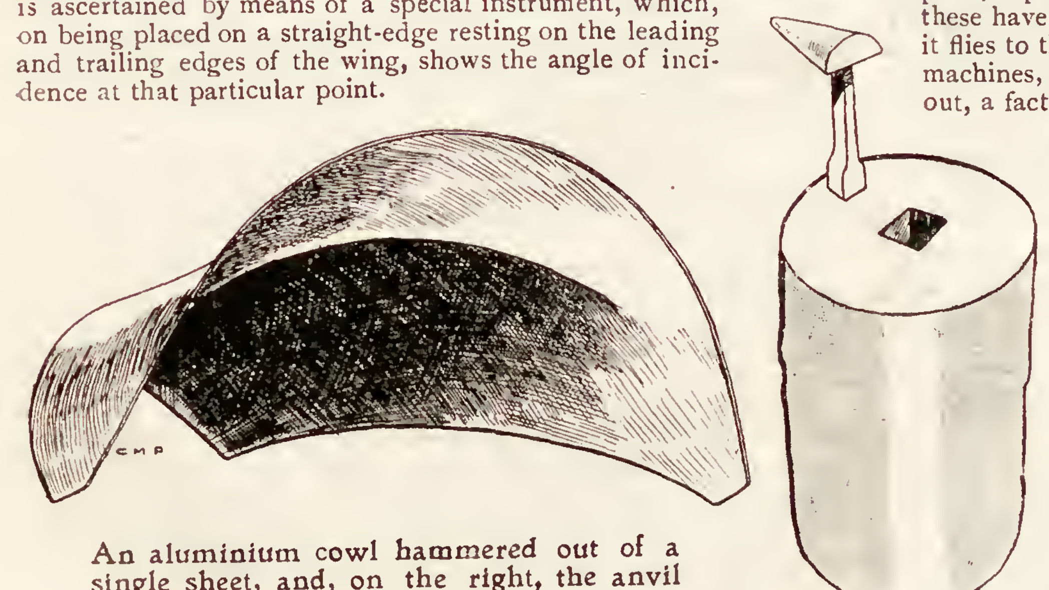
The two pieces of steel are welded together by letting the flame impinge upon them. The metal of the crank-lever soon begins to get hot, and when sufficiently heated runs down until it fills the small space between the crank-lever and the flange-plate. Should a small hole be left between the two, a piece of special Swedish steel wire, which the operator keeps handy for this emergency, is placed in the opening, and in melting fills up the hole, thus making a solid joint all along the edges of the flange-plate. This operation, as we have already said, requires great care, and skilled men must be employed for it. In order to protect his eyes against the glaring light of the gas flame, the welder wears special smoked glasses, which enable him to follow closely the process of fusing or welding the two pieces of metal.



Sketch showing how a rudder crank lever is made by oxy-acetylene welding.

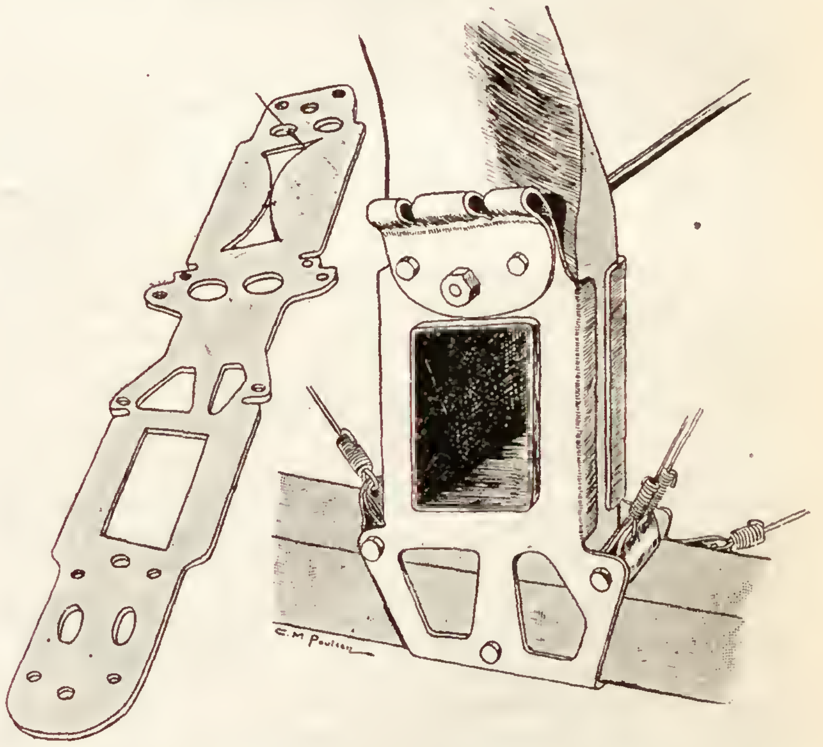
The subject of another sketch is an aluminium wind-shield which has been beaten out of a single sheet of aluminium. This is done by placing the sheet on a small anvil, similar to the one shown in the sketch, and hammering it with a wooden mallet until the desired shape has been obtained. In going over it the first time, only a slight curvature is obtained, and this is increased by degrees until sufficient curvature has been reached. The sketch illustrates one form of wind shield, but, of course, any desired shape can be obtained, and the process is used in making wind-shields, engine-cowls, &c. The procedure followed is the same in each case. The flanged steel engine-plate shown in one of the sketches is hammered out of a single piece of sheet steel, the flanges not being, as might well have been supposed, welded on.

Having arrived at this stage of the construction of the aeroplane, all that remains to be described is the erecting or assembling of the machine. The *fuselage* and wings are placed on trestles in approximately the right positions, and are then propped up until they are in line. The bolts and cables by means of which the wings are attached to the *fuselage* are then put into place, as are also the diagonal cross-bracing cables between the wings. As each wire has incorporated in it a turnbuckle or wire-strainer, it can be so adjusted as to give just the right angle of incidence. The *fuselage* is so placed that the propeller-shaft is absolutely horizontal, and this line is used as a guide for adjusting all other parts. Where a varying angle of incidence is employed the angle at any particular point is ascertained by means of a special instrument, which, on being placed on a straight-edge resting on the leading and trailing edges of the wing, shows the angle of incidence at that particular point.



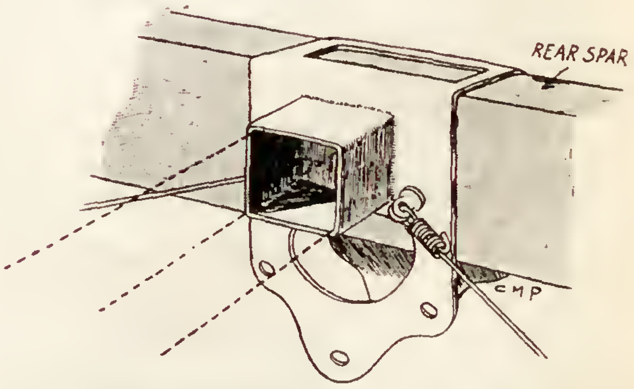
An aluminium cowl hammered out of a single sheet, and, on the right, the anvil used.

When the engine has been put into place and the whole machine adjusted, the wings are usually taken off, and the machine sent to be tried at the nearest flying ground, if the firm is not fortunate enough to have their works on the flying ground.



A socket connecting a *longeron*, a plane strut and the front spar; and on the left the sheet-steel clip from which it is bent to shape.

A few trial flights will generally suggest a few alterations to various parts, especially if the machine is the first of a new type; and after these have been effected, the machine is tried again and again until it flies to the satisfaction of its designer. In the case of the Sopwith machines, we believe that most of them have flown well the first time out, a fact which speaks well for the design.



A steel clip and socket on rear spar. The socket is welded to the clip.

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Mr. Hucks at Birmingham Again.

To-day, Saturday, Mr. B. C. Hucks is paying a return visit to Birmingham, and, commencing at 3 p.m., will give demonstrations of looping the loop and upside-down flying at the Tally Ho Club grounds.

Index and Title Page for Vol. V.

The Index and Title Page for Vol. V, January to December, 1913, has now been printed, and can be obtained by sending 3*d.* to the publishers, 44, St. Martin's Lane, W.C. After February 21st the price will be 6*d.* post free.

FURTHER DEVELOPMENTS OF MILITARY AVIATION.*

By Lieut.-Colonel F. H. SYKES.

Last year the Aeronautical Society kindly asked me to give my views on military aviation. I then tried to show the objects for which military aircraft would be used, the results likely to be gained, and the general lines upon which it was expected that progress would take place—in a word, the military aspect of aviation. I propose to-night to deal with the subject in the light of a year's progress. I make no excuse for reiterating the strong links which I feel bind soldier, sailor, designer, and aircraft constructor in this matter. Rapidity of progress is essential, and it can only be gained by cohesion of effort, lack of friction, and mutual understanding. The Service must remember that the aeroplane designer has to live, and is not always merely chasing "X" with a slide rule: the constructor that the soldier is not only pipe-clay and red tape, and that there is sometimes method in his madness.

The object of military aviation is the unselfish service of the State. It is essential that agreement should be promoted as to general lines of work needed and advisable, progress as to types of aircraft possible, and how they are to be built and used.

In this connection we must remember that in the Services "the best is often the enemy of the good." We cannot only look for what we want in the future. We must have a very tangible something ready for war in the present.

The progress made during 1913 tends to corroborate the ideas put forward in last year's lecture. Progress in aviation has not affected the principles of war strategy, nor will it, in my opinion, do so in the future, but strategic plans will require to be even more carefully worked out in peace than hitherto. An all-round acceleration will take place and less confusion occur. The cards will be more openly displayed.

The past year has been one of great interest. Safety, speed, strength, weight-carrying powers, climbing, and all-round efficiency have progressed. Some probabilities have been increased; some difficulties emphasized.

The results achieved by the new instrument of war are nevertheless of ever-growing significance and a short survey of the more importants points may be instructive.

I propose first to deal with the improvements arrived at, and indicate the more pressing requirements, secondly to turn to matters more directly appertaining to observation, and then to consider landing places and ground organisation, intercommunication and delivery of information.

Wind flying and duration.—The first improvement is undoubtedly that of general airworthiness. Last year I said that the use of aeroplanes was limited by fog, darkness and high winds. One of these limitations—wind—is already fast disappearing. A most marked advance has been made in long day-in day-out flying, almost irrespective of weather. I remember my delight on the evening of my lecture to this Society last year on receiving a telegram to the effect that the five aeroplanes, which then went to form the nucleus of our second squadron, had all safely reached their new station at Montrose. The flight from Farnborough is a fine one to-day, but a year ago it was a splendid flight, more especially as the weather conditions were bad. It took about a fortnight. Lately several of our aeroplanes have affected the same journey, under almost equally adverse wind conditions, in two days, and it has twice been done in good weather, in one day (once without a stop of any sort).

There are other indications of progress in this respect; for instance, before and after the Irish manœuvres our aircraft had to move some four hundred miles out to the manœuvre area and the same back (including two crossings of the Irish Sea), in addition to the actual work carried out while there on manœuvres. This was done without serious hitch.

Factors of Safety.—I am not quite certain that sufficient attention has been paid by designers to the fact that flying in high winds has been very much on the increase during the year, and that factors of safety have therefore decreased. This is the more so in view of the fact that such strides are being made in the direction of variable speed.

Climbing and Lifting.—Another marked improvement is in the climbing ability of the average aeroplane. A Service machine *must* be able to lift and climb well with a full load in windy weather, and four hundred feet a minute is now quite an ordinary achievement.

The notable advance made in variable speed, as exemplified, for instance, in the latest Sopwith, have helped greatly in the matter of landing in restricted areas.

Wing-Warping.—One cannot consider airworthiness without touching on the question of wing-warping as opposed to flaps. There is no doubt that the continual flicking about during a long flight of the control lever, caused by the self-warping of wings in a wind, has a very tiring effect on the pilot, and further, the warping wing requires more keeping in truth than one fitted with flaps. The dismantling and general handling of wings fitted with flaps is, besides, easier, quicker, and less liable to mistake. There is, I think rightly, a growing tendency to substitute flaps for warping.

Improvements in Landing Gear.—Bad landings must be expected from aeroplanes which are often called upon to bring back information to, and land in, a small field, probably surrounded by trees. Landing gears have considerably improved, but they still cannot withstand really rough treatment.

Such have been some of the advances as regards material and design. Progress in these and in other matters is still required. A little too much trust in Providence is still asked for. Military aviation, both in peace and in war, requires the utmost possible simplicity and strength. Much more ease is necessary in the removal and return of all parts. If an aeroplane is flying, morning and evening, it has at present still to be gone over more carefully during the day by its mechanics than should be necessary; and every fourth day it has to be left in for thorough overhaul and trueing up.

To and from, and during the actual days of manœuvres of last year, our aeroplanes flew an average of approximately 800 miles, but the number of hours flying per day that can be expected from pilots is going up slowly and steadily. This is due to the better training of personnel, to increasing reliability of machines, to improved arrangements for transport and spare parts—in a word, to better all-round training and organization. Last year I said that pilots and observers could only be employed for about three hours during the day. Now, in good weather for a short period, five hours flying a day can be done by good and seasoned officers.

The Motor.—Broadly speaking, the question of duration is now largely bound up with that of obtaining—(*a*) a good motor, including high fuel efficiency; (*b*) one capable of carrying the increased weight of fuel.

Engines are improving, but not very rapidly, though cases of failure are undoubtedly becoming more rare. A really reliable good engine of sufficient power is much wanted. This remark applies equally to British and foreign makes. I would add that a very intricate engine, whatever "Star" performances it may carry out under the eye of its maker and his pet mechanic, is not much use for the everyday purposes for which we want it.

Two engines may perhaps be the solution of many difficulties, but each still requires to be of a more reliable standard than is at present the case. I think that an opportunity is given by the forthcoming Competition.

Great progress has been made in the ability to keep the air in all weather for prolonged periods and to land in and rise from small areas, but I agree with the general view that there is still room for much improvement in the simplicity, strength and reliability of both aeroplanes and their engines.

Notes on Observation.

As a result of work done during manœuvres, it would seem that, given sufficient aircraft, failure to locate the enemy's movements may be due to two causes:—first, failure to carry out the reconnaissance owing to bad weather, engine trouble, failing light, &c., and second, failure owing to bad training or lack of skill in observation; to measures taken by the enemy to conceal himself, or again, weather.

None can control the weather, and engine failure is not altogether preventable. Knowledge, experience, training, the very careful selection of observers, and plenty of practice for them, are amongst the obvious remedies.

The instructions issued in September, 1910, for the manœuvres of that year, state "it is possible that our aeronauts may not readily find their way across country, and it must be borne in mind that they have had no practice in observing military operations from above."

It is quite possible that some aeronauts (even in this room there may be some) do not always readily find their way. But, as a matter of fact, there is no abstruse question of navigation about it, as one so often hears, it is mainly one of eye for country, aptitude for reconnaissance, and practice (for which, by the bye, many machines, preferably of the propeller type, are necessary).

A sound military knowledge is also essential. It is so pleasant in peace to go up for a "joy ride"; but go up as an observer in war, your brain slow and tired after many days and nights of strain, well knowing the fallibility of your machine, that your flyer is weary, that your machine and engine are tired. Know that much, very much, depends on you, your vision, decision, accuracy, and certainty. You see something. Your flyer throttles down to the lowest safe flying speed. Unless your faculties are well trained, you have passed it and have not decided what it is.

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* Extracts from a paper read before the Aeronautical Society on February 4th 1914, at the Royal United Service Institution.

Training of Observers.—Long training and much practice for observers is essential. And, as I have said, good observation can only be carried out satisfactorily, on the basis of a large and sound knowledge of military matters.

In working in the area traversed by a large river considerable difficulty is often experienced owing to mist and fog. Where there are mountains, there is likely to be rain. It is indeed probable that the climate of the theatre of war will, one way and another, much affect the amount of air reconnaissance possible. Perhaps even, on occasions, columns may take advantage of lines of advance known to be more than usually mist-covered. Such areas should be noted beforehand, both by troops and by aircraft.

When fighting takes place in hilly country, observation is often difficult, owing to the tops of the hills frequently being under mist or clouds. In this and other such cases the rule that observation can only be made at heights of over 3,000 ft. must be followed in the spirit rather than in the letter, otherwise observers may "be in the clouds" the whole time and see absolutely nothing.

Heights flown during reconnaissance must, then, be governed largely by the state of the atmosphere, and the consequent ease of observation. Questions of immunity from bullets must not affect this. Such immunity as we have in immediate sight is quite promising. If the flyer, observer and engine are placed under armour they are safe from rifle fire at, say, 3,500 ft., and as regards spars there is, I think, really not very much to fear. The factor of safety is good, as it is only in the unlikely event of two bullets piercing the spar in immediate proximity, and at right angles to its length that serious danger may be apprehended. With reference to wires, it is necessary not merely that two separate wires should be cut, but that they should be interdependent. The only other vulnerable spot, as far as I can see, is the propeller boss.

It was thought desirable in the interests of training to elaborate in detail the results of reconnaissances carried out during last manœuvres. We had also the object in view of showing the army at large what can and cannot be effected at this early stage. The results show what there actually was on the ground, and what was reported as being seen from the air at short intervals, throughout the whole operations. At first it seemed that we had located nearly everything, then as the work grew, it appeared that a certain amount had been missed, but the final result showed that really very little had been missed. I think, on the whole, the information obtained was good.

The elaborate precautions taken by certain bodies of troops, notably the 4th Division, were responsible for some of the failures.

Concealment.—With reference to efforts in concealment made by troops, as a rule those made during a halt on the road are not very successful. Broadly speaking, two methods of concealment are adopted. One consists in taking cover whenever an aero-engine is heard, the other in elaborate arrangements in bivouac. The first method is, on the whole, not a very successful one, owing to the fact that there is always an uneasy look about the road which attracts the attention of a good observer—the tail of a wagon, a deserted cooker, a belated ambulance, gives the show away. Transport and guns disguised as travelling shrubberies are not generally difficult to spot on the march. The second plan, however, meets with undeniable success, and further experiments in this direction will undoubtedly be made.

Photography.—Photography is a most useful auxiliary to the observer, who must, however, not use it to save himself. He must observe just as accurately and intently as if he had no camera. Photography is difficult from an aeroplane owing to the fact that the observer is often rather cramped, and the camera has to be fixed in the bottom of the machine. In my opinion there are considerable possibilities in the science of aerial photography, and it is well worth developing.

Night Work.—A word may not be out of place now with regard to night work. Here the great difficulty is that aviation motors, as I have said, are still far from being really reliable, and, as undercarriages are not very strong, an enforced and hurried landing entails considerable danger.

The lights carried on aeroplanes for flying by night across country are still in an experimental stage. The problems are those of weight, safety as regards fire, lack of glare and good diffusion of light, and range of beam. One way and another, though progress is being made, there is considerable risk attached to night work, especially in England.

To sum up the question of observation, although a very solid all round advance has been made in day work, night work, in so far as the aeroplane is concerned, has shown no tangible results. Night work at present lies in the scope of the aeroplane which can for certain fly for 14 hours with two engines and fuel for this endurance.

Intercommunication.

Having observed, the observer has now to communicate his information by the most rapid and safe method possible. The question of the best means of intercommunication is a difficult one. It involves problems of both material and *personnel*, and considerable time and experience will be necessary for their solution on sound lines. When we have solved them we shall have minimised the relative importance of many other difficulties, such as questions relating to landing grounds, alighting in small areas, ground communications, and undercarriages.

Wireless.—Wireless will undoubtedly be one of the best methods of transmitting from aircraft the information collected in reconnaissance. It was used with success by the army airships on last year's manœuvres, and the results gained were, I believe, in advance of anything which has hitherto been done either in England or abroad. In hilly or very closed country wireless transmission is essential. But the whole question of wireless in connection with aircraft is a thorny one. There are, for instance, the well-known difficulties in regard to tapping and jamming. Close study and much experiment is necessary. The prospects of using cipher for wireless messages are hopeful, though messages regarding reconnaissance call for quick transmission when sent from a craft moving at 70 miles an hour, whilst the ordinary process of enciphering is slow. A solution has been hit upon which has worked well, but so far it has only been tried with a small number of messages.

Message bags.—On occasion great responsibility must rest upon the observer. He must sometimes decide instantly whether it is desirable to transmit his information direct to the troops most concerned or to the staff. It will often be advisable to drop a message bag with some urgent piece of information in order that the news may be received at once. It requires considerable practice to drop messages in this way, and from some types of aeroplane it is dangerous to do so owing to the possibility of a bag being caught by the propeller. The bags also sometimes do not reach their destination.

On the whole, then, intercommunication still presents many difficulties, and the present more generally adopted system of landing for the transmission of information on the ground must be adhered to for a time.

Handing in Information.

Landing Grounds.—It has often been found a matter of much difficulty to find landing grounds in the vicinity of headquarters, A geat deal depends on this, as a distant landing ground probably entails loss of very valuable time. During manœuvres an umpire was attached to each squadron, whose duty it was to examine every observer's report handed in at the landing grounds. He checked the barograph record before allowing the report to be transmitted, in order to insure that the flight had taken place at such a height as would probably have enabled the information to be safely brought in.

All experience has tended to emphasize the necessity of having the landing ground very close to headquarters. In order to ensure this the best plan is for the officer responsible for ground arrangements to survey the area from the air. The most likely fields are more easily spotted in this way than by any amount of reconnaissance by road. The larger the field the better, but in this connection it is interesting to note that it has been found that some fields which are just too small to be of use as landing grounds for 70 h.p. Renault BE's, are just large enough for M. Farmans. For this reason it is quite possible that in some types of country information obtained by an observer in a M. Farman, will be in the hands of the General more quickly than that obtained in a very much faster craft. In windy weather this does not obtain, for obvious reasons.

For peace training work it is, I think, a good suggestion that all garrisons should look through their areas with a view to recommending one or several good landing grounds in their vicinity. Mayors of towns might also be asked to do the same. Local football grounds would in many cases be suitable, and an undertaking would, of course, be given that the grounds would not be used by the R.F.C. on Saturdays, or when otherwise required. A Royal Flying Corps officer would then be sent round to see if the grounds were really suitable, and draw up a rough report for inclusion in an air-route handbook, which could then be compiled. We have already collected much data for such a book.

There are many areas in the British Isles which demand very slow landing machines if constant mishaps are not to be the rule. Possibly air or ground brakes may overcome this difficulty. The method of altering the angle of incidence while the machine is in flight does not appear to be a sound solution.

Landing grounds should perferably be selected well away from sheets of water or low-lying ground, as it may be found that morning and evening reconnaissance work will be much impeded by mist when the surrounding country is comparatively clear.

To sum up, the bulk of information will be brought in to landing grounds. Their selection is therefore a matter of great importance, and necessitates a considerable knowledge, not only of the requirements of aircraft, but also of the conditions affecting the transmission of information to the staff.

Ground Organisation.

Personnel.—Added experience only goes to emphasise the necessity for a high degree of military training and technical efficiency in the ground personnel, not only of those responsible for attending to the machines, but those employed on other duties, such as transport, intercommunication, &c. Success in war will depend as much on the efficiency and keenness of the ground personnel as upon those whose duties are more essentially in the air. And we should not overlook the fact that although our officers and men are of the keenest, those employed on ground work must be continually subjected to the disheartening effects of seeing the results of their hours of toil brought to nothing by the mischance of a second. To the good air mechanic the machine for which he is responsible is his pride. I know men who regard their machine almost as a living thing. They are intensely proud of its achievements.

We are most fortunate in the fact that our officers and men are splendid: and I may say that such shocks have no effect on their keenness. Their efficiency is indeed increasing more rapidly than we have had a right to expect in view of the limited facilities so far obtained for training. The rapid expansion of the Corps with the consequent dissemination of the old hands has also militated against the immediate development on solid lines of our ground organization, though it is steadily improving with experience.

I would like to add here a plea to manufacturers that they should look with sympathy on the Military Wing of the Royal Flying Corps, and co-operate with it in connection with the employment of good men when they leave the Corps. In two or three years' time some men will be leaving the Service. They will prove—I say it advisedly—to be possessed of a high standard of character and technical ability, and will be available for and anxious to obtain skilled employment in aircraft factories. I will go further, and ask employers not to throw obstacles in the way of men wishing to join the Military Wing or its Special Reserve.

A point brought into relief is that a large number of officers is required, under present conditions, to cope with the work. They are wanted for piloting, observing, gunnery, and command and administrative duties. Hitherto piloting has had a tendency to obscure the great importance of the remainder.

Material.—I think it is often forgotten by soldiers and constructors in connection with casualties of material that we are apt to base our experience entirely on manœuvres. These generally only last a few days, and I think it should be remembered that the repairs and replacements which become necessary in the field do not give a fair indication of the average amount of such casualties to be expected in a longer period of campaigning. Much of the material is new at the commencement of manœuvres, and does not become unserviceable in so short a period, whereas in a longer period parts would deteriorate sufficiently to require renewal in the field. A reliable basis for requirements in this direction is very difficult to obtain. At present we can only guess at the figures.

Sheds.—Some aeroplanes deteriorate more rapidly than others by being out in the open, but there is no doubt that they all deteriorate to very considerable extent, and if the climate is damp or otherwise unfavourable, new planes will be required after each period of manœuvres. More attention to varnishing the wood and exposed metal would probably well repay the time given. A really good waterproofing dope is a want.

An entirely efficient very light portable tent is still lacking. If the ideal in this respect is obtained, considerable expense and deterioration of aircraft might be obviated by at once sending the tent shed to the breakdown, instead of having to go through the laborious process of dismantling the machine, loading it on a lorry, and bringing it in.

Transport and Accessories.—Our designs in the matter of transport are gradually hardening, and are tending towards standardisation and simplicity.

The amount of transport and accessories required in the field is at present large. But this must be in inverse ratio to the reliability and simplicity of aircraft, and to the degree of training of the personnel. We are now, I think, arriving at a sound organisation for the maintenance of aircraft in such particulars as petrol, oil, spare parts, repairs and supplies. Our great aim, however, is to make the maintenance of aircraft as simple as that of the field gun.

In this, as in all matters relating to the Flying Corps, time is required to enable the internal organisation to bear fruit.

Uses of Aircraft.

Having dealt with matters of detail as they at present exist, I will now try to formulate ideas as to the employment of aircraft in war.

Experience places the value of aerial reconnaissance beyond a doubt, not only in calm weather, but practically in all weathers. Also it has been proved that there is no inherent impossibility in maintaining aircraft in the field. An examination of the estimates of the various powers under this head shows how clearly the fact is recognised.

Aerial reconnaissance itself is much; it will however be opposed, and that in the air. Anti-aircraft guns will assist, but probably insufficiently.

This fact being granted, there is the obvious necessity for different types of aircraft. They will undoubtedly be required to perform several distinct duties, and thus the question of the most suitable composition and distribution of flying squadrons to different portions of an Army, is clearly of much importance, both to soldiers and to aeroplane designers.

Does the advanced cavalry require one type of craft? The Headquarters of an Army another? Flanking divisions a third? Will there be a battle squadron? A fast scout flotilla? A squadron to hunt down and destroy airships and to attack aircraft bases? A low-flying armoured destroyer of ammunition parks and supply trains? A heavy transport convoy craft? A breakdown and repair craft?

For all these duties, slightly different types and qualities are required. Even now, one can hardly imagine the tabloid Sopwith taking the rôle of a Sikorski argosy.

Standardisation.—Whatever the future may bring forth, I would like to emphasise as a principle, the necessity for all possible standardisation in the reproduction of any one design. We must weigh most carefully the merits of any new design, but at the same time check any unsound diversity. Standardisation of types is at present undesirable, but standardisation within types is essential. Every new pattern and every fresh modification spells increased stores, increased transport, and therefore loss of readiness and mobility of the force as a whole. Mobility and readiness for instant action at any time must be the essence of being a Flying Corps. A Flying Corps which is not in the field when the flag falls, if not before, has lost a large proportion of its utility.

But to return to types. I do not suggest that a rapidly developing science like aviation may not necessitate the unhesitating abandonment of one design for another, but the guiding principle must in any case be that of the fewest possible types compatible with the object to be attained. With each new type, innumerable attendant difficulties of maintenance, replacement and storage are forced upon one. This question is one of less importance in the case of the Navy, as it has no difficulties of land transport, but it is vital to an Army.

Aerial Fighting.

Hitherto, progress in military aircraft has had to do mainly with reconnaissance machines, and these have already been dealt with at considerable length, but the fighting aeroplane now claims attention.

The problems raised or inherent in the question of aerial warfare are very complex. Command of the air will undoubtedly be sought. It will, as undoubtedly, be difficult to obtain. The third dimension—climbing—remains one of the principal stumbling blocks.

There are two schools of thought regarding fighting in the air. The one holds that if an aeroplane is to flight, it must carry a passenger, gun and ammunition. It will be so large and heavy that it will be slow, also it will lack the means of intercommunication necessary for combined action, and it will be unable to come within range of a fast scout. The latter will come, get its information, and go, unmolested. It would appear that, for a time at all events, the fast scout will have the advantage. It depends largely on the number of fighting machines available.

The other view is that fighting in the air must occur if results are to be obtained. Given that one side has sufficient fighting machines, it should be impossible for the unarmed scout to approach the point where it desires to glean information.

We have as yet nothing to go on in this matter. It is however, of great importance that thought should be directed, by all concerned, to the problem, and to that of action against troops on the ground. Aerial tactics will take much working out, and an aerial building policy can only properly be based upon them.

Recognition of Aircraft.

A first requisite is the recognition of friend and foe. No system has yet been evolved to ensure the distinction and recognition of aircraft either from the air or from the ground. Instances do and will occur of rifle and gun fire being directed at aircraft, but it seems generally that troops refrain from firing owing to the impossibility of recognising friendly from hostile aeroplanes, and from fear of firing at friendly ones.

Reliance cannot as yet be placed on recognising hostile aircraft by their type. Moreover, as the speed of aeroplanes increases, the distances at which they must be identified in order to stand any chance of hitting them also increases.

Black and white stripes painted on the under surface of the planes are distinguishable at two or three miles, according to the light, but an aeroplane cannot be recognised at any distance. It is as difficult as it is important that a satisfactory method should be found, in order that it may be possible to issue orders to the troops to fire at any aeroplane, not definitely identified by some means as friendly. Various means have been suggested, and some attempted, for ensuring this, but so far with no marked success.

Summary of points brought out, requirements and suggestions for Constructors.

I will now endeavour to summarise the points which I have tried to indicate during the course of this lecture.

First, I would mention the paramount necessity for a really reliable, suitable, high-powered, and silent engine.

The second is that of factors of safety under the conditions of present aerial flight.

Third, the apparent advisability of flaps as opposed to warping.

Fourth, a better landing gear to sustain the shock of landings such as must often be made in a Service machine.

Fifth, progress required in the directions of strength and simplicity in design and construction, so as to reduce the time and labour now required to keep aeroplanes and engines fit for constant service.

Sixth, time would be usefully expended on experiment for better methods of intercommunication between aeroplane and aeroplane, and aeroplane and the ground.

Seventh, standardisation. There is method in the military insistence on limiting types to those absolutely essential and in requesting a rigorous standardisation of parts.

Eighth, a large type of machine with, if necessary, multiple engines and propellers is now required.

Ninth, invisibility.

Tenth, air or ground brakes.

Conclusion.

In conclusion, from the military point of view, I am glad to think that the words Sir John French used when kindly presiding at my lecture last year have been to a certain extent taken to heart. He said: "Aviation is one of the most important subjects to which the modern officer can pay attention at the present day." Interest in and knowledge of the subject by both Services have increased, and even public apathy has shown occasional signs of movement.

Aviation has advanced, and is still advancing at an unparalleled rate. May I quote to you the leading paragraph of the instructions issued in September, 1910, for the manœuvres of that year? They already read like Chaucer: "As this is the first occasion on which aeroplanes and dirigible balloons have been employed in this country for military work, their employment is largely a matter of experiment; and as the science of aerial navigation is yet in its infancy, unreal conditions which would not obtain in war must be observed for the safety of the aeronauts and their machines."

This, I think, constitutes a landmark. It is difficult to realise that these instruction were issued less than three and a half years ago. Where there were a very few isolated and groggy machines quite unsupported by ground organisation, there are now squadrons. This progress is producing new strategical considerations affecting radically all military arrangements and dispositions.

The aerial scout is well evolved.

The "fog" of war is already turning to mere mist.

Now the fighting machine which will eventually affect the destinies of nations is materialising.

Very soon we shall have aeroplanes with considerable weight-lifting capabilities, with a speed of say 100 m.p.h., and a capacity of 700 miles. They may be fitted with transparent wings. With such machines the flanks of even modern armies will be easily turned, vital arteries of supply, well in their rear, easily gained, the words "overland" and "oversea" will have little meaning.

It appeals very much to the imagination to think of a squadron of almost invisible and silent aeroplanes launched to raid some vital spot of the enemy's organisation.

A similar squadron, if armoured, might perhaps safely fly low over parked ammunition and supply wagons, and sow explosives amongst them.

I do not agree that these ideas are the product of too vivid an imagination. We have now the ability to keep the air in most weathers. Great weight-lifting aeroplanes are an accomplished fact. I would therefore urge British manufacturers to develop their designs for large machines; there can be no doubt that such machines will be required in war. I am aware that however good the will, bricks cannot be made without straw. Nevertheless, a year's, or even a few months', advantage now may mean much later.

This country is certainly not yet first in aerial strength, but the year's effort has been productive of such tangible progress as to show that we could attain aerial supremacy if we really meant to. Do we mean to? Believing as I do that land fighting and sea fighting will eventually wait on aerial fighting, I am convinced that we should make every possible effort to attain that end: and this effort should be made at once; we cannot afford to delay.

THE DISCUSSION.

IN opening the discussion, Mr. Joynson-Hicks observed that he was intensely interested in the Author's concluding remarks, but he would have liked to have had some information as to the future organisation of the air squadrons, whether they were or were not to form an integral part of an Army Division exactly as were the cavalry and artillery at the present time, and what relationship there would be between the Flying Corps of the Army and that of the Navy. He said that victory or defeat in battle would always depend upon the possession of information as early as possible, and the aeroplane could supply that in a way that no cavalry could.

Captain Waterlow observed that the Author had made no reference whatever to airships, and having spent so many years of his life on their development he much regretted this, especially as they were now handed over to the Admiralty. He hoped that before long they would have them back again, as the capital expenditure involved by a later transfer would prevent this from happening if deferred for some time. There were one or two points he would like to mention, in connection with what had been done with airships. During the last manœuvres they went out in a heavy mist, so thick indeed was it that at 1,000 ft. high they could hardly see the ground, and after making observations, messages were sent by wireless to headquarters. Within seven minutes of their despatch, these reports were received by the General, and in view of the fact that these had to pass the Censor and were transmitted by ground telephone, the performance was very creditable. Further, they had been able to transmit and receive messages from one airship to another—an achievement that had not previously been accomplished. On an airship the crew would work in reliefs, and there was not that fatigue to which Colonel Sykes had referred. His airship of the future was a very large vessel, travelling at high speeds, say from 70 to 80 or even more miles per hour, and he warned his hearers not to dismiss airships from their speculations, although he regretted to say that many people knew absolutely nothing about them yet would not allow anybody else to know anything about them.

General Henderson observed that in his opinion the control of aeroplanes in war should be invested in one person—the Commander-in-Chief—because of the great distance between the engaging forces, whereas the various divisions would be within two or three minutes' flight of each other. Later on, when the armies were in close contact, squadrons or flights might perhaps report directly to the divisions. In times of peace, he thought that the attachment of aeroplane squadrons to Army divisions would be most extravagant and not conducive to the best results. But this was a new organisation, and it would be most undesirable and pedantic to lay down hard and fast rules beforehand as to the procedure to be followed. He said that Colonel Sykes had spoken of the success of the fast flying aeroplane, but he would mention that when Prévost landed his Deperdussin in the Gordon-Bennett Race, he ran for nearly a mile on the ground after landing, and he hesitated to surmise what would be the value of information acquired by a scout should this happen in some parts of the country. There was a limit to the range of speed. At present there was no fighting aeroplane that could stop a good scout; and if his audience wanted to know which country had the fastest aeroplane—it was Great Britain.

Mr. Holt Thomas said that Military Aeronautics in this country had made enormous progress during the past two or three years. We now had the fastest machines, and our pilots on the average were better than those abroad, except for foreign picked men. In France on a windy day there was often no machine out, but on the manœuvres carried out last year in this country the machines were often blown to a standstill.

Major Baden-Powell remarked that he failed to see what advantage there was in carrying a large crew, although it might be possible to land a number of men for the purpose of destroying stations and cutting wires, or perhaps transfer bodies of troops to various spots on the field of battle.

The Chairman (Lord Sydenham), before calling upon the Author or his reply, observed that the development of aeronautics for military purposes had greatly extended the control and the information at the disposal of the Commander-in-Chief, and he dilated upon the tremendous possibilities that might have resulted had such machines been available at different crises in the history of the world. He said that while the aeroplane was at the present moment of greater importance than the airship, the future possibilities of the latter should not be forgotten. He emphasised the importance of possessing a sufficient number of trained pilots and observers, as well as aircraft, ready for immediate service.

In a brief reply, Colonel Sykes said that the scope and breadth of his paper prevented him from giving attention to the question of airships. He thought that one should not dogmatise on any matter in connection with military aviation, but should keep a perfectly open mind, and see both sides.

MR. B. C. HUCKS AT HULL.

Flying at Hedon suggests another familiar aerodrome; but Mr. Hucks hardly expected to be reminded so forcibly of Hendon at its best when he visited the Hedon Racecourse, at Hull, on Thursday, Friday and Saturday last, the 5th, 6th and 7th inst., to give demonstrations of looping-the-loop and upside-down flying. The enclosures were lined with enthusiastic spectators, there was hardly a breath of wind, and the sun shone from a perfectly cloudless sky. Even midges were misled by the summery conditions, and came forth in force and aviated with irritating vigour.

In addition to his looping Blériot, Mr. Hucks had also brought his 80 h.p. Blériot two-seater machine, which had been housed in a barn near Rochdale, since Mr. Hucks landed there a few weeks ago, after a terrible fight with a gale of wind and rain.

Promptly at three on Thursday Mr. Hucks rose in his passenger machine and gave a magnificent exhibition of steep-banking spirals, steeple-chasing along the front to the enclosures a few feet above the ground. Since Mr. Hucks has been flying the looping machine, his handling of the two-seater type has noticeably improved, and his "banks" approach very near to the vertical. He landed in order to take a passenger on board, and after another flight he changed over to his looping machine. In a few minutes he was high in the air, and during the demonstration he completed six loops and also did an "S" dive, remaining on his back for sixteen seconds. Then followed another passenger-flight. This finished the flying for the day.

On Friday the weather was again bright, although the wind proved rather troublesome. This did not, however, interfere with the flying, for Mr. Hucks gave further demonstrations with his two-seater machine, and on the looper completed eight more loops and another upside-down flight.

In the morning Mr. Hucks had flown around Hull and district, carrying Mrs. Craig and her little five-year-old son, the flight lasting twenty minutes and being watched by many thousands of people. On the previous day Mr. Hucks also carried a representative of the Hull *Daily Mail* over Hull, but owing to the foggy conditions he was not very clearly visible.

On Friday afternoon Mr. Hucks also took as passenger Master "Billy" Craig, who was attired in a complete miniature airman's suit, in a flight which lasted over ten minutes, during which Mr. Hucks indulged in some of his steep "banks," to the youngster's high glee, who frequently waved his hand when passing the enclosures. This makes Master Craig's fourth flight.

On Saturday morning there was a wind of over 50 miles an hour, which increased to over 60 at mid-day, but dropped a little by the advertised time for Mr. Hucks to fly. A huge crowd turned out, but a good many were very dubious about seeing any flying at all. At 3.30, however, Mr. Hucks took up his two-seater, and although he found the wind gusty and was troubled by the rain, he was able to give a fine ten minutes' exhibition flight. The looping monoplane had in the meantime been wheeled to the far end of the course, head to wind. Having been firmly strapped in, Mr. Hucks gave the signal to release the machine, when it immediately shot up vertically for 100 ft., where the wind was not so strong, and enabled Mr. Hucks to make a little headway. Having reached a height of 800 ft., he did a double loop, during which time he had been blown right outside the field. Fighting his way back to the centre of the course he did a further two loops, and, before he landed, had completed a total of eight for the afternoon, bringing his grand total up to date to 148.

When looping in a strong wind, Mr. Hucks always dives with the wind blowing diagonally across the machine. It seems to be the impression that it would be better to start the dive head to wind; but Mr. Hucks points out that, if he did this, when he reached the upside-down position, he would lose all his forward speed and "pancake" badly.

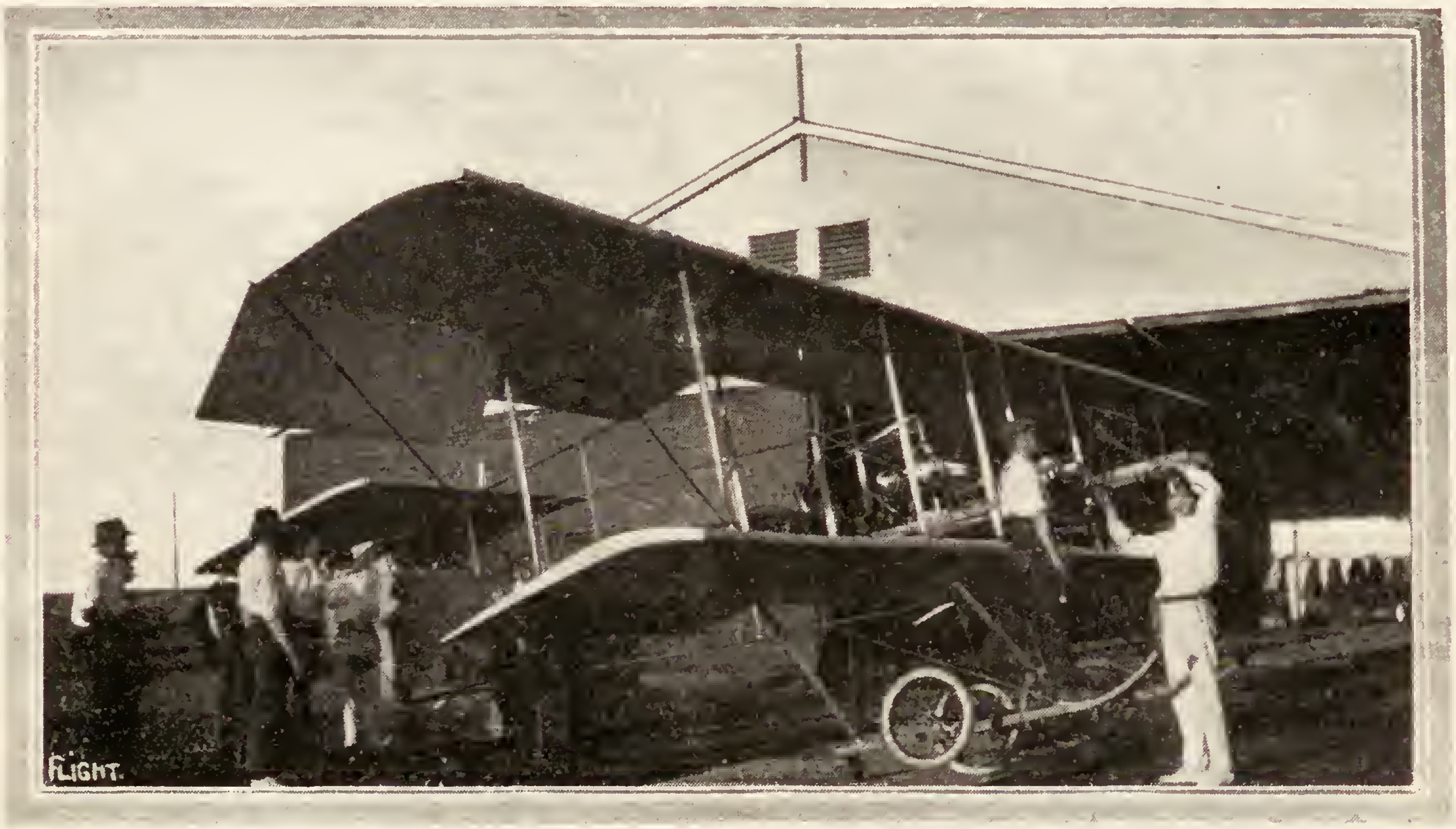
On landing, the enthusiasm of the crowd knew no bounds, and it was with difficulty that the spectators were prevented from storming over the railings and mobbing Mr. Hucks.

* * * *

A SOUTH AFRICAN-BUILT BIPLANE.

In sending us the two photographs appearing on this page and page 160, a Kimberley correspondent writes as follows:—

"I enclose two photographs of the South African-built biplane referred to in the communication you received and published (in FLIGHT for November 1, 1912) from the late E. W. Cheeseman. This machine is of special interest because it has been recently purchased by the South African Government, and is their first machine. It is also the first machine built in S.A. which has flown successfully. Mr. Paterson recently made a flight over the Kimberley Aerodrome with this machine of 2 hours 10 mins., covering 120 miles. Unfortunately the Paterson Aviation Syndicate is liquidated, and the beautiful aerodrome will be made no further use of until some enterprising firm turn their attention to the possibilities of success in South Africa."



A SOUTH AFRICAN-BUILT BIPLANE.—Final adjustments outside the hangar just previous to its first ascent.

* * * *

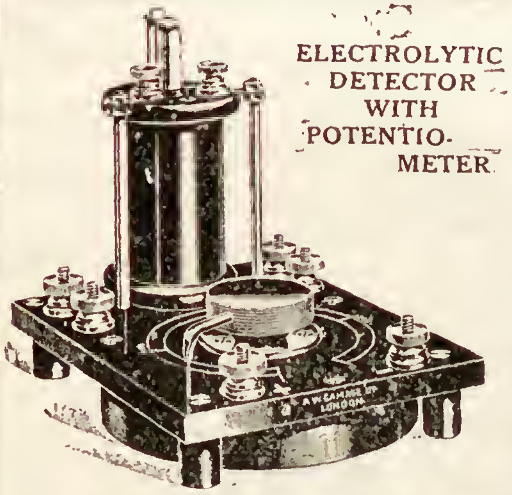
Testing the "Wight" Seaplane.

Several test flights were made with the "Wight" seaplane on Tuesday and Wednesday of last week. Various propellers were tried and we understand that the best result showed that the speed of the machine had been increased up to 72 miles per hour. Mr. Gordon England was the pilot, this being the first time he has flown since his accident; although his leg was very stiff and he had considerable trouble in walking, he had no difficulty in flying.

TELEGRAMS "WHITE, EAST COWES"
TELEPHONE: No 3 COWES.
THE "WIGHT" SEAPLANE AS CONSTRUCTED BY
PORTSMOUTH
SOUTHSEA
COWES
NEWPORT
SHANKLIN
VENTNOR
J. SAMUEL WHITE & Co LTD.
EAST COWES
ISLE OF WIGHT

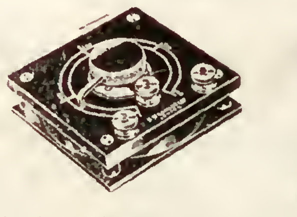
GAMAGES

EXCLUSIVE and ORIGINAL WIRELESS APPARATUS.



ELECTROLYTIC DETECTOR WITH POTENTIOMETER.

The advantages of an Electrolytic Detector is that it does not get out of adjustment when transmitting. The above instrument is the result of a good deal of experimenting, and is a really sensitive piece of apparatus of first class construction, complete with potentiometer, reading from zero to 300 ohms, with platinum contact point. Lacquered brass and ebonite throughout. Price 35/-.



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Volume IV of FLIGHT

JANUARY TO DECEMBER, 1912.

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• • • • • • • • • • • •

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FOREIGN AIRCRAFT NEWS.

Parmelin Crosses Mont Blanc.

AFTER waiting at Geneva for some time, Parmelin succeeded in flying across Mont Blanc on Wednesday. Leaving Geneva at 1.39 p.m. on his Deperdussin monoplane, he made his way across the highest peak of Mont Blanc, which is 15,782 ft. above sea level, and after covering 25 miles had to land owing to the fog near Aosta, instead of continuing to Turin as intended. The greatest height attained was about 17,500 ft.

Pegoud Makes 52 Loops.

IT is reported from Agram, in Austria, that during his exhibitions there on Sunday afternoon, Pegoud looped the loop no fewer than 52 times.

French Military Aviators Leave Crotoy.

THE French military authorities having decided to do away with the military aviation school at Crotoy, Capt. Gerard and Lieut. Vuillemin, on the 5th inst., flew to their new stations at Rheims, while Lieuts. Le Bihan and Thenault went to Douai.

A Fatality at Villacoublay.

WHILE making some experimental flights at Villacoublay on the 5th inst., a biplane, piloted by Raoul de Reals-Mornac fell from a height of 200 metres. The pilot was killed on the spot.

A Nieuport Superior Pilot.

ON a Nieuport monoplane, Sergeant Verwitch on the 4th inst. made the second qualifying flight for a superior *brevet*, flying from Villacoublay to Rheims and back. He had previously carried out the first test over the triangular course, Villacoublay–Orleans–Chartres.

More Nieuports for French Army.

BEFORE a military commission headed by Capt. Destouches, three 100 h.p. Nieuport monoplanes were on the 4th inst. put through their official tests at Villacoublay, the pilots being Espanet, Gobe and Marmier respectively.

Mme. Pallier to Fly Nieuport Monoplane.

HAVING done all her flying up to the present on an Astra biplane, Mme. Pallier has decided to turn her attention to the monoplane. She is now at Villacoublay practising with a Nieuport monoplane.

and Mme. Richer a Caudron.

HAVING completely recovered from the effects of the accident which befell her in August, Mme. Richer has decided to again take up flying, and she is now at Crotoy, at the Caudron school.

Changing Places in Mid Air.

BY way of demonstrating the stability of the Maurice Farman type of biplane, an interesting experiment was carried out at Buc on Monday. On a military machine with the ordinary system of control, Maurice Farman ascended, accompanied by Renaux, and during the flight he changed places with Renaux, who piloted the machine to the end of the trip.

Long Flight on a M. Farman.

A FINE non-stop flight of 250 kiloms. from Buc to Bourges was made on a De Dion engined M. Farman by Col. Barres, accompanied by Col. Caron, on Thursday of last week. Also with Col. Caron, Col. Barres returned to Buc on Monday.

Baron Cederstrom Flying a Biplane.

THE well-known Swedish pioneer, Baron Cederstrom, who has hitherto confined his attention to monoplanes, has recently spent some time at the Farman school at Buc, familiarising himself with the control of the Farman machines. On one of the H. Farman biplanes, on Monday, he flew with a passenger from Buc to Etampes and back.

Etampes to Verdun on Farmans.

AFTER taking delivery of two H. Farman machines at Etampes, an officer-pilot and a sapper, each with a mechanicien, mounted the machines and flew on them to their station at Verdun, on Monday.

M. Blériot Unsuccessful.

DESPITE a very strenuous campaign carried on by means of handbills and other election literature dropped from the sky by Blériot pilots, M. Blériot was unsuccessful in his candidature for Seine General Council. His opponent, M. Perinard, polled 2,072, while M. Blériot's poll was 1,852.

An Aerial Post for Russia.

THE Imperial Aero Club of Russia is endeavouring to obtain official sanction to organise an aerial post. It is proposed to charge an extra 50 kopecks on letters carried by the aeroplanes, the proceeds to be devoted to the National Aerial Fleet Fund.

Fatal Accidents in Germany.

A NON-COMMISSIONED officer, named Foellmer, was killed at Schleissheim aerodrome on the 4th inst. through his machine falling 200 metres on to the barracks.

At the Waune-Herten aerodrome in Westphalia on the 7th inst., a pupil—Hugo Frank by name—in making a steep landing at the conclusion of his first flight, received injuries which terminated fatally.

An Etrich monoplane, piloted by a pupil named Degner, who was making his first solo flight at Johannisthal on Tuesday, was crashed into by a biplane piloted by Sedlmayr, who was accompanied by Lieut. Leonhardy, which had just left the ground. The machines were at a height of about 199 ft. when the collision occurred. Degner was killed on the spot, while Sedlmayr and his passenger were seriously injured.

Turkish Officers Flying to Cairo.

FOLLOWING a suggestion of the Turkish Minister of War, Capt. Fethi on a Blériot and Lieut. Nouri on a Deperdussin, each with a passenger, started from Constantinople on Sunday morning to fly to Cairo. Capt. Fethi made a first stop at Ada Bazar, while Lieut. Nouri got to Isnik, Broussa.

Beachey to Demonstrate the Langley Machine.

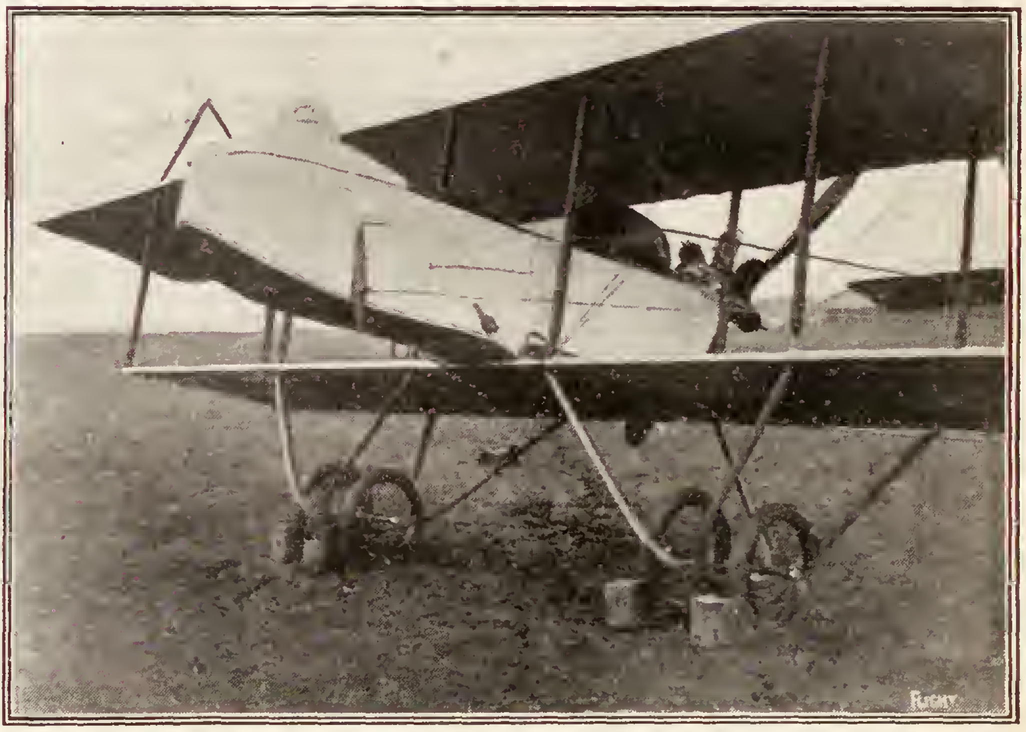
LINCOLN BEACHEY recently offered to the Smithsonian Institution to fit a modern motor to the flying machine designed and built by the late Prof. Samuel P. Langley, and demonstrate its flying possibilities. While the institution will not allow the original machine to be taken from its place in the museum, they have offered to give every facility to anyone who would wish to make and test a perfect reproduction in order that Langley's real success might be shown.

An American Military Pilot Killed.

A CABLE message from San Diego, Cal., states that the American Army pilot, Lieut. H. B. Post, was killed on Monday, through his biplane falling from a height of 500 ft. when flying over the bay. Lieut. Post recently made a fine cross-country flight of 120 miles, and also beat the U.S. Army altitude record.

The Gordon-Bennett Balloon Race.

ARRANGEMENTS have been made for the Gordon-Bennett Balloon Race to be held this year from Kansas City, and the start will be on October 6th. The city authorities, besides providing free gas, and the labour necessary for inflating the balloons, are offering $7,200 in prizes, and are making every effort to ensure that the event may be a thoroughly International one.



NEW H. FARMAN CHASSIS.—It will be seen that it consists of four pairs of "U" steel tubes of stream-line section, each pair of which converge at their lower extremities, where they are connected by short transverse distance pieces. It is claimed that this machine can be converted into a hydro. by simply substituting floats for the wheels. For resisting transverse strains when landing with a side wind it would seem that this chassis is an improvement on the older type H. Farman chassis.

Models

Edited by V. E. JOHNSON, M.A.

The Dependence of Aviation on Model Aeroplane Work.

By F. Handley Page.

(*Concluded from page 128.*)

Now that I had a suitable design of a model upon which to experiment, and had made all the necessary arrangements for testing it, it was necessary to plan out a proper scheme of tests to be carried out on these models to obtain the data that was required.

In these experiments the lifting capacity of the planes as well as the stability effects obtained, had to be tried at one and the same time. There were made up many types of planes; some of them of the type which we are making at the present time, and others with the ordinary square ended planes, in this case the model being provided with a tail. The best results which we obtained were with the plane of the type similar to the present one.

Here it is necessary to give a word of warning to the experimenters. It is necessary when comparing results on different types of planes that the standard of workmanship should be exactly the same on each model. If not there is the probability that the model which has the inferior aerodynamical qualities may prove the better flyer owing to its being made better. It is necessary, therefore, to most carefully examine the models to see that each has been made as well as possible.

Turning now to the results which were obtained with these model experiments, it was found that if the plane ends were swept back far enough, and there was a sufficient difference of angle between the tips and the main lifting portion of the plane, the model was very stable fore and aft. The reason for this is very easily seen if you refer to the Turnbull experiments of which I have already told you. The centre of pressure moves forward when the angle decreases, and backward when the angle increases, as found by Mr. Turnbull with his plane of double curvature.

With a plane of single curvature with the concave side facing downwards, the centre of pressure moves backwards up to an angle of from 15° to 20°, and thus there is a change in the results and the centre of pressure moves back again. It is necessary with this type to employ a tail so as to obtain the same movement that the centre of pressure has with a plane of reverse curvature.

It is most important when designing a plane with a reverse curve that the negative angle of the rear portion should be exactly right both in length and angle, otherwise there is a tremendous loss of efficiency. This required amount it is only possible to find out by experiment.

In carrying out these experiments, we found many things that were not necessary in the planes which we had originally fitted to the models, and that to obtain the best results as regards stability and lighting power, certain curvatures and so forth had to be used.

So far I have dealt mainly with the lift experiments on the models, but when the plane was found that gave the best lifting result, it was then that the second problem had to be dealt with—namely, that of stability.

In this connection a great many devices were tried with vertical fins placed at different points on the longitudinal axis of the model, mainly with a view to damping out lateral oscillations.

It was found that if the plane had a sufficiently large "wash out" and was thick in the centre, a vertical fin between the planes was not necessary. A vertical fin at the tail, of the proper dimensions, was exceedingly useful for keeping the machine facing the wind, and with this small adjustments could be made, and the machine kept on a straight course.

I have taken this experiment as an illustration of the way in which tests may be carried out to obtain certain definite data to full-sized machines. They form, when the designer does carry them out, most useful supplementary work to the research work which is now carried out in wind tunnels in the laboratory.

In this connection it is very interesting to note, that with the composite plane upon which I experimented, the centre of pressure found in the model experiments came at exactly the same point as the resultant centre of pressure on the plane, found by dividing the plane into a series of sections, and for the angle at which the plane was flying determining its centre of pressure from wind tunnel results.

From the model experiments was constructed our first full-sized machine, which was known as the "Blue Bird," it having been painted with a blue paint. The "Blue Bird" was followed by the "Scrap Heap," so called because the machine fell to pieces; then came another to which no name was given; following it was the "Antiseptic," named by the late Mr. Edward Petre, owing to the machine having been painted with a non-rusting paint. Then there is our old 50 h.p. monoplane, built in 1911, and still flying, known as the "Yellow Peril."

I should like to give you some suggestions as to the way in which your future model work might be extended so that experimental results of value might be obtained.

There is probably not very much more progress to be looked for in the improvement of the lifting capacity and the diminution of resistance of ordinary planes. Experiments have been, and are still being, carried out all over the world, and plane sections have been evolved which have lift drift ratios of very high value. It is probable a maximum of one in twenty to one in thirty will be reached shortly. There are, however, great improvements to be effected as regards the stability of machines. It is the carrying out of tests for the improvement of this feature of machines that should call your attention for the coming year. It is a subject that can only be properly dealt with by model flying tests, and it is one therefore that should demand your closest attention.

There seems to be a particular way in which machines of the future may develop. The modern efficient flying machine will have to be efficient, travelling at a high speed, and capable of a wide speed variation, and to obtain these results to the fullest effect the propeller will have to be placed in the rear of the aeroplane.

To understand the reasons for this, let us consider how the power required to drive the aeroplane through the air is split up. Part is used in overcoming the resistance of the planes to their motion through the air, and the other part for that of the body planes. No matter at what speed you fly, planes for a given lift will have approximately the same resistance, provided that they are designed to fly at their most efficient angle at this speed. It is, however, different with the body resistance. Even if the *fuselage* is most carefully streamlined, and pilot, passenger, and engine, &c., all carefully enclosed, yet the higher the speed at which it is driven through the air, the higher will be the resistance which has to be overcome.

The characteristics of a slow-speed machine will be that the largest proportion of its power will be necessary to drive the planes through the air, whilst in the high-speed machines the power will be required for the body. In the slow-speed machines, the propeller blowing in front upon the *fuselage* increases its small resistance a negligible amount.

In the high-speed machine the body resistance, already a serious item, is increased considerably if the propeller is placed in the front of the machine. It will pay them to place the propeller in the rear in the high-speed modern machine, just as it pays in a steamship, where the whole of the resistance is the body and wave making resistance.

From the point of view of Naval and Military requirements, the propeller behind the machine is much the better type. It offers such splendid opportunities for observation or for firing a gun. From the point of view of both efficiency and service, the propeller-behind machine scores every time.

There are many ways in which a propeller-behind machine may be made:—

1. As in the Maurice Farman machine, with a tail boom and outriggers surrounding propeller.
2. As in the Paulhan Tatin or the old Petre aeroplane, with the propeller at the extreme end of the *fuselage.*
3. With the split type *fuselage* and the propeller revolving on one of the fixed tail booms, as in the Grahame-White Military aeroplane shown at the Olympia last year.
4. With a tailless plane and swept back wings.

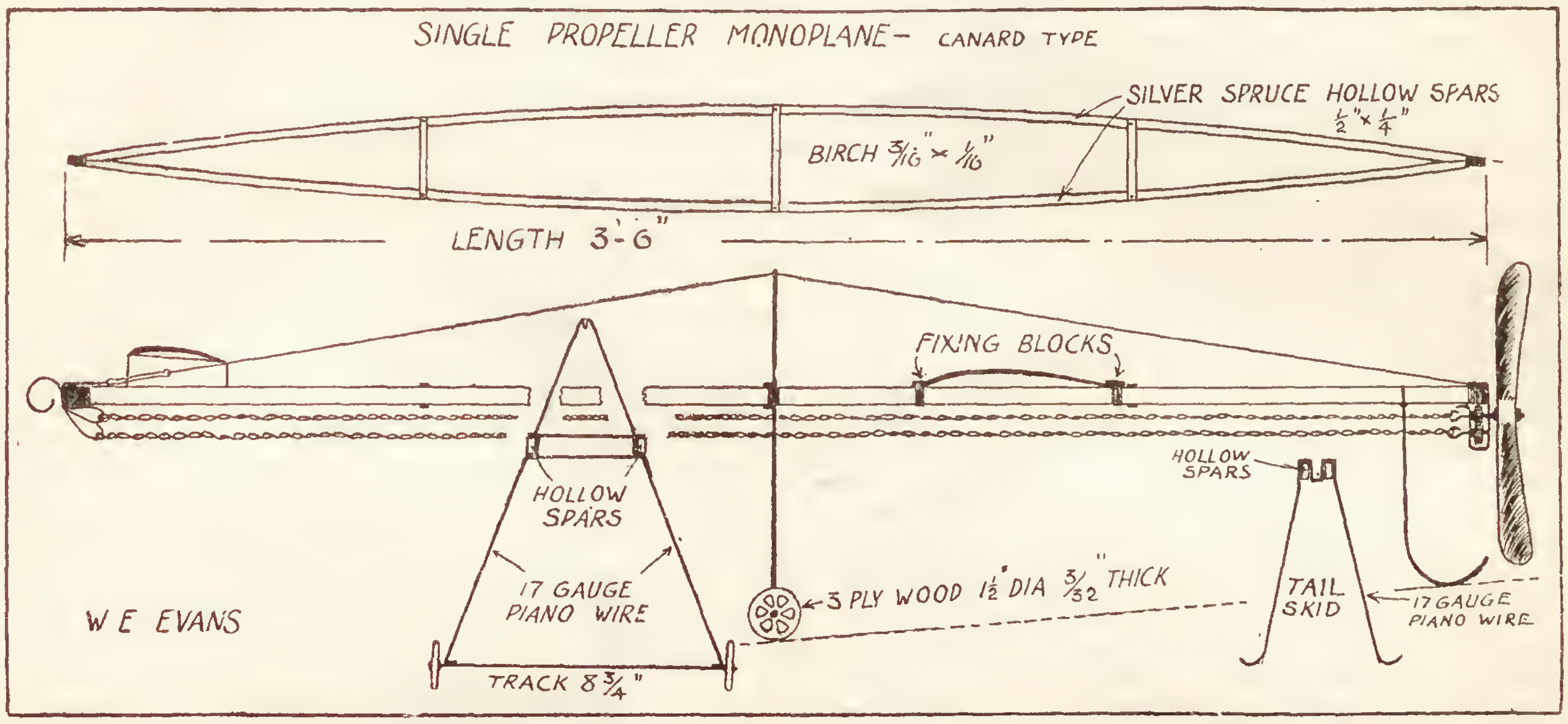
In the Farman machine the increased efficiency obtained by the propeller position, is to a large extent nullified by the large resistance of the rear frame-work exposed to the air. This type is also not quite so easy to handle when built for hydroplane work as a *fuselage* machine.

The second type with the propeller at the tail has a large moment of inertia owing to the heavy tail shaft, and is weak constructionally. The propeller position necessitates the tail being a long way off the ground, and this leads to an increased length of chassis struts with a consequent increase in resistance.

Type 3 is also very weak mechanically, and heavy.

Type 4 would appear to have the best future, as there is nothing in the rear of the propeller to detract from its efficiency, and it is a type which has good longitudinal and lateral stability. It is, therefore, in this direction that I think progress will be made.

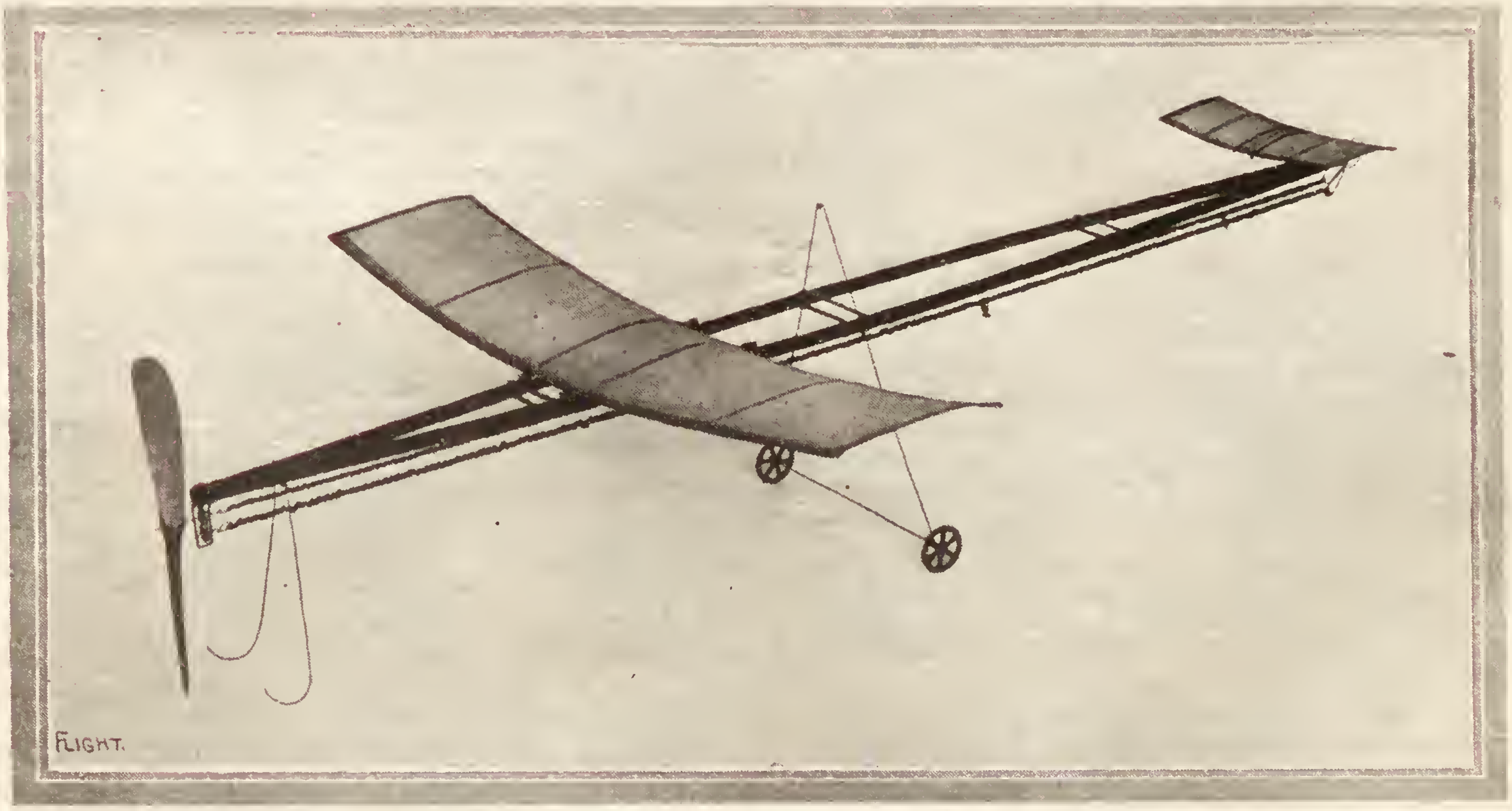
Finally I would ask you devote some more of your time to scientific research work with your models: improving their gliding angles, their lifting capacity and their stability. You can always improve your model by cutting down its weight, but if this is done at the expense of its strength it is no real improvement. Improvement should move along the lines of better aerodynamical qualities; therefore, it is in this direction that I hope you will experiment and carry out research work.



Mr. W. E. Evans' Single Propeller Record-Holding Model.

We have much pleasure in publishing the following particulars and illustrations (supplied us by Mr. Evans) of this model, which holds the official British records *both* for distance and duration, the former being 290 yards and the latter 64 secs.:—

The *fuselage* is built up of two silver spruce hollow spars blocked at the centre and ends, of rectangular section ½ in. high by ¼ in. wide, and 3 ft. 6 ins. long, planed very thin so as to weigh only ½ oz. each. The centre is bowed to the extent of 3 ins., and held in position by two pieces of $\frac{3}{16}$ in. by $\frac{1}{16}$ in. birch glued and pinned above and below. Similar pieces for stiffening are also fixed across midway between the centre and the ends. The hollow spars are chamfered one side at either end to form a joint which is glued and bound with thread.



A single screw r.o.g. monoplane by W. E. Evans.

The gear, comprising two ½-in. cog-wheels, was specially made by Messrs. J. Bonn and Co., the weight of which (complete with spindle for propeller), is only 6 drams. It answers its purpose admirably. The front hooks, or rather loops, and protector is made of 17 gauge piano wire in one piece bent to the necessary shape and soldered, and then bound on with thread.

The chassis, also of 17 gauge piano wire, is triangular in shape being 11 ins. from axle to top and having a base of 8 ins. This extends 3¾ ins. above the top of *fuselage*, and forms a kingpost for the necessary straining wire on top. Genuine piano wire only should be used for this, otherwise the longitudinal stability of the model becomes unreliable owing to the strain of the rubber underneath. The wheels are of 3-ply wood 1½ ins. in diameter and $\frac{3}{32}$ in. thick, fret cut and fitted with hubs made of brass tubing with a collet soldered on either side to make the tubing quite firm. Their weight is one dram each.

A double skid of 17 gauge piano wire is fixed at rear of *fuselage* to allow ample clearance for the propeller.

The main plane is 27½ ins. span and 5½ ins. chord, made of $\frac{3}{16}$ in. by $\frac{1}{16}$ in. birch and covered with fabric. The weight of this is 10 drams. The dihedral is a curve instead of the usual V. The camber is ½ in. in the centre and ¼ in. at the tips, these having a very slight negative angle of incidence. Two of the ribs are fixed 1½ ins. on either side of the centre to rest on the *fuselage*, and allow a firm fixing. When birch plane edging is glued and rivetted, holes should always be bored for the fine pins just a tight fit, to avoid splitting the wood.

The elevator is 9 ins. span and 2¾ ins. chord, and weighs 3 drams.

It is made of $\frac{3}{16} \times \frac{1}{20}$ birch, covered with fabric, and raised 1 in. above *fuselage* by means of a framework of 22-gauge piano wire.

The propeller is a Bonn's Invincible type 9½ ins. diameter, weight 3 drams, and has an effective pitch of 14 ins. It is driven by two skeins of four strands each of ¼ in. strip rubber. Greater consistency has, however, been obtained with a similar propeller of 9 ins. diameter, and an effective pitch of 13½ ins. with the same amount of rubber.

The model has an inclination of 1 in 12, but I think 1 in 8 would give a greater altitude in flight. Its best performances to date are the distance and duration records for this type of model, namely, 290 yds. nett, measured in a straight line, and 64 secs. The time occupied by the distance flight was 57 secs. The total weight of the model is 4¾ ozs., and with the surfaces totalling 176 sq. ins., the loading works out at 3⅞ ozs. per sq. ft. It is exceptionally stable, both laterally and longitudinally, and has been flown regularly in all weathers without breakage of any sort since last October.

The South-Eastern Model Aero Club's Exhibition.

By H. G. Wilkinson.

On Thursday, January 29th, in response to an invitation from the Hon. Sec. of the S.E.M.Ae.C., I paid a visit to the exhibition of model aeroplanes organised by this club, and after what I saw at the Central Hall, Peckham, I should think the future for the club looks very promising.

The extraordinary number of models exhibited was astonishing, and the great assembly of visitors a proof of the interest now being taken in flying, particularly the model aspect, where it is properly encouraged, as is evidently the case in this part of South London.

Mr. Clark, the Secretary, was good enough to personally conduct me round the Exhibition, and fully explained the chief points of the various models, foremost of which being a large steam-driven monoplane shown by Mr. Groves. This model was of the front elevator type and measured some 5 ft. across, and has, I understand, made numerous successful flights. Another large "engined" monoplane called "the Gnat" was exhibited by Mr. J. Dollittle. This was distinct from Mr. Groves model in that it was of the "propeller first" variety, and the engine was driven by compressed air instead of steam. Considerable interest was created when Mr. Dollittle demonstrated the capabilities of the multi-cylinder engine, which worked splendidly. Another model which appealed to a number of visitors was a scale copy of the well-known "Morane-Saulnier" monoplane, complete in nearly every detail.

Mr. Plummer, the constructor, is to be congratulated on the fine workmanship displayed in this machine, and several others, comprising a large self-rising tractor monoplane (which proved successful in the last "Trophy" competition), a splendid biplane fitted with a four-bladed tractor-screw and a twin propeller duration monoplane.

Mr. Clark exhibited a model of a "Blériot" similar to the one used by Mr. Hucks in his recent demonstration of "looping the loop" at Hendon and elsewhere. The controls on this machine came in for a lot of attention, as everyone seemed keen on becoming efficient "pilots" there and then, working the warp and elevator levers and rudder bar.

A very large rubber-driven tractor model weighing nearly 2 lbs. was shown by Mr. Westwood (the *fuselage* of this being, I am told, a complete departure from regular model practice), and Mr. Prance exhibited a cleverly-designed single-cylinder engine suitable for either steam or compressed air.

Other models worthy of note were those made by Messrs. A. Chinnery, Brunton, Brown, L. Morris, C. and A. Beere, and F. W. Evans. In addition to the above, one item of more than usual interest to model-aeroplane constructors was the partially-finished 4-bladed propeller shown by Mr. A. Nicholls. Each of the blades was in a different stage of construction, showing the whole process of making this type of propeller.

The writer is looking forward to the pleasure of seeing the majority of these models in actual flight, and if the foregoing particulars prove of interest to your "Model" readers, I shall be glad to communicate the results of the tests to you. [We shall be pleased to receive these results.]

Model Club Exhibits at Olympia.

We are very glad to see that up to date, eight clubs have decided to take club stands at Olympia. We cannot see any real and consistent reason why every model aero club in the neighbourhood of London, at any rate, should not take a stand; with the provincial clubs it is of course rather a different matter, since there is the question of distance and consequent expense to be considered. But even here, if clubs as a whole cannot see their way to take a stand entirely on their own, we trust some individual members will exhibit privately on their own account. No *club* exhibition (useful though they are) can possibly give a club the public advertisement that the taking of a stand at Olympia can do. Beside, in any club exhibition there is lacking that larger criticism and comparison, which can only arise when one sees them arranged side by side under the same roof. Moreover, in all exhibiting *together*, there is exhibited to the public a display not only of friendly rivalry but of comradeship on a larger scale, which is absolutely essential if model aeroplaning is to make real progress and obtain any adequate and proper recognition. At the present day one can see on every hand how futile (so far as official recognition is concerned) is individual effort—how all powerful, how instant to claim *immediate* attention is a combined body, no matter of what or whom composed. Seeing that this is such a self-evident truth, it is curious that in every walk of life, in every trade and profession and also in sport there are always those who prefer to stand aloof, to plough the lonely furrow, rather than assist in the general cultivation of the soil, which at the present day—to bear the fruit it might do—*must* be tilled and cultivated on a scientific scale, which can only be done by the *united* efforts of all those interested therein, and by a general pooling of the best results obtained by all.

We think it is not too much to say that those who stand aloof from this concerted effort cannot have the real progress of any cause at heart.

A Long-Distance Looping Model.

A correspondent (Mr. H. W. A. Thorogood) sends us the following :—"For the past six years I have been experimenting with single-propeller model aeroplanes, and have met with great success, With my latest model I have secured flights of half a mile at an altitude of 100 ft. and a duration of 60 secs. This model is 2 ft. 9 ins. by 2 ft., propelled with a 9-in. screw and 8 strands of rubber $\frac{3}{16}$ in. by $\frac{1}{32}$ in., and weighs 3½ oz. complete.

"This model will also loop the loop; on a recent occasion it made six consecutive loops, and covered a distance during this performance of a quarter of a mile. This model will fly just as well in a gale as in a calm." It is a pity Mr. Thorogood does not send us further particulars, with, say, drawings to scale, of his model, so that others could emulate its performances.

Mr. R. V. Tivy's Steam Plant.

We have received the following communication from Mr. Tivy :—"With reference to the photograph of my steam-driven model, and your interesting remarks thereon, which I see you publish this week, the account of the test with the steam plant appeared in FLIGHT some months ago, and I think you have overlooked the fact that this plant is not of the flash boiler type, but has a vertical centre flue boiler built with a cross tube and steam dome. I think I am quite right in saying that no model has yet been made to fly with a steam plant other than one of the flash boiler type, and everyone is rather prejudiced against the possibilities of centre tube boilers." Mr. Tivy is perfectly right; we had overlooked the fact to which he refers. We scarcely think, however, that everyone is prejudiced against centre tube boilers; many no doubt are so, but we have heard more than one speak in their favour. Provided that one could be made of sufficient power and small enough weight to once rise the machine, it would in some ways undoubtedly be preferable to the other type. Our correspondent has not, we presume, tried the result of an "assisted" launch. Hand-launching a power-driven model, flying (for a model) at a high speed, is impracticable, but there are, of course, other means that could be employed.

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver	85 secs.
Twin screw, do.	Distance	R. Lucas	590 yards.
	Duration	G. Hayden	137 secs.
Single screw, rise off ground	Distance	W. E. Evans	290 yards.
	Duration	W. E. Evans	64 secs.
Twin screw, do.	Distance	L. H. Slatter	365 yards.
	Duration	J. E. Louch	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance	C. C. Dutton	266 yards.
	Duration	J. E. Louch	91 secs.
Do., off-ground	Distance	C. C. Dutton	190 yards.
	Duration	J. E. Louch	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter	60 secs.

Exhibition at Felixstowe, May 6th to 16th.—The Felixstowe Advancement Association have applied for an aeronautical section to be organised in connection with their forthcoming exhibition in May next. Will any member or reader who is willing to lend models send in their names to the hon. secretary? It is hoped that a first-class exhibit will be sent, and members are asked to help the hon. sec. in this matter.

Gift of Prizes.—The Women's Patriotic Aerial League, of which The Dowager Lady O'Hagan is the chairman, has kindly offered prizes for kite and model competitions for ladies during 1914. Will others come forward and help on the science in this country?

Exhibition of Aeronautical Trophies.—Members and readers will be pleased to hear that Messrs. Gardiner and Co. (the well-known clothiers), Scotch House, Knightsbridge, are kindly exhibiting in their window till end of month the Farrow Shield of this association, also the Mappin and Webb Gold Trophy and others presented to the Grahame-White Co. for competition at Hendon.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (N. Branch) (27A, SEDGEMERE AVENUE, EAST FINCHLEY, N.)

FEB. 14TH, flying at Finchley, 3 p.m. Feb. 15th, 10 a.m.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

FEB. 15TH, flying Wanstead Flats as usual. If wet meet at clubroom. The sec. would be glad to receive at once all completed entry forms for models to be entered at Olympia.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

FEB. 14TH, flying at Sudbury.

Reigate, Redhill and District (THE COTTAGE, WOODLANDS AVENUE, REDHILL).

FEB. 14TH, flying Earlswood Common.

Wimbledon and District (165, HOLLAND ROAD, W.).

FEB. 14TH and 15th, flying as usual.

UNAFFILIATED CLUBS.

Edinburgh Ae.S. (Model Section) (41, DRUMSHEUGH GARDENS).

THE announcement made in last week's issue of FLIGHT that "the majority of the model members of the above society have resigned their membership" is incorrect, as by far the greater majority of members have not resigned.

Finsbury and District (52, LAMBTON ROAD, HORNSEY RISE, N.).

FEB. 14TH, flying as usual Finsbury Park, 3.30 till dusk.

Ilford Model Ae.C. (83, ENDSLEIGH GARDENS, ILFORD).

FEB. 15TH, flying at 10 a.m. at Newbury Park (weather permitting). The first annual dance of the club will take place at Kensington Hall, March 4th, commencing at 8 o'clock sharp. Tickets, singles 1*s*. 6*d*., and doubles 2*s*. 6*d*. Tickets can be obtained from the secretary.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

FEB. 14TH, flying meetings Woolwich Common, 3 p.m. till dusk. Feb. 15th, Blackheath, 7.30 to 10 a.m.; Woolwich Common, 10.15 a.m. to 12.30 p.m. Members are requested to note that the club will hold its third exhibition on Feb. 18th, 19th, and 20th, at Albemarle College (Church House), Lennard Road, Beckenham, and members who intend exhibiting should notify the hon. secretary on or before the 17th inst.

* * *

CORRESPONDENCE.

Automatically Stable Aeroplane.

[1837] The following is a description of an automatically stable aeroplane invented by myself and provisionally protected by Patent No. 25,364.

It will be seen from the accompanying drawings that the machine is fitted with twelve planes, two sets of four main planes and one set of four tail planes.

Unlike most aeroplanes the wings of this machine are not rigidly fixed direct to the *fuselage* but are placed at the end of struts, which are rigidly fixed to cylinders (skeleton cylinders covered with canvas), which are capable of revolving round the *fuselage*, thus also enabling the planes to move in a circular direction round the longitudinal axis of the machine.

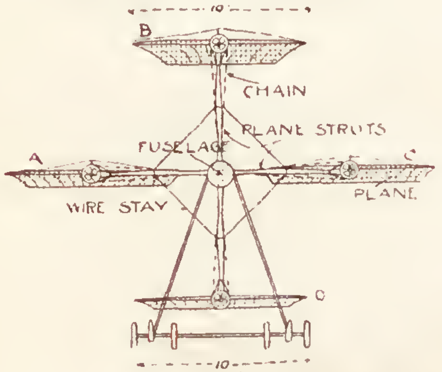

FIG. 1

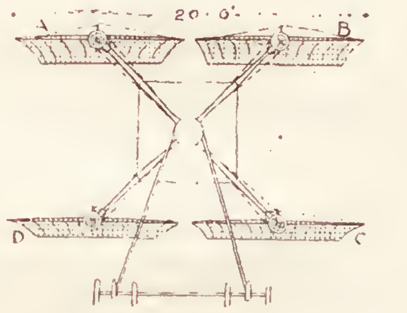

FIG. 2

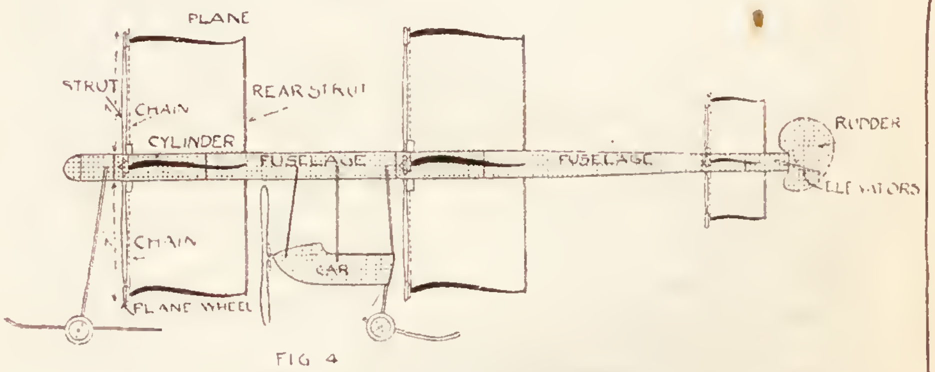

FIG 4

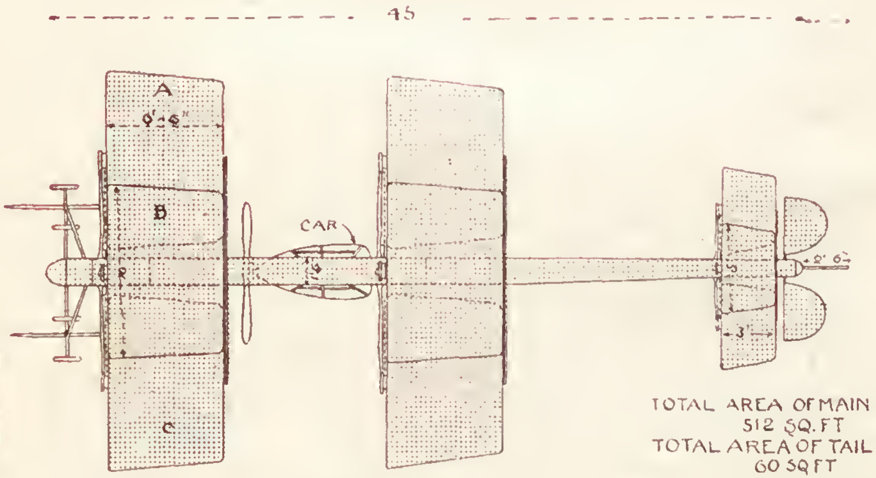

FIG 3

TOTAL AREA OF MAIN PLANES 512 SQ. FT
TOTAL AREA OF TAIL PLANES 60 SQ FT
AREA OF ELEVATORS 12 SQ. FT
RUDDER 9 SQ. FT

AUTOMATIC GEAR (NOT TO SCALE)

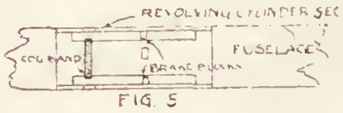

FIG. 5

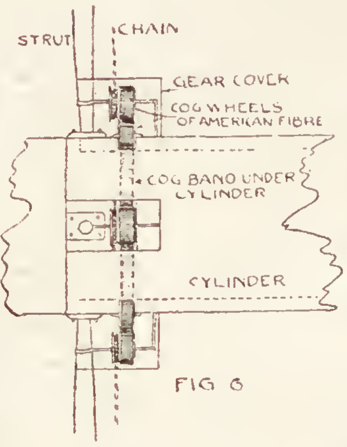

FIG 6

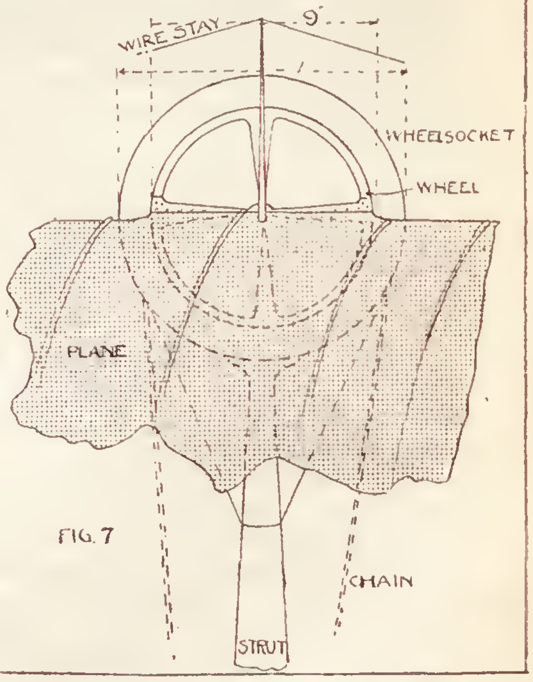

FIG. 7

Between the planes and the *fuselage* is a system of small cog wheels and chains which is brought into action by any difference of lateral pressure on the planes on either side and acts so as to equalize that pressure.

Description of Automatic Gear.—Round the *fuselage* at three certain places there is fixed a band of small cogs (Fig. 5), and over this the cylinder is fitted so that it can revolve round the *fuselage*. On to this cylinder four plane struts are fixed at equal distances round (Figs. 1 and 2), and at the top of each strut a chain cog-wheel is fixed working in a socket as big as itself. The middle portion of the front spar of the plane forms a diagonal of the wheel to which it is rigidly fixed (Fig. 7).

At the base of each strut are two small cog-wheels of American fibre (for lightness) which are fixed as depicted in Fig. 6, the lower one passing through a hole in the cylinder and working round the cog-band on the *fuselage*. Working on the same axle as the top cog-wheel is a small flanged chain cog-wheel, which is connected to the wheel at the top of the strut by a light chain (Figs. 6, 7). The wheel at the top of the strut has the same number of cogs on it as the cog-band round the *fuselage*, thus necessitating the *fuselage* being as narrow as possible.

This arrangement of wheels is such that as the cylinder and struts move round the *fuselage* in one direction the wheel at the top of each strut turns to exactly the same degree in the opposite direction, thus always keeping the planes in a horizontal position (*see* Figs. 1 and 2) and ensuring a constant lifting area and an equal distribution of plane surface on either side of the *fuselage*.

Now suppose a gust of wind strikes the under surface of Plane A, Fig. 1, this plane gives to the wind and moves upward and round, and probably takes the position of Plane B, Fig. 1, allowing the gust to slide across the plane surface and out the other side, or, if it retains its grip on the plane surface, it will expend its power in position B as a lifting force instead of a capsizing one. These movements of the planes take place every time there is a difference of lateral pressure on either side of the *fuselage*, so that at one time the planes may be in the position of Fig. 1, while at another they may assume the position of Fig. 2. All three sets of planes work independently of each other.

The whole arrangement is prevented from revolving too rapidly by brakes acting on the inside of the cylinders and constantly applied to a certain degree according to the velocity and the state of the prevailing wind (*see* brake blocks, Fig. 5).

The *fuselage* is kept in position by the suspended car between the two sets of main planes. As will be seen this car will always be steady, the planes exerting no leverage upon it, and the only plane surfaces fixed to the *fuselage* being the elevator flaps and the rudder. All controls between the rudder, the elevator flaps, brakes, &c., and the car, pass through the centre of the *fuselage* so as not to foul the working of the planes.

PERCY PARKER.

Brighton.

[Although an arrangement of the main planes of a machine like that suggested by Mr. Parker might possibly possess automatic lateral stability, there are several theoretical and constructional difficulties which would, we think, render the value of such an arrangement a doubtful one. In the first place the method of supporting the main planes does not appear to be very satisfactory, as each plane is mounted on a cantilever beam which would have to be of immense strength and which would consequently be very heavy. Secondly, as at present arranged, the centre of thrust seems to be far too great a distance below the centre of gravity. This might possibly be remedied by placing the propeller in the nose of the *fuselage*, but this arrangement would entail extra gearing and long shafts, which would be difficult to mount on account of the long revolving *fuselage*, and which would—even supposing it is constructionally possible—add very considerably to the weight of the machine.

There would also seem to be considerable difficulty in transmitting the thrust from the suspended car to the *fuselage*, as direct bracing by means of cables or wires to the *fuselage* obviously cannot be employed owing to the revolving plane struts which would foul the cables. The only method available seems to be diagonal bracing of the struts by means of which the car is suspended from the *fuselage*, and this does not seem adequate for the purpose. Another point which has, however, nothing to do with the stability of the machine, is the arrangement of the chassis. One cannot quite understand how the nose of the machine can be raised off the ground on starting, as one imagines that the centre of gravity is situated forward of the rear pair of wheels. However, a different type of chassis would remedy this point, so we will turn our attention in another direction.

Owing to the comparatively small length of the individual planes, which have a very low aspect ratio, the lift would be very small due to end losses so that although the total area of the main planes is stated to be 512 sq. ft., the load per sq. ft. which planes of this type would support would probably not be anything near as great as that supported by two planes of the usual type and of the same total area.—ED.]

The R.A.F. and the Industry.

[1838] "Octopus" and others appear to take the view that "if the R.A.F. is to have the slightest control of the buying, then they must not design or make aeroplanes," as he puts it. Why not? It is the practice of all other Government departments, not only of our own, but all other of the principal powers. It is also the practice of all the large and successful commercial concerns. No individual firm or Government makes everything it requires from the original ore, &c., and they therefore buy things more or less completely finished. They endeavour to find what suits them, and then insist on its being supplied. The larger the firm or Government, the larger their experimental staff, and the more detailed the drawings and specifications, which have to be worked to, but the *principle* is worked to by everyone, even in the smallest things. There appears no reason whatever why the Government should not do the best they can to find what is most suitable in the way of aeroplanes for Army work and then buy them. This is the practice in Naval control and has worked well on the whole. At least it has made our Navy much respected, while contractors' profits have been good in the case of well managed firms. I don't quite understand "Octopus'" remarks as to judges' own machines competing in competitions. What competition and what machine does he refer to?

F. STRICKLAND.

Malton.

Olympia Exhibition.

As there appears to be some confusion as to the dates of the forthcoming Aero and Marine Exhibition, we are asked to make it clear that the exhibition will open on Monday, March 16th, and close in the evening of the following Wednesday week, March 25th.

Cellon in the Antipodes.

It may be recalled that the Sopwith "Tabloid" biplane, which Mr. H. G. Hawker has taken with him to Australia, and which put up such wonderful performances before leaving this country, is doped with Cellon. Consignments of Cellon have also been sent to the Australian Government and to Mr. J. R. Duigan, so that there should be quite a number of machines in Australia using this well-known dope.

Gamage Athletics at Dinner.

ONE of the most cheery functions which it has been our lot to attend was the second annual gathering of the Gamage Amateur Athletic Association at the Holborn Restaurant on Saturday last. There were over 600 members of the staff with their wives and friends present, so that the King's Hall was completely filled. Mr. A. W. Gamage was in the chair, supported by practically all the family. The various toasts were eloquently proposed and responded to, especially that of "The Visitors," which was proposed by Mr. Parker, and responded to by Mr. W. S. Edwards. An excellently-arranged musical entertainment made the evening pass all too quickly.

* * * *

IMPORTS AND EXPORTS, 1913-1914.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see FLIGHT, January 25th, 1912, and for 1912 and 1913, see FLIGHT for January 17th, 1914:—

	Imports.		Exports.		Re-Exportation.	
	1913.	1914.	1913.	1914.	1913.	1914.
	£	£	£	£	£	£
January	12,097	5,945	4,005	210	1,510	879

* * * *

NEW COMPANY REGISTERED.

Premier Airships Synd., Ltd.—Capital £2,000, in £1 shares. Manufacturers of and dealers in airships and flying machines of all kinds, &c.

* * * *

Aeronautical Patents Published.

Applied for in 1913.

Published February 5th, 1914.

2,512.	E. HYRA AND K. KLINHOSCHE. Illuminating devices for airships.
10,142.	T. MOORE. Safety shield for airmen.
11,792.	C. D. O. VOLLMANN. Aerial machines.
12,372.	G. MEES. Floats for aircraft.
12,804.	E. VON PETROCZY. Aeroplanes.

Published February 12th, 1914.

1,307.	C. B. THOMAS. Stabilising device for aeroplanes.
2,895.	R. R. GRANT AND C. O. MORSE. Aeroplanes.
5,003.	C. R. FLEMING-WILLIAMS. Hydro-aeroplanes.
6,264.	E. DULIER. Aeroplanes.
14,036.	F. RIOTTE. Aerial machines.
14,838.	M. ROGLER. Airship shelters.
15,265.	J. R. GAMMETER. Aerostats.
17,435.	H. PODOLSKY. Aeroplanes.
18,109.	C. R. AND A. D. WITTEMANN. Flying machines.
19,933.	H. E. S. HOLT. Aerial illuminating devices.
22,764.	L. SINAVE. Aerial machines.

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Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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CONTENTS.

Editorial Comment: PAGE
A Sorry Comparison ... 181
Men of Moment in the World of Flight: Mr. F. W. Goodden ... 182
Flying at Hendon ... 184
The Curtiss Monoplane Flying Boat (with Scale Drawings) ... 186
Royal Aero Club. Official Notices ... 188
From the British Flying Grounds ... 189
Eddies. By "Will o' the Wisp" ... 190
Aero Engines at the Paris Show ... 191
Armchair Reflections. By "The Dreamer" ... 194
British Notes of the Week ... 195
Foreign Aircraft News ... 197
Propellers. By F. H. Bramwell, B.Sc. ... 199
Models. Edited by V. E. Johnson, M.A. ... 204
Correspondence ... 206

EDITORIAL COMMENT.

A Sorry Comparison.

A production which is exceedingly well worth the careful perusal of every British patriot is the first annual report of the German National Flying Endowment. We confessedly do not care much for the word "patriot," but it must stand in this instance as indicating the person who really has that intelligent interest in the affairs of the nation, and that grasp of actualities and requirements, which enables him to exert some influence, no matter how slight, on the trend of passing events. To the apathetic the Report may have no significance, though we should very greatly like to be able to place a copy of the document in the hands of the uninterested majority—for we have only too much reason to fear that the majority *is* apathetic in matters affecting aerial defence—and leave it to do its missionary work.

Perusal of the work in question must create two distinct sets of impressions. The first will be one of admiration for the singleness of purpose and the intense patriotism of the Germans as a nation. The second, unfortunately, will be one of bitter regret that our own people remain so entirely untouched by the seriousness of the situation as it exists in all its naked actuality. It is not as though the facts had not been stated and restated with all the emphasis at the command of some of the ablest of contemporary writers. Time after time it has been pointed out in the public prints that we are lagging hopelessly behind other nations in the development of aviation, but the great mass of the public continues to regard things with the eye of apathy, even if it condescends to regard them at all. In vain have been all the appeals to England to wake up. In vain has money been spent by public spirited men in demonstrating the marvellous pitch of development to which the science of flight has attained. Still we seem content to drift, and even the thinking classes appear happy in the belief that when the time comes for the reckoning we shall, as we have always done, muddle through somehow. They might possibly admit that it is tempting Fate—but then we have so often tempted her, and yet in the end of things she has smiled kindly upon us.

Let us glance for a moment at some of the most salient facts disclosed by the German Report. The "National Flying Endowment" was instituted in 1912, as an answer to the French fund for the provision of aerial craft for the army. It received the active support of the Kaiser himself and of Prince Henry of Prussia, who both lent their names to an urgent appeal for money wherewith to develop aviation. The appeal was not for money to purchase aircraft for the Services—that matter was very properly left to the departments of State involved. On the contrary, the fund was to be one for development purposes alone. Within six months £360,000 had been subscribed—and this in addition to the memorable subscription of £300,000 collected to enable Count Zeppelin to continue his experiments with airships! Two years ago, the few German airmen were absolutely dependent upon France for their engines, and in great part for the actual machines into which the motors were to be fitted. To-day they are flying German machines with German engines—all as a result of the magnificent response made by a patriotic people to the appeal of the Kaiser and those identified with the Endowment. At the present moment nearly all the world's flying records that really matter are held by German aviators, flying German machines, propelled by German motors. According to the report, Germany now has no fewer than 650 licensed civilian pilots, in addition to military aviators, of whom there is no record given. There are forty-seven properly equipped aeroplane factories in Germany, many of them able to turn out more than a hundred machines a year; there are forty-three aerodromes, or "landing places," as the Report describes them, with sheds for aeroplanes or airships, and twenty aerial "lighthouses." At the flying ground of Johannisthal, near Berlin, there were made 4,732 flights during the month of October last, as compared with 2,537 in the corresponding month of 1912. There were made 36,817 flights at Johannisthal during the year, representing a total of 4,096 flying hours, compared with 1,966 hours in 1912. And so we might go on almost *ad infinitum* in the detail of figures and increases disclosed by the Report.

How does the Endowment work? Let us quote from an article upon this same Report by the Berlin correspondent of the *Daily Mail*, who says :—

> "The *Flugspende*, though nominally a private enterprise, is officially administered, having been made an adjunct of the Imperial Home Office. The colossal progress in German flying is due primarily to the Endowment's influence. There was tremendous significance in the recent announcement that as Germany now possessed the most important flying records, and a sum of £40,000 set aside as bonuses to German record-breakers was already exhausted, no more bonuses would be bestowed, and the Endowment's remaining funds would henceforth be devoted to more urgent purposes. £15,000 has been distributed between seven airmen for distance flights within twenty-four hours, including £5,000 to Herr Victor Stoeffler for the world's record of 1,350 miles, and £3,000 to Herr Schlegel, whose 935-mile non-stop flight outstrips M. Brindejonc des Moulinais's French record by seventy-two miles. Besides this the Endowment distributed another £25,000 in premiums. A reward of £50 was paid to every airman who made a non-stop flight of one hour, with £25 extra for every passenger carried overland. For every additional non-stop hour and passenger, another £50 and £25, respectively, were given. On the airman who established the German non-stop record of at least six hours a monthly bonus of £100 was bestowed, and to airmen who executed the longest cross-country flight of a minimum of 375 miles, including landings, within twenty-four hours, monthly bonuses of £200 were paid. Monthly bonuses could be claimed for a maximum of five months as long as the record-holder's achievements were not outstripped.
>
> "Monthly premiums of £200 for the longest cross-country flight were awarded to seven airmen for flights ranging between 312½ and 1,350 miles. Six airmen received monthly awards of £100 for non-stop flights ranging from 6 hrs. 4 mins. to Bruno Langer's recent record of 14 hrs. 7 mins.
>
> "In addition to encouraging and rewarding airmen, the Endowment has paid annual subsidies of £2,000 to numerous aeroplane factories which undertake to train five pilots a year. This not only facilitates the free education of pilots, but helps to put the flying-machine industry on a commercial footing. The endowment also maintains a system of free insurance benefits for airmen and for dependents of those killed or incapacitated in service. For bonuses, prizes, training of pilots, benefits, flying competitions, flying stations, scientific purposes, and sundry other forms of promotion, £85,000 was disbursed in 1913, leaving £275,000 in the Endowment's treasury. The budget for 1914 provides for £68,000 expenditure, including £15,000 for a long-distance competition, £5,000 for promotion of flying in the Colonies, £11,250 for a motor competition, £6,250 for a naval waterplane competition, and £12,500 for a waterplane station on the Baltic. It is stated that the German Army has at its disposal at least as many qualified "field pilots" as France. The number at the end of 1913, I think, was 650, which is shortly to be increased to a 1,000. The Army has twenty-two aeronautical stations, mostly near frontiers. The Navy had thirty-six waterplanes at the end of 1913. Tremendous enthusiasm for flying prevails in both services. Aeroplane factories and flying schools can hardly compete with the demand for tuition."

And while all this is going on in Germany, what are we doing to encourage development? We have not done so badly, considering the handicaps under which the industry labours. We certainly can claim that we have one or two aeronautical engines comparable to the best of the foreign motors, but in consequence of uncertain demand they are not being made in large numbers. Our machines will compare in design and air-worthiness with the best of those made abroad, but here again production is restricted by want of encouragement. On the other side of the picture, we have made no answer to the French fund, let alone to the German Endowment. What, for example, has become of the attempt to raise a paltry £50,000, through the Aerial League's "Million Shillings" fund. Whatever has become of it, the money was not raised, and that in spite of the imposing array of names of municipal and other authorities who were supposed to have lent their influence to it. The appeal fell on deaf ears—apparently the great mass of the public are so apathetic, so wanting in regard for the prestige and even the safety of the nation that they do not assess their stake in the country at the price of a shilling! It is a sad and a bitter reflection, but there it is. It really seems to us that nothing in the world will serve to awake this type of patriot (!) from his apathy but the realisation of all that is meant and implied by the German toast "*Am Tag*."

* * * *

F. W. GOODDEN.

It was about five years ago that F. W. Goodden, having spent three years at practical engineering, decided to become actively connected with aeronautical work. He joined Messrs. C. G. Spencer and Sons, the well-known balloonists, in 1908, and the following year made his first balloon ascent, then going on to parachute descents, giving exhibitions at most of the large towns in the Midlands and the North. This was followed by some experience with airships, and in October, 1910, Goodden left Spencers in order to assist in the construction of the Willows airship "City of Cardiff" at the Crystal Palace, and he was with Mr. Willows on the craft during its voyage to France on November 4th, 1910. Returning to England in the following January, Goodden settled at Oxford, and after a good deal of ballooning, including a number of parachute descents, decided to turn his attention to the heavier-than-air type of machine. On New Year's Day, 1912, he set to work to build a monoplane, and, although the only motor available was an old 35 h.p. J.A.P., some very good flying was done in the summer. The venture, unfortunately, had to come to an end owing to lack of funds, and in the following February Goodden joined the Caudron school at Hendon, where he has been since. His fine flying on the Caudron has been so frequently referred to in these pages that it is unnecessary to make any detailed reference to it. It will be seen that Goodden has had a most unique experience, such as probably no other pilot in this country, with the exception of Mr. Herbert Spencer, can claim.

THE HAWK.

* * * *

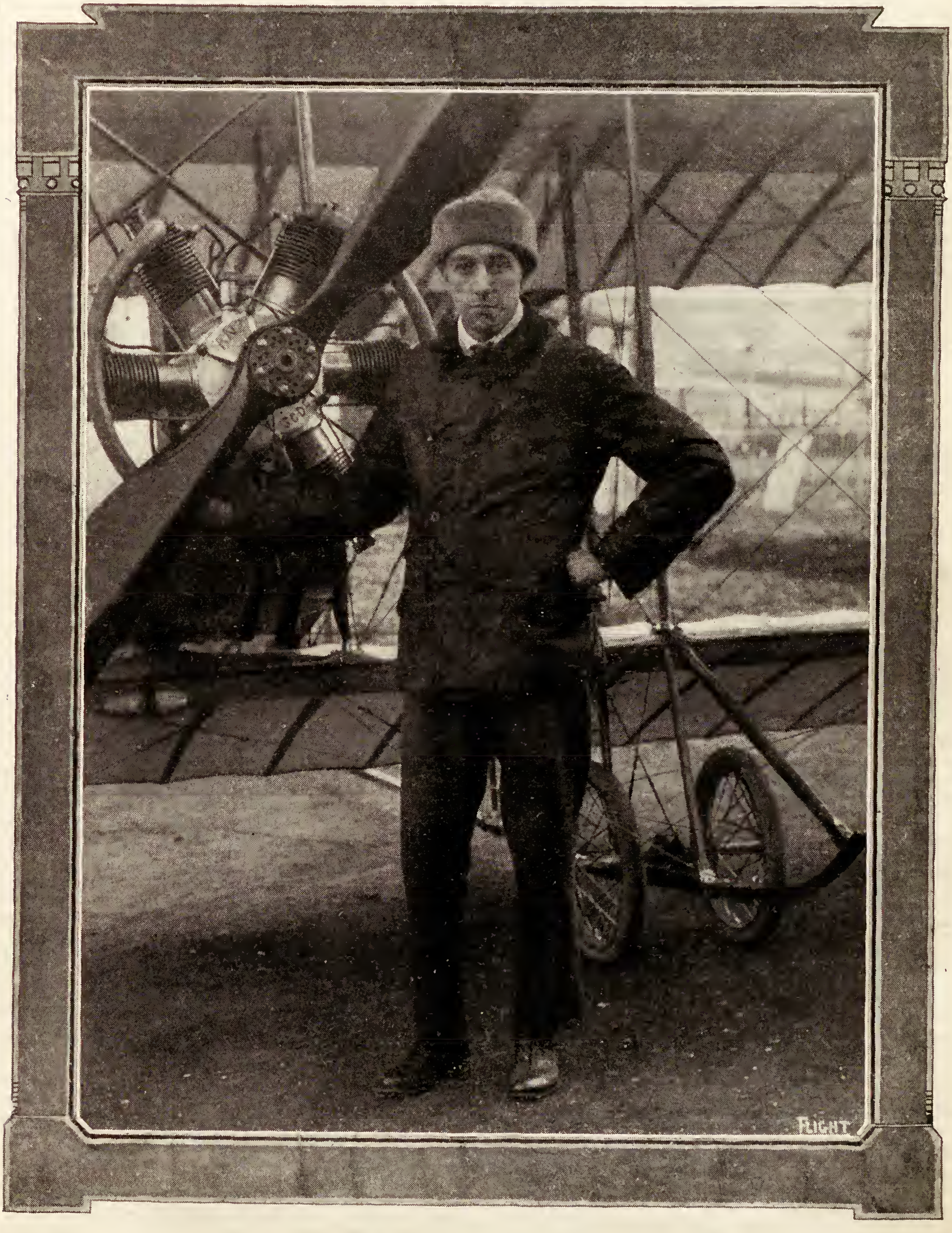
The Slack Fund.

AMONG the latest donations received towards the fund being raised for the aid of the widow and children of the late Robert Slack are: Anonymous, £12 12*s.*; the Grahame-White Aviation Co., £10; the Aircraft Co., Mr. G. C. Gold, Mrs. Arthur Forman, £5 5*s.* each; Mrs. Wallace Stroud, £2; Messrs. Frank Sale, Ben. Suttley, L. A. Strange, A. V. Roe, A. B. Leakey, £1 1*s.* each; MM. P. Marty, Verrier, £1 each; Mr. J. H. Hall, 11*s.*; Messrs. C. J. Fairfax Scott, T.O.H.B., 10*s.* 6*d.* each.

Magneto Ignition for Beginners.

THERE is appearing in our contemporary the *Auto.* (Yellow Cover), an elementary explanation of magneto electricity and the action of a magneto, which may be of interest to those readers of FLIGHT who are not familiar with the why and wherefore of electrical phenomena, and yet are concerned with magneto ignition in practice. The dates upon which the articles appeared were February 7th, 14th and 21st, and these issues can be obtained from the Publishers, at 44, St. Martin's Lane, at 1½*d.* each, post free.

MEN OF MOMENT IN THE WORLD OF FLIGHT.



MR. F. W. GOODDEN.

TESTS FOR AEROPLANES OF PRIVATE DESIGN.

The following *communique*, setting forth the tests which the War Office require aeroplanes of private design to pass before acceptance, was issued from the War Office on Wednesday last:—

1. The Chief Inspector of Military Aeronautics is prepared, on the request of an aeroplane constructor, to put an aeroplane through the ordinary military acceptance test under the following conditions:—

(i) The test consists of examination of workmanship and materials, speed test, fast and slow, climbing, weight of load carried, rolling test, and one hour's flight. The constructor must supply the pilot and passenger. For purposes of calculation weights of pilot and passenger will be 160 lbs. each. 72,5

(ii) Stress diagrams in duplicate for the aeroplane must be sent with or before the machine. A minimum factor of safety of 6 throughout is essential.

(iii) No machine will be tested for military purposes unless it fulfils the conditions of one of the types used for military purposes. These are given in attached table.

(iv) The constructor, when applying to have his machine tested, should state his reasonable expectation of the performances of the machine.

(v) Aeroplanes submitted for test must be put through the whole of the tests unless damaged before their completion, or unless the Chief Inspector considers that the tests should be stopped for reasons of safety.

2. The Chief Inspector of Military Aeronautics is also prepared to examine and test aeroplanes which may be designed not for purely military purposes, but to demonstrate some practical or theoretical improvement in design or construction. The tests imposed in such cases will be at the discretion of the Chief Inspector.

3. Results of any test will be supplied to the constructor by the Chief Inspector, and will be kept secret, if desired by the constructor. Should the constructor wish to publish the result of the test, it is to be understood that the result should be published complete. Should only part of any report of the test be published, the Chief Inspector reserves the right to publish it in full.

4. The satisfactory performance of the tests laid down in paragragh 1 does not constitute a guarantee that the aeroplane in question will be purchased by Government.

5. These tests may be altered from time to time; notice will be given as early as possible of any alteration.

War Office.
February, 1914.

PERFORMANCES REQUIRED FROM VARIOUS MILITARY TYPES.

	Light Scout.	Reconnaissance Aeroplane (*a*).	Reconnaissance Aeroplane (*b*).	Fighting Aeroplane (*a*).	Fighting Aeroplane (*b*).
Tankage to give an endurance of ...	480 km 300 miles	480 km 300 miles	325 200 miles	325 200 miles	480 300 miles
To carry	Pilot only	Pilot and observer plus 80 lbs. for wireless equipment 36,5 kg	Pilot and observer, plus 80 lbs. for wireless equipment 36	Pilot and gunner, plus 136 300 lbs. for gun and ammunition 105	Pilot and gunner, plus 100 lbs. 46
Range of speed ...	50 to 85 m.p.h.	72 45 to 75 m.p.h.	35 to 60 m.p.h. 97	45 to 65 m.p.h.	72 45 to 75 m.p.h.
To climb 3,500 feet in	5 minutes	7 minutes	10 minutes 92	72 10 minutes	8 minutes
Miscellaneous qualities	Capable of being started by the pilot single-handed		To land over a 30-ft. vertical obstacle and pull up within a distance of 100 91 yds. from that obstacle, the wind not being more than 15 m.p.h. A very good view essential	A clear field of fire in every direction up to 30° from the line of flight	A clear field of fire in every direction up to 30° from the line of flight

Instructional aeroplanes with an endurance of 150 miles will also be tested under special conditions; safety and ease of handling will be of first importance in this type.

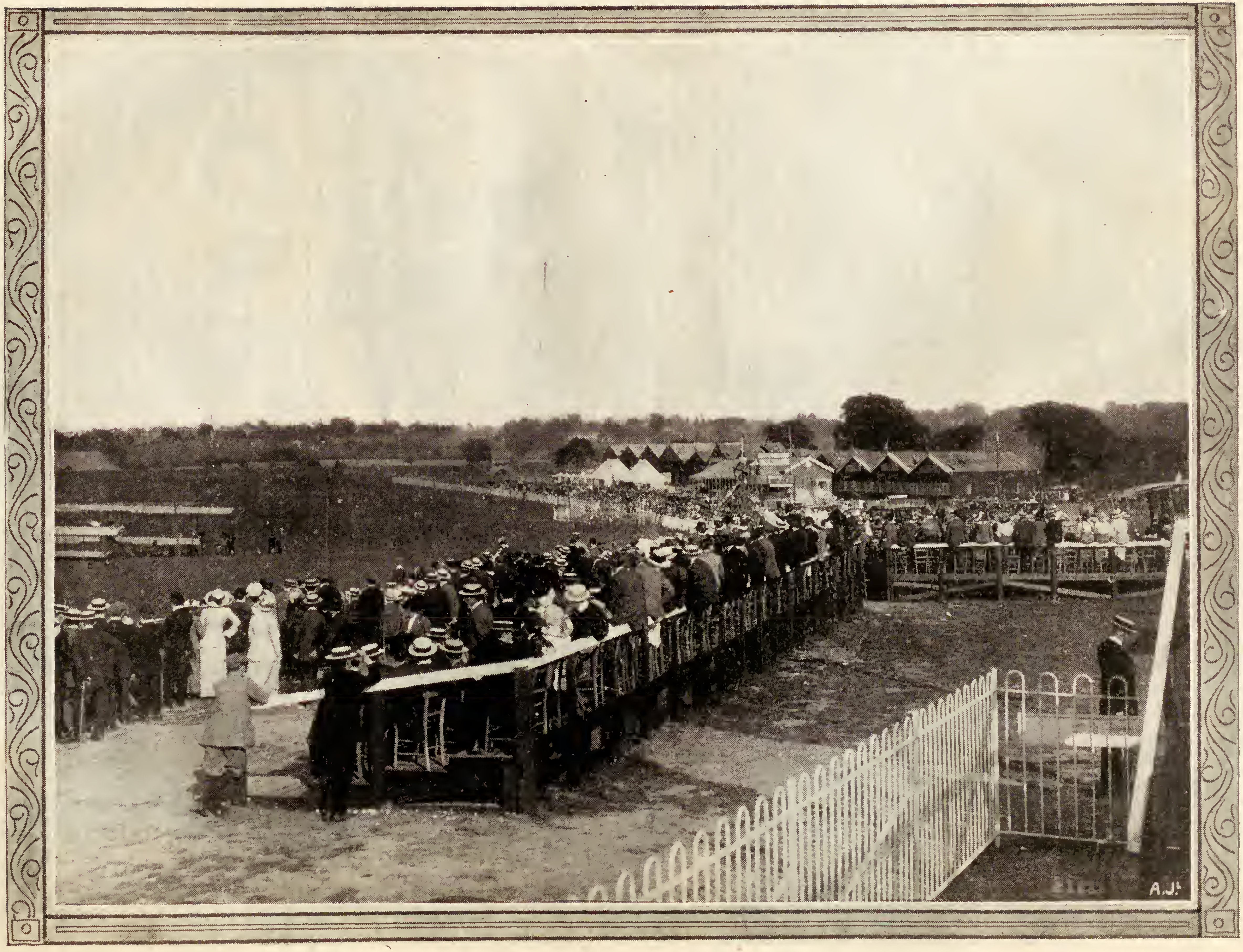
⊛ ⊛ ⊛ ⊛

FLYING AT HENDON.

St. Valentine's Meeting at Hendon last Saturday provided plenty of interesting flying in spite of the terrible weather that arrived with the afternoon. The wind, blowing at something like 40 m.p.h., prevented the speed handicap down on the programme from taking place, so a cross-country handicap was held in its place, and even this had to be flown over three instead of the usual four laps of the Bittacy Hill course (12 miles), whilst the race had no sooner started than an unpleasant driving rain came down. Earlier in the afternoon several exhibition and passenger flights were made by the Hendon pilots, including A. Cripps—a new pilot who has but recently taken his "ticket" at the Grahame-White school—W. Birchenough, and L. Strange on 50 h.p. G.-W. biplanes, R. H. Carr on the remarkable little G.-W. tractor biplane "Lizzie," Louis Noel on the G.-W. Maurice Farman, Philippe Marty on the 80 h.p. Blériot and Morane-Saulnier monoplanes, F. W. Goodden on the 45 h.p. Caudron, and J. L. Hall on his Avro. Goodden made a very spectacular flight, ascending to a height of about 3,000 ft. and banking and diving in splendid style. Mention must also be made of Pierre Verrier, who came out on a new Maurice Farman just before the cross-country race started, and put up some of his hair-raising but masterly stunts, "diving upwards," as somebody described it, in an extraordinary manner. Just before 4 o'clock a start was made for the cross-country handicap, the competing machines being taxied out over to the far end of the aerodrome, in order that they might start head to wind. Altogether eight machines lined up for this event, and started off in the following order:—A. Cripps (11 mins. 56 secs.), W. Birchenough (9 mins. 56 secs.), and L. Strange (9 mins. 16 secs.), all on 50 h.p. G.-W. biplanes; Claude Grahame-White (4 mins. 56 secs.), on the G.-W. Maurice Farman; Pierre Verrier (2 mins. 56 secs.), on a Maurice Farman; R. H. Carr (2 mins. 9 secs.), on the G.-W. tractor; Louis Noel and passenger (21 secs.), on the 80 h.p. Blériot; and Philippe Marty and passenger (scratch), on the 80 h.p. Morane-Saulnier. It should be mentioned here that Noel was flying a monoplane, practically speaking, for the first time, and under conditions that were by no means favourable, so that the splendid way in which he handled his new mount in the race stands very much to his credit. The limit man had no sooner got outside the aerodrome than he experienced engine trouble, and had to descend on the golf links at Totteridge. After completing two laps, Grahame-White landed in the aerodrome owing to his engine not running as it should, but with the exception of Verrier the others eventually crossed the line. The two remaining G.-W. 'buses, piloted by Birchenough and Strange, provided no small amount of interest in the race, for they kept very close together, and only changed positions towards the end of the finish, when Strange, who was flying the rebuilt 'bus, overhauled his rival on the 'bus Manton used to fly. In the meanwhile, Carr, on "Lizzie," was rapidly catching up, and it could be seen that the finish was going to be exciting. The first to cross the line was Strange, with Carr, who had dived under both the 'buses at the last moment in order to pass them, alongside him, and ⅕ sec. behind. Strange came in third, 2⅘ secs. after Carr, whilst Marty just managed to obtain fourth place from Noel by 5 secs. Verrier only gave up at the end of the last lap, and bringing his machine head to wind he proceeded to soar over the centre of the aerodrome for some ten minutes, eventually stopping his engine and making a silent spiral glide to earth. After this Noel made a final flight on the Maurice Farman, and the proceedings were brought to a close.

Cross-Country Handicap. (12 miles.)	Handicap.	Handicap Time.
	m. s.	m. s.
1. L. Strange (50 h.p. G.-W. 'bus No. 109) ...	9 16	32 1
2. R. H. Carr (50 h.p. G.-W. tractor biplane)	2 9	32 1⅕
3. W. Birchenough (50 h.p. G.-W. 'bus) ...	9 56	32 4
4. Philippe Marty (80 h.p. Morane-Saulnier monoplane)	scratch	32 22
5. Louis Noel (80 h.p. Blériot monoplane) ...	0 21	32 27

P. Verrier (70 h.p. M. Farman), 2 m. 56 s.; C. Grahame-White (70 h.p. M. Farman), 4 m. 56 s.; A. Cripps (50 h.p. G.-W.), 11 m. 56 s., retired.

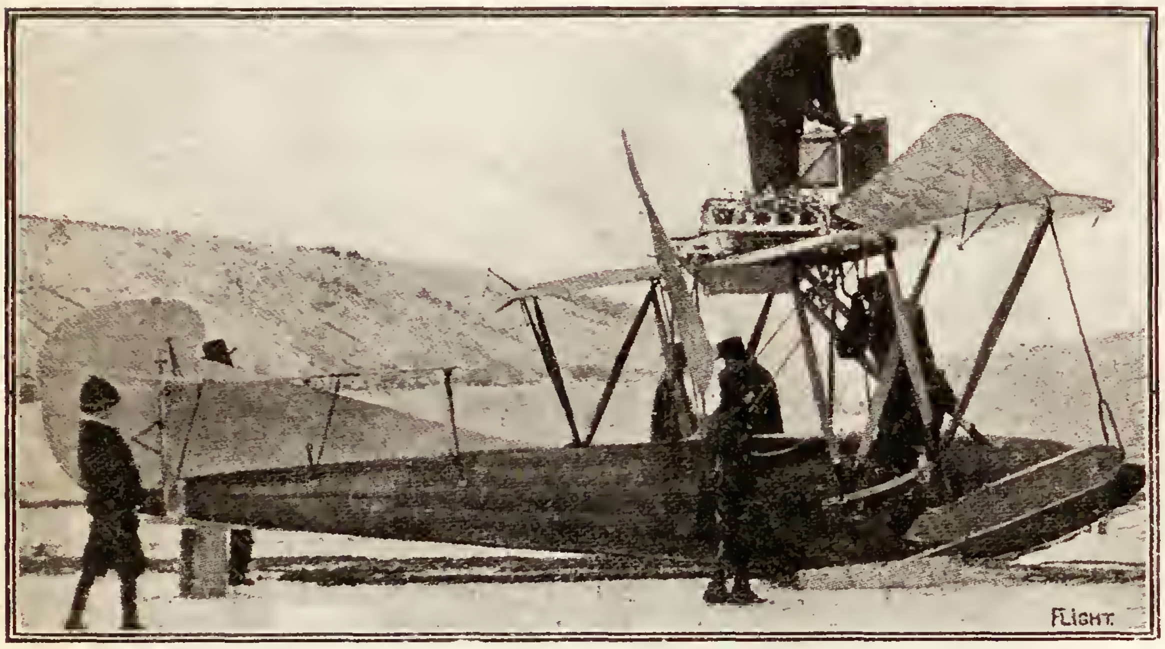


A TYPICAL AFTERNOON AT HENDON AERODROME.—Watching the flying.

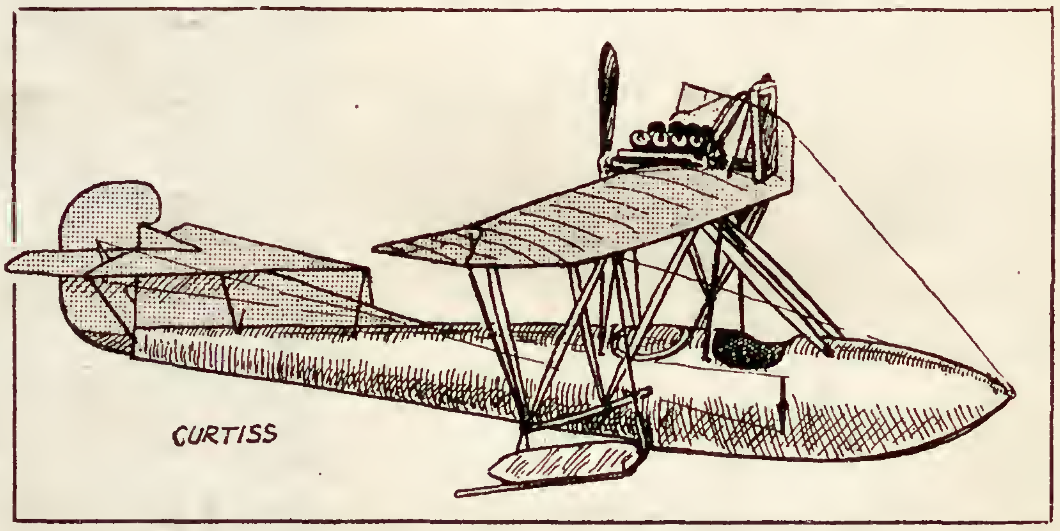
"Flight" Copyright.

THE CURTISS MONOPLANE FLYING BOAT.

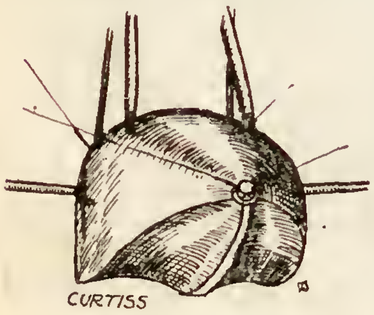
An extremely interesting machine has been turned out just recently at the Hammondsport factory, where the Curtiss machines are built. It has been specially built for Mr. Raymond V. Morris, of New Haven, Con., and differs very considerably from the other machines turned out by the Curtiss firm. In the first place, it is a monoplane; and secondly, the design and construction of the hull are new. Early in January its owner put it through some tests on Lake Keuka, New York, with very successful results. Perhaps the most interesting feature of this new Curtiss machine is to be found in the wings. These are of the form that is so popular in Germany, known as the "arrow plane," in which the wings are swept back so that in plan form they resemble an arrow-head. The wing section employed on this new machine is similar to that of the Blériot XI *bis* and the B.E. 2, and the method of wing bracing is like that found on many of the "taube" machines in Germany. The wings are mounted some 4 ft. above the hull and are attached to a steel superstructure forming the engine bed, whilst the bracing consists of four pairs of "V" struts, two on each side of the hull, the apex of each pair joining a single transverse spar extending under the wings from each side of the hull. In construction the wings follow usual practice, being built up of two main spars with ribs spaced at intervals of about one foot. The leading edge of the plane curves rearwards at the tips to a point where it meets the *ailerons*. The latter are almost triangular in shape, and are counter-balanced, that is, when one goes up the other goes down. The tail consists of a triangular plane with two elevator flaps hinged to the trailing edge mounted above the stern of the boat, together with a vertical fin, triangular in shape, and a rudder. The engine, as previously mentioned, is mounted in the centre and on the top of the plane, the propeller being situated immediately at the rear of the trailing edge of the latter. The type of engine fitted is one of the latest 90 h.p. 8-cyl. Curtiss O-X models, water cooled, with the radiator mounted in front on the leading edge of the plane. In addition to two pairs of tubular steel struts supporting the engine bed, a pair of stout wood struts extend forward from the engine to the hull to a point just in front of the pilot's cockpit, and serve to take the thrust of the propeller. In shape the hull is very like a torpedo, except that the stern tapers to a vertical knife-edge, and that the bottom from bow to about midships, where there is a step, is of the double concave type employed on the latest navy pattern Curtiss boats. The framework of the hull is built up of ash longitudinals and ribs. On the framework is a diagonal layer of $\frac{3}{32}$ in. mahogany planking, and over this is a covering of heavy "Sea Island" cotton set in marine glue. Another layer of mahogany planking of the same thickness, but laid longitudinally, forms the outer covering. Immediately under the plane is the pilot's cockpit, the seat being placed low down in the hull in order to afford ample protection for the pilot from wind and spray. A second hole has been cut in the top of the hull, just behind the pilot, for a passenger, but when the pilot only is on board this hole is covered up. An auxiliary float is attached to each outer extremity of the transverse bracing spar. The control is of the usual Curtiss pattern, shoulder yokes for the *ailerons*, rocking column for the elevator, and foot-bar for the rudder. The principal dimensions of this new air-boat are as follows:—Overall span from tip to tip of *ailerons*, 34 ft.; span of wings, 28 ft.; maximum chord, 5 ft.; wings swept back 7°; Supporting surface, 120 sq. ft.; length of hull, 22 ft.; maximum beam, 2 ft. 6 ins.; maximum depth, 3 ft.; weight with pilot and fuel, 1,200 lbs.



The Curtiss monoplane flying boat.



The Curtiss monoplane flying boat.



Front view of boat.

In view of the success of the new craft it is anticipated that the new model will prove to be very popular during the coming season. It will be remembered that Messrs. White and Thompson, Ltd., of Middleton, Bognor, are the representatives of the Curtiss firm in Great Britain.

Capt. Lee, 40th Pathans Indian Army,
upon Biplane at VICKERS School.
Obtained his Brevet
8th December, 1913.

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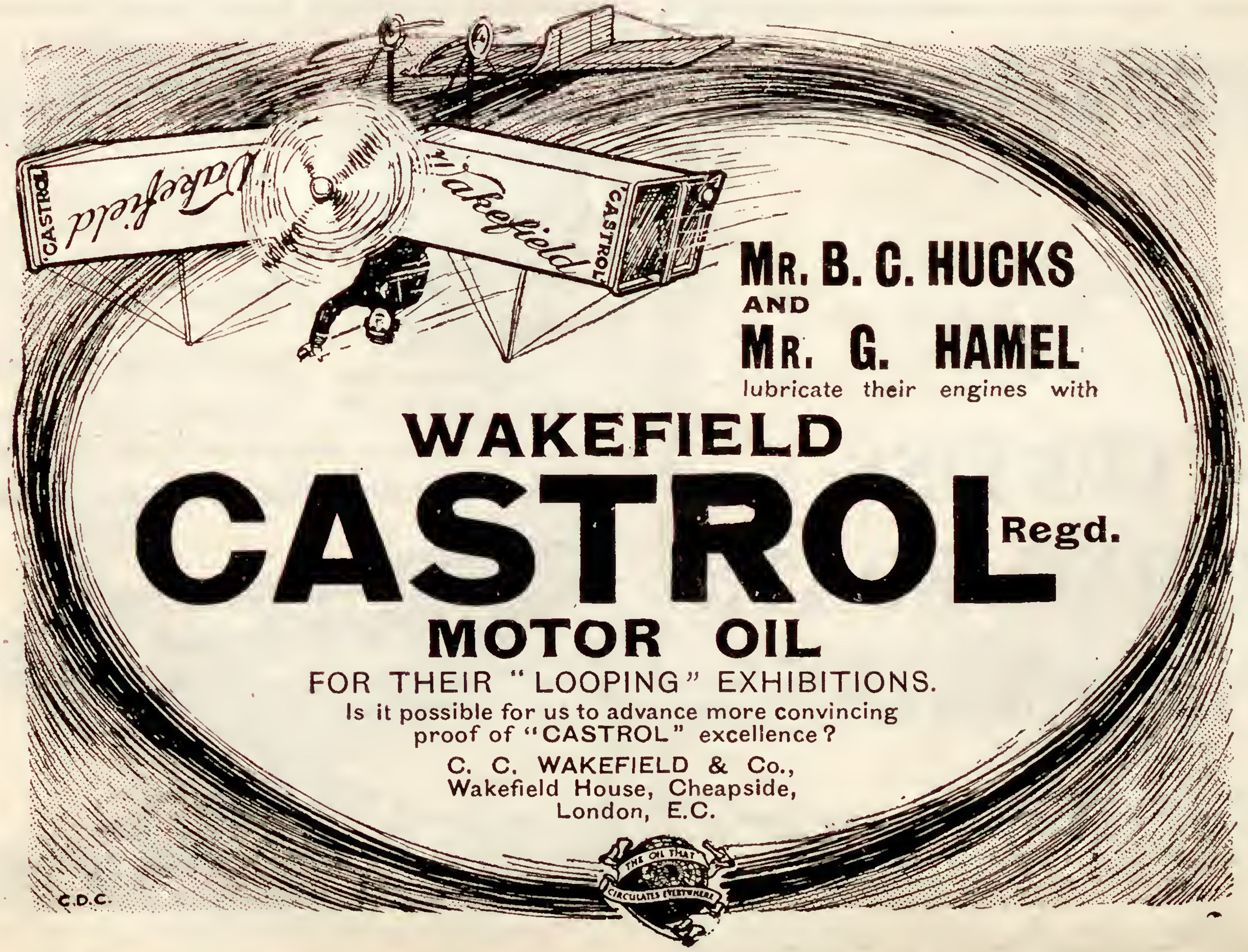

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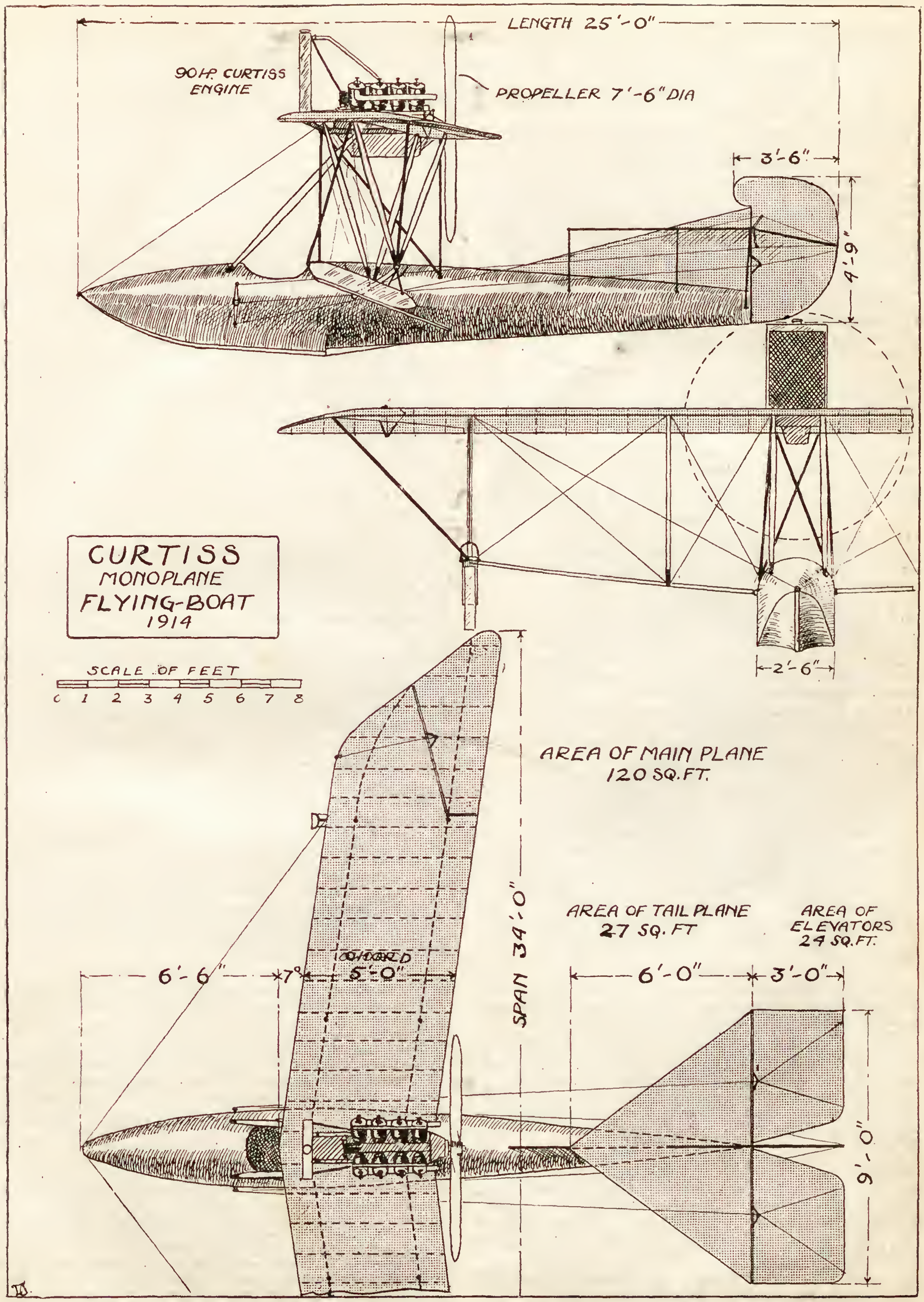


THE CURTISS MONOPLANE FLYING BOAT.—Plan, side and front elevations to scale.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

ANNUAL DINNER.

In consequence of the First Lord of the Admiralty having been commanded to dine with H.M. the King on the 27th inst., the Royal Aero Club Dinner fixed for that date, at which Mr. Winston Churchill was to be the principal guest, has been postponed until WEDNESDAY, MARCH 4th. It will take place at the ROYAL AUTOMOBILE CLUB, PALL MALL, LONDON, S.W. (by kind permission), at 7.30 for 8 o'clock.

The Marquess of Tullibardine, M.V.O., D.S.O., M.P., the Chairman of the Club, will preside.

The number of applications for tickets having already exceeded the accommodation available, no further tickets can be issued.

Annual General Meeting.

The Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Tuesday, March 24th, 1914, at 4 o'clock, at 166, Piccadilly, London, W.

Notices of motion for the Annual General Meeting must be received by the Secretary not less than twenty-one days before the meeting, and must be signed by at least five members. Wednesday, March 4th, 1914, is the last day for the receipt of notices of motion.

Committee.

In accordance with the rules, the Committee shall consist of eighteen members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the committee are :—

Col. J. E. Capper, C.B., R.E.
G. B. Cockburn.
Major J. D. B. Fulton, C.B., R.F.A.
J. T. C. Moore-Brabazon.
Com. C. R. Samson, R.N.
A. Mortimer Singer.
T. O. M. Sopwith.
The Marquess of Tullibardine, M.V.O., D.S.O., M.P.
Roger W. Wallace, K.C.

Col. J. E. Capper, C.B., R.E., does not offer himself for re-election.

The following members have so far been nominated :—

G. B. Cockburn.
Major J. D. B. Fulton, C.B., R.F.A.
Robert Loraine.
Fred May.
Com. C. R. Samson, R.N.
A. Mortimer Singer.
T. O. M. Sopwith.
The Marquess of Tullibardine, M.V.O., D.S.O., M.P.

Any two members of the club can nominate a member to serve on the Committee, having previously obtained such member's consent. The name of such member so nominated, with the names of his proposer and seconder, must be sent to the Secretary in writing not less than fourteen days before the Annual General Meeting. Wednesday, March 11th, 1914, is the last day for the receipt of nominations.

Members are reminded that a ballot paper for the election of nine candidates to seats on the Committee of the Club will be forwarded to them at least seven days before the date of the Annual General Meeting.

Committee Meeting.

A meeting of the Committee was held on Tuesday last, February 17th, 1914, when there were present: The Marquess of Tullibardine, M.V.O., D.S.O., M.P., in the Chair, Mr. Griffith Brewer, Mr. E. C. Bucknall, Col. J. E. Capper, C.B., R.E., Mr. G. B. Cockburn, Major J. D. B. Fulton, C.B., R.F.A., Col. H. C. L. Holden, C.B., F.R.S., Prof. A. K. Huntington, Mr. Mervyn O'Gorman, C.B., Mr. C. F. Pollock, Mr. T. O. M. Sopwith, Mr. Roger W. Wallace, K.C., and the Secretary.

New Members.—The following new members were elected :—Eng.-Lieut. W. Briggs, R.N., Henri Fabre, and Lieut. W. H. C. Mansfield.

Aviators' Certificates.—The following Aviators' Certificates were granted :—

732 Filip Augustin Björklund (Swedish Subject) (Grahame-White Biplane, Grahame-White School, Hendon). Feb. 3rd, 1914.
733 Lieut. Francis Hesketh Pritchard, R.G.A. (Vickers Biplane, Vickers School, Brooklands). Feb. 10th, 1914.
734 Capt. Arthur Burdett Burdett (Blériot Monoplane, Blériot School, Hendon). Feb. 10th, 1914.
735 Lieut. Dudley Stuart Kays Crosbie (Vickers Biplane, Vickers School, Brooklands). Feb. 16th, 1914.
736 Lieut. Frank Burges Binney (Bristol Biplane, Bristol School, Brooklands). Feb. 16th, 1914.
737 Richard Patrick Creagh (Vickers Biplane, Vickers School, Brooklands). Feb. 16th, 1914.

The following Certificate was passed in France :—

B. D. Ash (Maurice Farman Biplane, Etampes). Jan. 24th, 1914.

Aeronaut's Certificate.—The following Aeronaut's Certificate was granted :— 39. Capt. L. L. Atherton.

Airship Pilot's Certificate.—The following Airship Pilot's Certificate was granted :—

24. Capt. L. L. Atherton.

Gordon-Bennett Aviation Cup.—The following entries were reported :—

A. V. Roe and Co., Ltd.	Manchester.
Sopwith Aviation Co., Ltd.	Kingston-on-Thames.
British and Colonial Aeroplane Co., Ltd.	Bristol.

It was decided to send in a formal entry on behalf of three competitors to the Aero-Club de France.

Jacques Schneider International Maritime Race.—The following entry was reported :—

Sopwith Aviation Co., Ltd.	Kingston-on-Thames.

It was decided to send in a formal entry on behalf of one competitor to the Aero-Club de France.

***Daily Mail* £10,000 Trans-Atlantic Flight.**—The entry made by the Aero Club of America on behalf of Rodman Wanamaker was reported.

Aviation Benevolent Fund.—The report of the Sub-Committee, together with Counsel's draft of scheme was received. It was unanimously resolved to establish an Aviation Benevolent Fund, the object being to relieve aviators, their wives, widows, and dependents when in necessitous circumstances. Full details of the scheme will be issued shortly.

It was unanimously resolved to vote a sum of Fifty Guineas as the Club's first donation to the Fund.

It was reported that the British Petroleum Company, Limited (the Distributors of Shell Motor Spirit) had kindly promised a donation of Fifty Guineas.

Alteration to Club Rule No. 7.—On the motion of Mr. C. F. Pollock, seconded by Col. H. C. L. Holden, it was unanimously resolved that Club Rule No. 7 be altered by deleting the words "but the names of retiring Members of the Committee shall be indicated by an asterisk."

This alteration will be submitted for confirmation of the Members of the Club at the Annual General Meeting.

The rule now reads as follows :—

> "7. Ballot Papers.—Not less than 7 days before the Annual General Meeting a ballot paper shall be posted to every Member. The ballot paper shall contain the names of Candidates nominated for the Committee in the form of an alphabetical list. The same type is to be used throughout."

Aerial Navigation Orders.—Letter was read from the Home Office, stating that the revision of Orders was under consideration, and asking the Club if they had any amendments to suggest. The matter is under consideration.

Special General Meeting.

The Marquess of Tullibardine, the Chairman of the Club, presided at the Special General Meeting held on Tuesday last, the 17th inst.

Alteration to Rule 9.—Col. H. C. L. Holden presented a statement regarding Rule 9 of the Club Rules dealing with the method of election of the Committee. The following Members took part in the discussion :—Mr. A. S. E. Ackermann, Mr. Harry DelaCombe, Mr. J. H. Ledeboer, Mr. M. O'Gorman, and Mr. C. C. Turner.

The recommendation of the Committee to add the words "or less" was eventually carried, the voting being 40 in favour and 10 against.

Rule 9 now reads as follows :—

> "Invalid Ballot Papers—No ballot paper which is signed or on which the number of Candidates voted for is more or less than the number of vacancies or which is received by the Secretary later than 12 noon on the day preceding the Annual General Meeting shall be valid."

New Club Premises.—Col. H. C. L. Holden reported the result of the replies to the circular issued to Members in October last, when they were asked to answer the following questions :—

1. Are you in favour of the Royal Aero Club acquiring fresh premises with the usual facilities of a West End Club?

2. Would you, in this event, be prepared to pay an increased Subscription, say, not exceeding four or five guineas per annum, for present Members only?

About 1,450 circulars were issued, and 980 replies were received as follows:—

673 in favour of new premises and an increased subscription.
238 against.
69 in favour of new premises but against an increased subscription.

At the conclusion of a general discussion, the following resolution was carried unanimously:—

"RESOLVED that the Committee be empowered to take steps to acquire new premises by lease or purchase on such terms as it may think proper in the event of a favourable opportunity arising."

Monaco Aviation Meeting.

The International Sporting Club of Monaco is organising an aviation contest to take place from April 1st to the 15th, 1914, the prizes for which will amount to about £3,000. Rules and entry forms can be obtained from the Royal Aero Club.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

ON Monday and Tuesday of last week the greater number of the Naval officers were out getting through some fine flying. No flying was possible on Wednesday and Thursday owing to the gale. On Friday a new B.E. made short flights, and on Saturday B.E. and Sopwith short flights; owing to her Gnome missing the Sopwith was soon down. Sunday, gale.

Civilian Flying.—Tuesday, the Hon. Maurice Egerton made a fine flight on his 50 h.p. Short "Pusher." On Wednesday morning a surprise visit was made by Mr. Sydney Pickles who arrived driving his Chalmer car. Though not able to walk yet, Mr. Pickles gave an exhibition of a "short straight hobble." After going round seeing his many friends he again left for town with the hearty good wishes of all for a speedy and complete recovery. It is interesting to note that as it was his right leg which was broken, when driving his car he manipulates the clutch (as usual) with his left foot, and uses only the hand brake.

Brooklands Aerodrome.

MONDAY last week turned out a great improvement on the continuous rain and wind of the previous day, and as the wind was entirely absent for part of the day (although at one time it reached a velocity of 34 miles per hour) a lot of useful work was got through by the Bristol and Vickers pupils. Mr. Alcock was out on the Maurice Farman (100 h.p. Sunbeam) biplane, and Herr Roempler on the D.F.W. biplane, whilst a successful trial was made of the new Martinsyde monoplane. Major Brooke Popham called *en route* for Farnborough from Shorncliffe.

There was less wind Tuesday, the variations being from calm to a 20 mile an hour breeze. Herr Roempler, with Mr. Cecil Kny as passenger, flew to Farnborough on the D.F.W. biplane in the morning. Mr. Raynham, with Mr. MacGeagh Hurst as passenger, accomplished another first class performance by taking his 80 h.p. standard model Avro biplane up to an altitude of 14,420 ft., thus beating the previous British record accomplished by Mr. Hawker in June, 1913, on the Sopwith tractor biplane of 12,900 ft. A further good test was made of the new Martinsyde monoplane. Mr. Dukinfield Jones took his Flanders biplane up to 3,250 ft. Herr Roempler returned from Farnborough on the D.F.W. biplane. Lieut. Prichard passed his *brevet* tests on a Vickers biplane in workmanlike fashion, rising to 300 ft., in his figures of 8, and to 850 ft. in the altitude test; whilst Lieut. Crosbie passed the altitude part of his *brevet* test on a similar machine, rising to 750 ft.

There was no flying on Wednesday, the wind variation being between 4 and 38 miles per hour.

On Thursday again no flying was possible, as the wind was blowing up to 40 miles an hour. A novel machine called the Varioplane arrived, and its *début* is being looked forward to with much interest.

On Friday, no flying at all was possible with a gale of wind blowing up to 60 miles an hour, and on Saturday the force of the wind was still great (40 miles an hour), and only two machines were out. Mr. Raynham took a passenger (Mr. Acland) for a flight up to 3,250 ft. on the 80 h.p. Avro biplane, and afterwards Mr. J. Alcock took up the same passenger on the Maurice Farman (100 h.p. Sunbeam) biplane.

On Sunday, notwithstanding a gusty wind blowing at over 40 miles per hour, Mr. Raynham went up on the 80 Avro, the machine flying most steadily. The ballot for the free passenger flight had to be drawn three times ere a claimant put in an appearance in the person of Mr. E. L. Mather, of Lunesdale, Beckenham, who was taken for a good flight by Mr. Raynham on the Avro biplane in a 34 mile an hour wind. Mr. J. Alcock was also out on the Maurice Farman biplane, which was flying strongly and well against the wind. Mr. Pixton was testing the engine of the new "tweenie" (in size between the tabloid and the ordinary 80 h.p. tractor type) 100 h.p. Gnome-engined Sopwith biplane.

Mr. F. Warren Merriam is almost himself again and is taking a fortnight's rest in Cornwall before resuming his duties at Brooklands, and in the meantime his old pupil and present assistant instructor, Mr. Frank Halford, is working hard with the pupils at the Bristol School. The British and Colonial Aeroplane Co., Ltd. have contributed £5 5*s.* towards the Percy Lambert Memorial Fund.

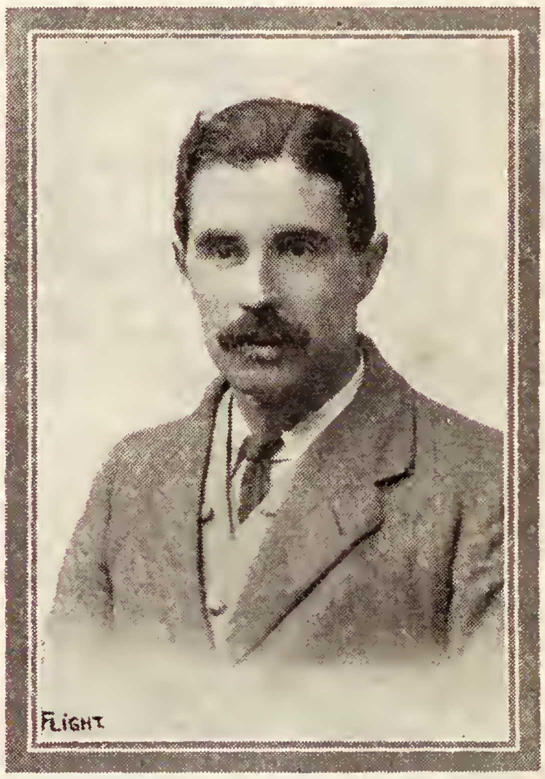
Bristol School.—The only tuition during last week was carried out on Monday morning, when the wind dropped. Sippe went out for a test flight, and then handed over the machine to Air-Mechanic Locker, who flew solo straights and circuits for 30 mins. Lieut. Binney also made several solo flights with landing practice, being in the air for 30 mins., followed by Lieut. Lawrence on solos for 20 mins.

The high wind and rain prevented any further attempt at tuition during the week.

Vickers School.—Monday, last week, Barnwell, Knight and Elsdon instruction on biplanes to Lieuts. Mansergh and Jackson. Capt. Ross Hume, Mr. Spencer Warwick, Lieuts. Prichard and Crosbie, solos. Knight with Mr. Hurst. Messrs. Hinshelwood and Chataway on No. 5 mono.

Lieut. Prichard very good *brevet* performance on biplane No. 21, Tuesday. Lieut. Crosbie solo circuits. Knight with Capt. Ross Hume.

Friday, Knight and Elsdon instruction on biplane to Lieuts. Jackson and Mansergh. Lieut. Jackson solo straights and circuits.



Lieut. Crosbie, who has just passed his *brevet* tests on biplane at the Vickers School, Brooklands.

Eastbourne Aerodrome.

ON Thursday last week, Mr. Hamel gave another of his exhibitions of looping the loop in a high wind. No school work was possible until Monday, when Gassler tested the new E.A.C. tractor biplane. Fowler was out with Mrs. Salmon, and Hunt was up on the Bristol.

Tuesday morning early, Hunt was out on the new tractor, and Fowler took Mrs. Salmon up three times on the E.A.C. 'bus. Two Army machines paid the aerodrome a visit during the morning, one being an 80 h.p. H. Farman from Folkestone, piloted by Lieut. Sheckelton, and the other, also from Folkestone, the F.E.-2, piloted by Lieut. Smith.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School. — 8th Feb., Messrs. Piercy and Green, straights with Instr. Strange in passenger seat last Sunday week. On Monday Mr. Howarth and Mr. Cripps, solo circuits, and Tuesday Mr. Francis straights with Mr. Strange in passenger seat, and afterwards solo straights. Mr. Clarke solo straights and Mr. Howarth solo straights.

Aircraft Co. School.—On Thursday, Feb. 12th, Verrier was out on a new type British-built Maurice Farman machine. This machine has a monoplane tail, but no front elevator, while the *fuselage* is mounted between the planes. Although there was a considerable wind blowing at the time, several flights with passengers were made over the surrounding country.

Last Saturday, Verrier started off for Farnborough at 8.30 on a new Maurice Farman, in a wind of about 45 miles an hour, but finding his speed was slow postponed the delivery of machine. On Monday he left the aerodrome at 9 o'clock, and arrived at Farnborough some 35 mins. later, at a height of 7,500 ft. His descent with the propeller completely stopped was very fine. Capt. Becke, on a B.E. biplane, then very kindly flew to Hendon, carrying Verrier as passenger. Verrier then returned with another British-built Maurice Farman to Farnborough. Later he put both machines through the necessary tests in his usual brilliant manner.

Blériot School.—Last week under the instruction of Mr. Jules Teulade, Messrs. H. O'Hagan and W. F. Cooper doing straights. Capt. Burdett, who has proved a very able pupil, passed all trials for his certificate in very good style.

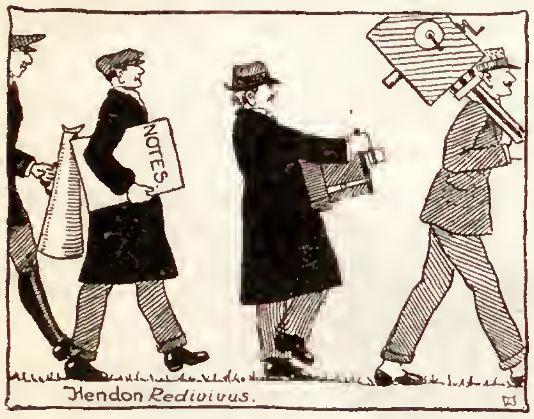
W. H. Ewen School.—On Tuesday last week, school out at 8.30 a.m. After test flight by M. Baumann on *brevet* machine, Lieut. Kinnear did straights and half-circuits. On Wednesday morning M. Baumann made a test flight on *brevet* machine, but found it too bumpy for school work.

Salisbury Plain.

Bristol School.—The high winds, accompanied by fog and rain, during the whole week made flying tuition at Salisbury Plain out of the question, the wind at times blowing in gusts of over 40 miles per hour. Much useful instruction was, however, given to pupils in the sheds.

EDDIES.

It is a pity that Raynham's climb to 15,000 ft., before his great glide from Brooklands to Hendon, was not done under official observation, and had to be repeated. The second time he only reached 14,420 ft. with a passenger on board; nevertheless, it was a real good flight, and captures the English altitude record. Chatting with Mr. A. V. Roe at Hendon on Saturday last on things in general, I learnt that the new 100 m.p.h. Avro, which will be shown at Olympia, will have a range of speed of 100–35, which is something to be proud of. He also mentioned something about air-anchors, but did not go into details, evidently wishing to "leave a gallop for the avenue." I am therefore looking forward with great interest to the coming Show, and am fully prepared to be surprised once more by this surprising firm. Only last week I was looking through some old photographs, and found some of Mr. Roe flying his triplane at Lea marshes—some little difference between this and the latest Avro with its staggered planes and neat cowl. "Roe the hopper" was possibly true to some extent in those days—just now he must be hopping with seven-league boots on.



Hendon Redivivus.

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It was good to hear from Mr. Birkett that the Slack fund is being very well supported. Those who have not yet sent in their little donation are reminded that it is not too late, and that the modest half-crown will be greatly appreciated from those who would like to subscribe their mite but cannot afford more. Quite a touch of nature was to be seen at Hendon on Saturday, when Sydney Pickles, still on his crutches from the result of his own accident, was found putting down his name as a subscriber to the fund of a less fortunate brother aviator.

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With a subscription of twenty guineas to the Slack fund the I.C.S. have come along in their usual spirit, and shown that they do not forget their old pupils. Bobby Slack was of course a pupil of theirs, and afterwards flew their Blériot monoplane on a tour of many weeks' duration. There are many schools in London, established to teach anything from bioscope operating to poultry farming, but in a good many cases their interest ends with the payment of the fee, and the pupil is got through as quickly as possible, to their, if not his own, satisfaction. I have spoken to several old pupils of the I.C.S., and one and all have expressed themselves satisfied with the treatment they received, and the thoroughness of the tuition. I have noticed, too, that there is great camaraderie between the wearers of the button.

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By adding Mont Blanc to its other conquests, the all-conquering aeroplane is proving its utility and the possibilities of flying in a way that should convince the most unbelieving. By the way, I read that Mr. Orville Wright, who, with his brother Wilbur, was the pioneer of aviation in America, does not at the moment think it at all possible for any aeroplane to cross the Atlantic. He says that, in his opinion, there is not at the moment any aero engine capable of the strain of working all out for 17 or 18 hours at a stretch, and that until we get engines capable of this, it is, in his opinion, foolish to attempt the feat. We are bound to lend an ear when such an authority as Mr. Wright talks on aviation, but there have been so many magnificent flights put up lately that one hardly knows what to expect.

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It is not quite clear to me if M. Jean Ors is claiming for his newly-invented parachute a method whereby a pilot may seek safety in the event of an accident to his aeroplane, or whether it is simply a new sensational stunt. Seeing that M. Ors sat under the aeroplane, and that his parachute was fixed beneath the *fuselage*, it does not seem to me to go far towards attaining the former, and parachutes have been tried before as a method of descent from aeroplanes. One that promised to be quite effective was introduced by Mr. Prenseil and tried at Hendon last year. I have not seen or heard anything of it for a long time now, and am wondering why it was not taken up. The idea was, and it seemed to work well, to discharge the parachute from a cylinder of compressed air situated just behind the pilot. The rope descending from the envelope finished in a belt round the pilot's waist, and the force used was only just sufficient to take the parachute to the extent of the rope length, when, assuming that an accident had happened and that the machine was falling, the pilot would leave the machine and be suspended in the air. It seemed to me quite good and well worth following up. "WILL O' THE WISP."

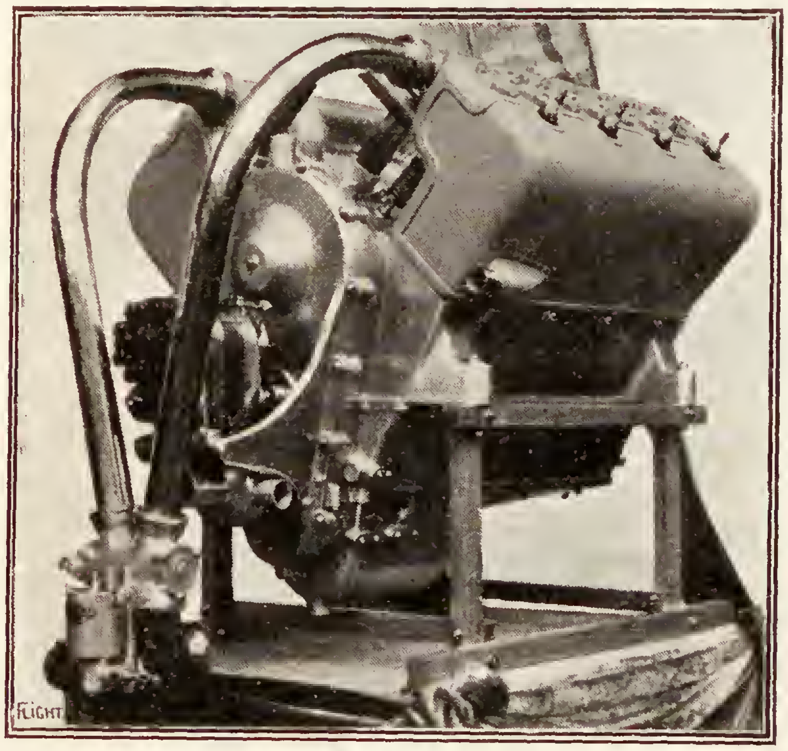
Wounded Birds at Hendon.

AERO ENGINES AT PARIS SHOW, 1913.

(*Concluded from page* 163).

Panhard-Levassor.

These well-known manufacturers exhibit their 8-cylinder 100 h.p. water-cooled vee engine, in which the cylinders are arranged in groups of four cast *en bloc*, a construction that lends itself greatly to rigidity, a desirable quality in engines of this class. These cylinders are of cast iron, and it will be observed from the accompanying illustration that the ribbing which was originally formed on aluminium side-plates on the outer side of the jacket is now omitted, as are also the two tie-rods between the heads of the cylinders. Both inlet and exhaust valves are mechanically operated.



100 h.p. Panhard engine.

The propeller is mounted on an extension from the end of the camshaft, which is driven by gearing from both ends of the crankshaft, with the object of reducing torsional oscillation in the latter. This construction necessitates an increase in the diameter of the camshaft, which, therefore is slightly heavier, although since the timing gears, and the bearings, &c., need not be capable of transmitting and supporting the full engine torque, it is possible that the actual engine weight is not thereby increased, and in any event by its adoption the gear is probably much more silent and durable as well as more efficient after a period of use.

It should be noted that the water pump, which is placed immediately beneath the magneto, has two outlets—one on each side of the engine—so as to equally distribute the water delivered between the two groups of cylinders, a precaution that should always be observed in order to prevent any possibility of a steam or air lock occurring in either group of cylinders.

Renault.

These motors embody the same construction as has been employed by this firm during the past few years, and which has proved so successful in aeronautical work on dirigibles as well as aeroplanes, namely, air-cooling by forced circulation through a casing fitted over the cylinders and the attachment of the propeller to the end of the camshaft. The two models exhibited were the eight-cylinder 70 h.p. and the twelve-cylinder 100 h.p., which were illustrated in FLIGHT for November 2nd, 1912. Both engines are of the vee type, the angle between the two groups of cylinders being 90° for the eight-cylinder and 60° for the twelve-cylinder engine. The crankshaft end bearings are of the roller type, but the intermediate bearings are lined with white metal. The air casing is capable of ready dismantlement, and in the 70 h.p. may be omitted if an effective method of cooling can be substituted by the purchasers. A single magneto is provided on the eight-cylinder engines, but two magnetos, entirely separate and driven off the timing shaft, are fitted on the 100 h.p. engine.

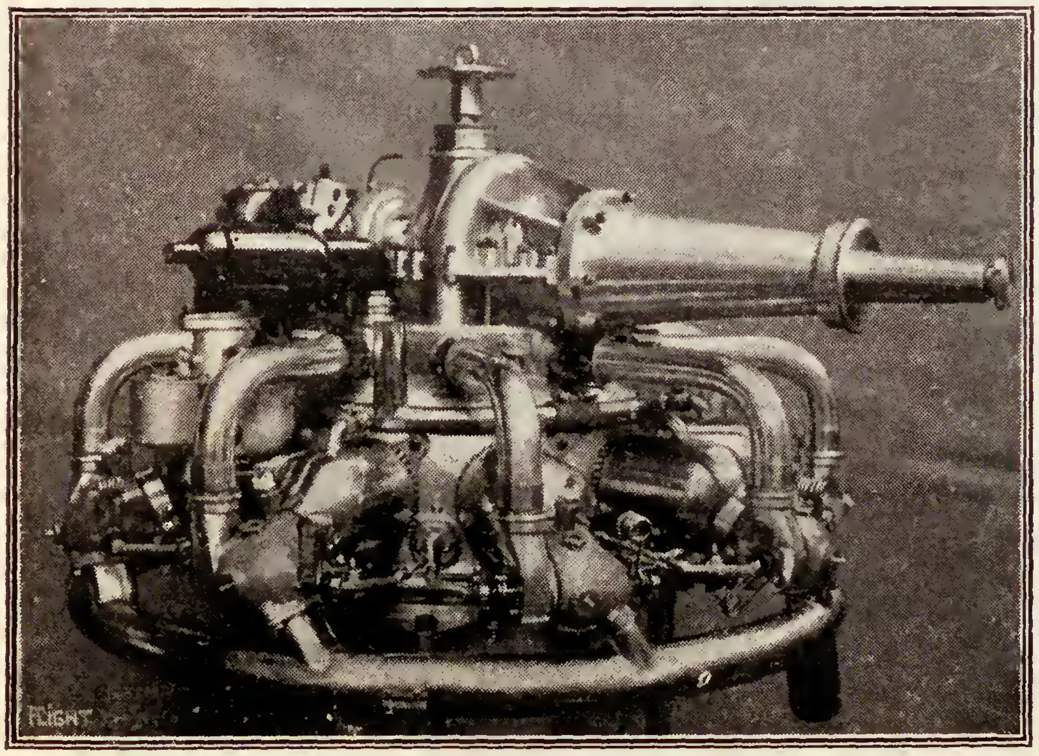
Messrs. Renault Frères now confine their activities to three different engines for aviation purposes—the two motors above referred to, and a 40 h.p. eight-cylinder engine of 75 mm. bore and 120 mm. stroke which runs at a speed of 1,800 revolutions per minute, and weighs 212 lbs. The price of this engine is 8,000 francs, and it is similar in design to the larger engines, but without the air casing.

Salmson.

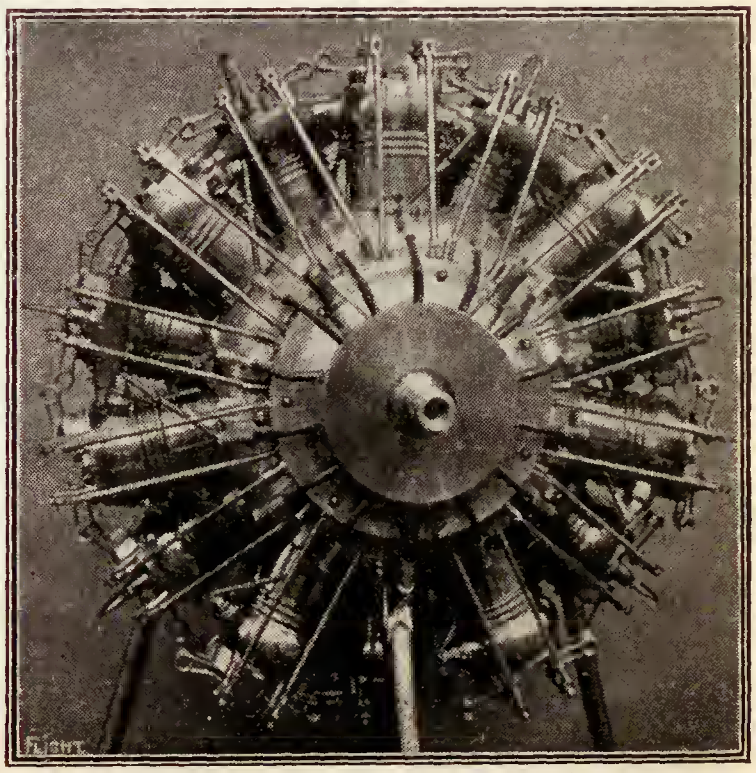
These engines, which have attained a large measure of success during the last two years, have recently been made more compact in design, are made in five different sizes, 90, 135, 150, 200 and 300 h.p., and in three types, all of which are stationary and water-cooled. The 150 and 300 h.p. engines are, however, arranged with their cylinders in a horizontal plane, and the 150 h.p. engine has a bevel-reducing gear to the propeller-shaft embodied in a casting fitted to the crank-case, giving a gear reduction of 1·8 to 1.

The cylinders in all models are made of steel, and have cast-iron heads for the reception of the valves, whilst the water-jackets, of copper, provided with expansion bellows, are brazed at the ends to the cylinders, as well as clipped between the cylinders and their attachments. The pistons are made of cast-iron, and have three rings fitted of similar material. The connecting rods articulate on a bronze bush supported on the crank-pin by two ball-bearings. The inlet as well as the exhaust valves, which are of ample size, are mechanically operated through push-rods and levers by cams arranged on a sleeve concentric with the crank-shaft. On the horizontal engines, which are specially designed for use on hydro-aeroplanes and dirigibles, these valves are arranged on the side of the head as shown, whilst on the other types, they are placed radially in the head.

The crank-cases are cast in aluminium on all models, but the construction employed varies considerably. On the vertically placed



150 h.p. horizontal radial Salmson engine.



200 h.p. 14-cylinder Salmson engine.

radial engine, it is in two parts, the one carrying the lugs for fixing the engine on the machine, whilst to the other the timing mechanism is attached; both parts are bolted together, and in so doing secure the cylinders in position. The crank-chamber on the other two engines is made in one piece, the lower portion serving as a reservoir for oil, and the cylinders are attached in a special manner that allows of their ready dismantlement when necessary. The cylinders project for some distance into the crank-case on the vertical type of engines, and the excess oil is thereby prevented from falling into the lowermost cylinders.

The crankshaft is in two parts, the driving end with one web and crank-pin forming one piece, and the remaining web and journal forming the other part, a bolt passing through the web and the crank-pin to secure them in position.

Forced lubrication is provided to the cylinders, gearing, &c., and two carburettors are fitted to the crank-case, through which the gas passes by radial piping to the cylinders. The water pump and magneto are mounted on the crank-case at the rear of the engine, except on the largest model, where two magnetos are fitted, and the elaborate system of water piping employed may be seen in the accompanying illustration. It will be observed that on the vertical models the cooling water is passed through the water jackets of the several cylinders in succession, entering at the bottom, where it divides into two streams, and leaving at the top. On the other engines the water is taken to the cylinder and leaves by radial piping connected to main supply and return pipes surrounding the crank-case, so that each cylinder receives a separate quantity of water. On the 300 h.p. engine a collector is fitted, to which all exhaust piping is led, and which assists in silencing the exhaust. The orders of firing on the seven and nine cylinder engines are 1, 3, 5, 7, 2, 4, 6 and 1, 3, 5, 7, 9, 2, 4, 6, 8, respectively.

It is claimed that these engines, while developing high power, and

AERO ENGINES AT THE PARIS SHOW, 1913.

Name.	Type.	Cooling.	Cylinders.			h.p.	Revs. per min.	Weight.		Piston Speed.	Stroke/Bore	Type of Inlet Valve.	Price.
			No.	Bore.	Stroke			Total.	Per h.p.				
				mm.	mm.			lbs.	lbs.	ft. per min.			francs
Anzani	72° fan radial	Air	3	105	130	30	1,250	154	5·13	1,065	1·24	Auto	100 francs per nominal h.p.
	Star radial	,,	3	105	120	30	1,300	121	4·03	1,025	1·14	,,	
	,,	,,	6	90	120	45	1,300	154	3·42	1,025	1·35	,,	
	,,	,,	6	105	120	60	1,300	176	2·93	1,025	1·14	,,	
	,,	,,	10	90	120	70	1,250	216	3·10	985	1·33	,,	
	,,	,,	10	90	130	80	1,250	225	2·81	1,065	1·44	,,	
	,,	,,	10	105	140	100	1,200	298	2·98	1,100	1·33	,,	
	,,	,,	10	115	155	125	1,250	465	3·70	1,275	1·35	,,	
	,,	,,	20	105	140	200	1,250	683	3·41	1,150	1·33	,,	
Austro-Daimler	Vertical	Water	6	130	175	130	1,200	440	3·38	1,380	1·35	Mechanical	18,500
Chenu	,,	,,	4	110	130	65	1,800	254	3·91	1,540	1·18	,,	8,000
	,,	,,	4	110	130	90	2,300	258	2·87	1,960	1·18	,,	10,000
	,,	,,	6	110	130	100	1,600	397	3·97	1,365	1·18	,,	15,000
	,,	,,	6	150	200	250	1,500	950	3·80	1,970	1·33	,,	30,000
Clement Bayard	,,	,,	6	—	—	300	—	—	—	—	—	—	—
Clerget	,,	,,	4	110	120	50	1,450	214	4·28	1,140	1·09	Mechanical	10,000
	,,	,,	4	140	160	100	1,300	396	3·96	1,365	1·14	,,	19,000
	Vee	,,	8	140	160	200	1,300	640	3·20	1,700	1·14	,,	32,000
	Rotary	Air	7	120	120	50–60	1,180	198	3·30	930	1·00	,,	13,000
	,,	,,	7	120	150	80	1,180	216	2·70	1,160	1·25	,,	16,000
De Dion*	Vee	,,	8	106	120	80	1,800	465	5·81	1,420	1·13	,,	13,000
Demont	Rotary	,,	6	175	80	300	2,000	220	0·73	1,050	—	,,	—
D'Henain	,,	,,	7	—	—	50	—	—	—	—	—	,,	—
Edelweiss	Radial	,,	6	115	120	75	1,350	276	3·68	1,150	1·04	,,	14,000
	,,	,,	10	115	120	125	1,350	353	2·82	1,150	1·04	,,	22,500
E.J.C.	Rotary	,,	6	100	100	60	2,000	185	3·08	1,310	1·00	,,	13,000
Esselbé	,,	,,	7	110	120	65	1,250	167	2·57	985	1·09	Special	12,000
Gnome	,,	,,	7	110	120	50	1,200	172	3·44	945	1·08	Auto	13,000
	,,	,,	7	120	120	60	1,200	192	3·20	945	1·00	,,	13,000
	,,	,,	7	124	140	80	1,200	207	2·59	1,100	1·13	,,	17,500
	,,	,,	9	124	150	100	1,200	298	2·98	1,180	1·21	,,	22,000
	,,	,,	14	110	120	100	1,200	309	3·09	945	1·08	,,	24,000
	,,	,,	14	124	140	160	1,200	397	2·48	1,100	1·13	,,	35,000
	,,	,,	18	124	150	200	1,200	540	2·70	1,180	1·21	,,	44,000
	,,	,,	7	110	150	80	1,200	—	—	1,180	1·36	Special	17,500
	,,	,,	9	110	150	100	1,200	—	—	1,180	1·36	,,	22,000
Laviator	Vee	Water	8	100	130	80	1,200	275	3·43	1,020	1·30	Mechanical	13,000
	,,	,,	8	114	160	120	1,200	418	3·48	1,260	1·40	,,	19,000
†	Radial	Air	6	100	130	50	1,200	198	3·96	1,020	1·30	,,	10,000
†	,,	Water	6	100	130	80	1,300	242	3·02	1,110	1·30	,,	11,000
Le Rhône	Rotary	Air	7	105	140	60	1,200	194	3·23	1,100	1·33	,,	13,000
	,,	,,	9	105	140	80	1,200	245	3·06	1,100	1·33	,,	16,000
	,,	,,	11	105	140	100	1,200	297	2·97	1,100	1·33	,,	19,000
	,,	,,	14	105	140	120	1,150	375	3·12	1,055	1·33	,,	24,000
	,,	,,	18	105	140	160	1,150	464	2·90	1,055	1·33	,,	30,000
Panhard-Levassor*	Vee	Water	8	110	140	100	1,500	440	4·40	1,380	1·27	,,	15,000
Renault*	,,	Air	8	96	120	70	1,800	396	5·66	1,420	1·25	,,	12,000
	,,	,,	12	96	140	100	1,800	638	6·38	1,655	1·46	,,	17,000
Salmson	Radial	Water	17	120	140	90	1,250	374	4·15	1,150	1·17	,,	16,250
	,,	,,	9	120	140	135	1,250	462	3·42	1,150	1·17	,,	21,500
	,,	,,	14	120	140	200	1,250	660	3·30	1,150	1·17	,,	32,000
	Horizontal radial	,,	9	120	150	150	1,250	—	—	1,230	1·25	,,	28,000
	,,	,,	9	150	210	300	1,200	990	3·30	1,650	1·40	,,	47,500
S.H.K.	Rotary	Air	7	110	140	70	—	154	2·20	—	1·27	Special	15,000
	,,	,,	7	124	140	90	—	198	2·20	—	1·13	,,	20,000
	,,	,,	14	110	140	140	—	308	2·20	—	1·27	,,	28,000
	,,	,,	14	124	140	180	—	396	2·20	—	1·13	,,	38,000

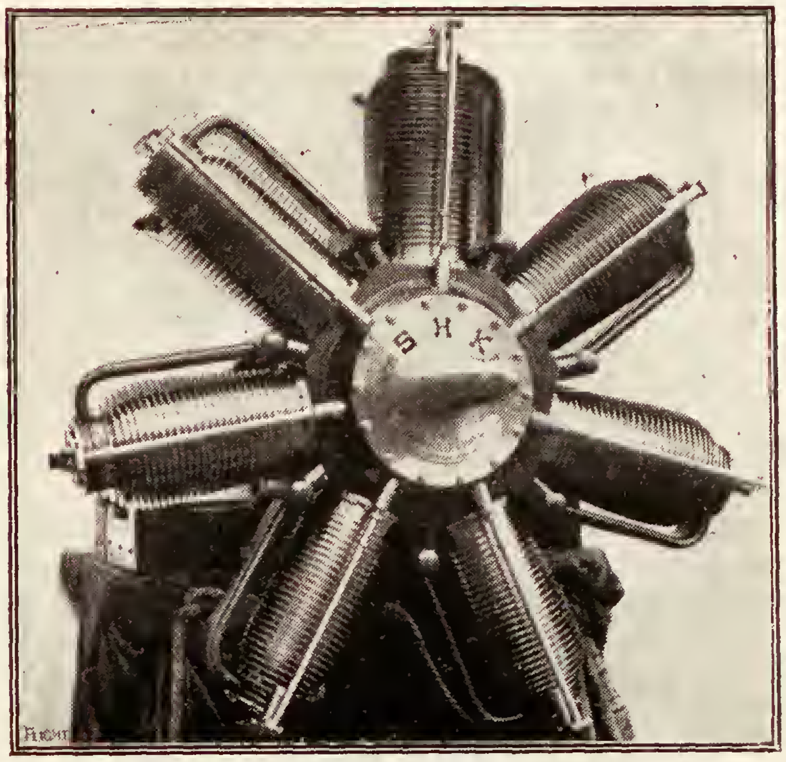
* Propeller on cam-shaft. † Two-stroke.

Note.—Weights given for water-cooled engines are ex radiator and water.

having a low fuel consumption, possess an excellent degree of flexibility, the range of speed being from 300 to 1,350 revolutions per minute. These fine engines are now being constructed in England by the Dudbridge Iron Works, Ltd., Stroud.

S.H.K.

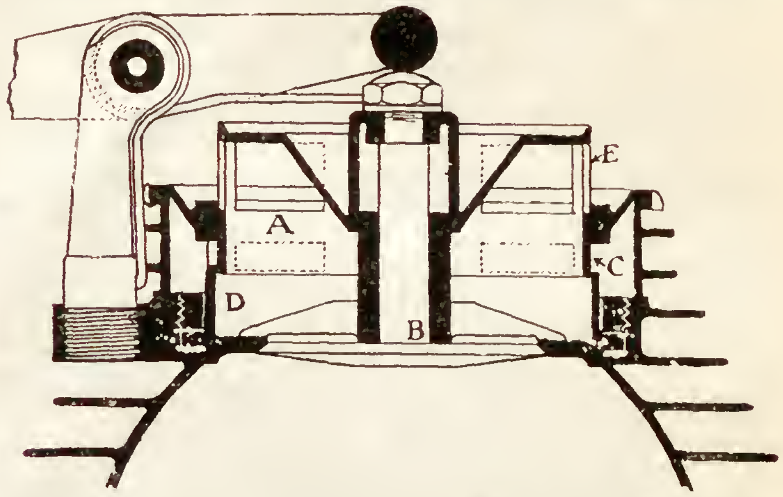
These engines, shown by Secqueville and Hoyau, are manufactured in four sizes, and are further examples of the all-steel construction—cylinders, piston, crank-case, inlet-piping, &c., all being made of forged steel, and no casting being used in the design.



70 h.p. 7-cylinder S.H.K. engine.

The cylinders are secured to the crank-case by means of a gland that screws into the crank-case on a flange formed at the base of the cylinder, a locking-ring being fitted to prevent the part from becoming loose. On the seven-cylinder engine the cranks are in two parts, the web remote from the propeller being mounted at the axis of rotation on a ball-bearing supported on a shaft fitted to the rotating crank-case, and on this fixed shaft the gearing for operating the valves is mounted. The connecting-rods are attached to the crank by feet, to which bronze shoes are riveted, two circular rings of ⊃ section encircling the lateral extensions along the shaft and effectively securing them in position. There are no rings fitted to the piston, but gas tightness is said to have been secured by cutting three shallow grooves round the piston.

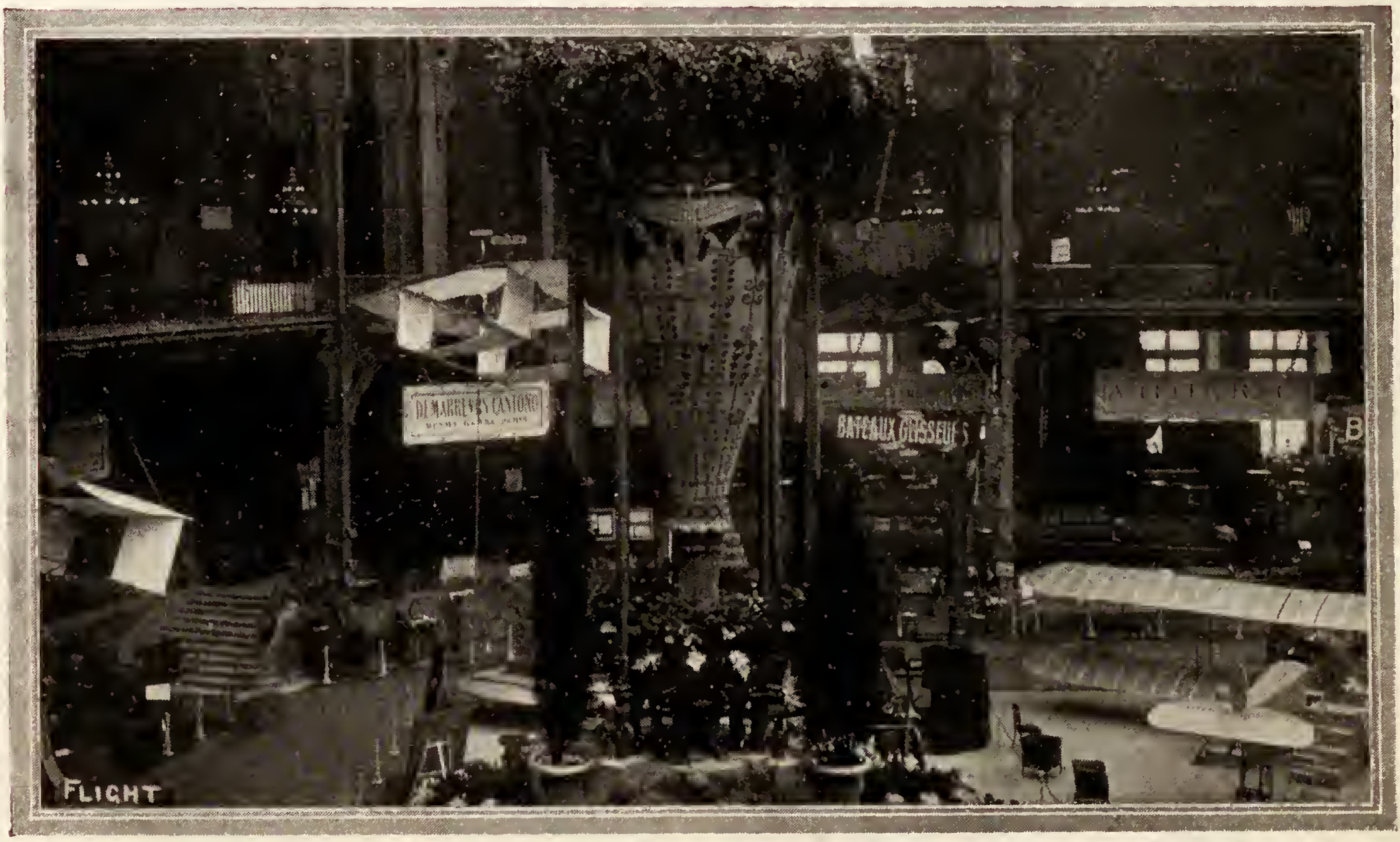
The valves are mechanically operated by a single push-rod, and are of the special concentric design shown in the accompanying diagram. The cylindrical piston, A, is attached to the conical valve, B, which seats in a casing, D, secured to the cylinder. In the casing D, ports C are cut, making communication by means of radial piping with a central gas chamber which is fed through the crank-shaft from the carburettor. At the outer end of A, other ports, E, are made, which, as the valve is opened, register with the ports C. When the period of exhaust is reached, the lever depresses the central valve stem and places the interior of the cylinder into communication with the atmosphere. During exhaust the valve continues to move inwards until, at length, when the exhaust period is completed, the lower edge of the ports in the moving piston valve, A, commence to register with the inlet ports, C. Induction thus takes place through the inlet ports, whilst air is also drawn in through the ports, E, the proportions decreasing as the valve approaches the limit of its inward movement when the ports, E, are completely closed, and increasing as the valve returns, and finally closes the valve B. A coiled spring is fitted round the support for the rocking lever for closing the valve.



Section through concentric valve used on S.H.K. Engine.

Oil is supplied under pressure by a plunger pump to the crank-pin, cams, gearing, &c., and high tension magneto ignition is fitted.

The power/weight ratio of these engines is abnormally low.



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A view of one of the important floral devices which were a feature of the scheme of decoration at the Paris Aero Salon.

ARMCHAIR REFLECTIONS.

By THE DREAMER.

In the day when Dick Whittington sat on the milestone at Highgate, and listened to the bells telling him in his imagination to return to success and prosperity, London was a city of worshipful companies and apprentices. Holywell Street and the treasures it held are lost to me for ever, and I can but look back on the hours I spent there rummaging through boxes of old books, as a man looks back on the hours spent with his first love. Holywell Street is no more. Some of its attractions are still to be found in Charing Cross Road, and the younger generation, no doubt, never having known anything better, are satisfied, but we who knew our love in her native village, as it were—we who could find her hidden away at the bottom of certain old trunks and could dig her out and enjoy her company behind screens and in shop entries, have no use for her in Charing Cross Road, splashed as she is with mud by the motor 'buses. To try and glean a sentence from Harrison Ainsworth with the hoot of motor horns in one's ears is impossible. I carry in my mind many happy recollections of things seen in Holywell Street. I remember a large engraving in a birdseye-maple frame priced at three guineas, and I religiously started every Monday to save up the money to buy it, only to make serious inroads into the fund before I got to the end of the row where now stands the statue of Gladstone. It represented Cheapside in the olden time. Picturesque with its old gables, inviting with its taverns and chop houses, I cannot but feel pleased that it is not of that picturesqueness to-day. Apprentices in jerkin and shorts stood about the court entries seeming to have nothing more to do than carry a large stick, yet when I look back I can plainly see those apprentices as representing the coming big men of the city. There was no royal road to success in those days without the precincts of the royal palaces. Courtiers finding favour with royal masters or mistresses might wake one morn to find themselves famous and one step nearer the Tower, but in trade, in silversmithing, in silk-mercing, in all the hundred and one businesses proclaiming a worshipful company resplendent in apron, magnificent under silken banner, there was but one way to the top; but one road whereby a youth might climb to an exalted position in his master's business—the apprenticeship. It is perhaps well that in these days when men and youths pass from one business to another, when any opening that offers a little more weekly salary is grasped, no matter what the business may be; when a man is jack of all trades and expert in none, it is, I say, perhaps well that the apprenticeship system should become practically obsolete, but it gave us good men of their trade and guaranteed a succession.

There was no reason to go to America in those days to find a man capable of managing a railway, because there were no railways, but when railways did start to lay their lines, reaching like tentacles through our peaceful valleys, men were wanted, and working on the only system then known, were moved up into higher positions as they became vacant. Then we started to live in irresponsible fragments. The great stores came along and taught us departments—we lead a departmental life. Everything is measured and cut and boxed and labelled for us by men who know nothing about anything except measuring and cutting and boxing and labelling in their respective ways.

The porter at the station is there to carry your luggage—ask him the time of the next train, and he will tell you—after he has looked at the time-table: ask a Waterloo porter, for instance, how to get across London to Euston and he will gaze at you open-mouthed—who ever wanted to go anywhere out of London except from Waterloo? And so when a new manager is wanted for an English railway, he has to be imported.

In aviation we have not yet become departmental. Perhaps, this is because the industry is so young; perhaps later on men will know one thing and one thing only, but at present the top rungs of the ladder of success in aviation are there waiting to be grasped by any who care to climb to them through the school of thoroughness.

It is easy to learn to fly; it is easy to pay a fee to be taught; it is easy to secure the coveted *brevet*, and it is easy to pass away into oblivion and be forgotten. Think for a moment of the hundreds of pupils who have joined the various schools and learned to fly; where are they? Scattered, gone. Where are the men who took up aviation seriously in the early days; who started in the workshops and sheds; who had to do anything and learn everything; who had to help to build a machine first and learn to fly it afterwards? You will find most of them still at it and generally somewhere near the top.

I cannot agree with Lord Claud Hamilton that it is necessary to go abroad to find men capable of filling high positions. The thinking men of England are every bit as good or better than they ever were, the trouble is they do not get the chance. Hedged in as they are by all sorts of restrictions; boxed up as they are in one department—often meaning, as it does, discharge to be found in another—how are they ever to know anything about the working of the machinery of which they are but one cog, coming round in their turn to engage with another cog, so forcing on the wheels of progress by ever so little towards an end of which they know little, and in time get to care less. In time, as they wear out, a new cog will emerge starfish-wise and gradually eclipse the old one, which will almost imperceptibly dissolve away into nothingness, his work done, forgotten. It may be that economy demands that it shall be one man one job in order, as would be most likely pointed out, that skill and exactness be obtained in each department, but it will never have the effect of bringing the good men to the top, and there will ever be a dearth of men with an all-round knowledge whilst the system obtains.

* * * *

A Four-winged Monoplane.

A remarkable monoplane has recently been built by the Ponnier works for M. Bonamy, who has entered it for the competition for safety devices. Very scanty details are at present to hand, but it appears that there are two sets of main planes, the first pair, of the usual Ponnier shape, having a pronounced dihedral angle for the purpose of securing lateral stability, while immediately behind them is a pair of wings, arranged in V form, as on the Dunne machine, for the purpose of obtaining longitudinal stability. The machine has been tested at Rheims by Bielovucic and Emile Vedrines, and, fitted with a 70 h.p. Gnome motor, easily lifted a load of 640 kilogs.

BRITISH NOTES OF THE WEEK.

THE ROYAL FLYING CORPS.

The following appointment was announced in the *London Gazette* of the 13th inst.:—

R.F.C.—Military Wing.—Capt. John H. W. Becke, the Sherwood Foresters (Nottinghamshire and Derbyshire Regiment), from a Flight Commander to be a Squadron Commander, and to be granted the temporary rank of Major whilst so employed. Dated February 1st, 1914.

Mr. Sydney Pickles was last week-end at Hendon once again, and in our photograph he is seen placing his signature to the subscription list for the Slack Fund, which is receiving such sympathetic support.

The Number of British Airships.

Replying to a question in the House of Commons as to the number of airships owned or being built either by the Government or by contractors, Mr. Winston Churchill (First Lord of the Admiralty) stated that there are 15 dirigible airships built, building, or ordered at the present time for the Naval Wing. The majority will be ready for service with the Fleets when required during the next year. Mr. Churchill excused himself for not being more precise.

Army Aircraft.

Replying to questions by Mr. Joynson-Hicks, in the House of Commons on Wednesday, Col. Seely (Secretary for War) stated that 28 of the monoplanes which were on the list of efficient machines had been struck off at various dates since July 1st. One remained on the list as efficient. The Royal Aircraft Factory was now making 24 aeroplanes of a special type. All those Army officers who were engaged in the airship squadron of the Royal Flying Corps except one had agreed to be transferred to the Naval Wing. The exact conditions of their employment were still under consideration, but the hon. member might rest assured that they would not lose either in seniority, rank, or grading.

An Aviators' Benevolent Fund.

It will be seen from the official notices on page 188 that the Royal Aero Club has decided to establish an Aviation Benevolent Fund with the object of relieving aviators, their wives, widows and dependents when in necessitous circumstances. The Club has opened the fund with a first donation of fifty guineas, and the British Petroleum Co., Ltd., the distributors of the well-known "Shell" motor spirit, have promised a donation of a similar amount. It is a scheme which merits the attention of all connected with aeronautics, and we feel sure it will meet with the financial support it deserves.

The Royal Aero Club Annual Dinner.

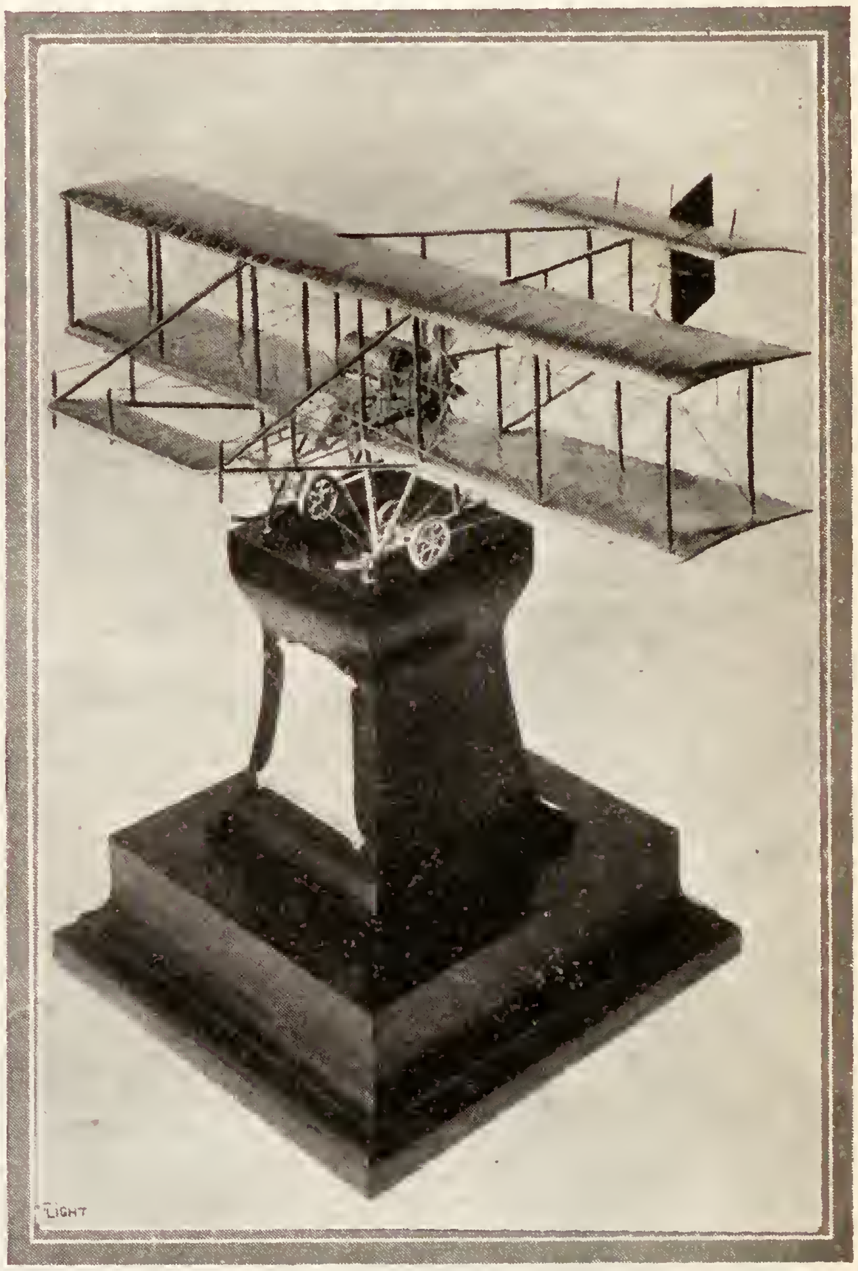
The success of the annual dinner of the Royal Aero Club, which is to be held at the Royal Automobile Club on Wednesday week, is foreshadowed by the fact that the number of applications for tickets has exceeded the accommodation available, so that no further tickets can be issued.

Learning to Fly in Pictures.

One of the items in the programme of the special matinee at the Palace Theatre, at which the Queen has promised to be present, on Tuesday next, will be the Kinema film, "Learning to fly at Vickers' School." The matinee is for the benefit of the Schools for Mothers in Fulham, Poplar, Shoreditch and Stepney.

More Farmans for the R.F.C.

On Monday morning Verrier flew a new British-built M. Farman from Hendon to Farnborough in fine style. Verrier then enjoyed a ride back to Hendon on a B.E. piloted by Capt. Becke, and took a second M. Farman to Farnborough, after which he put both machines through their official tests.



An exquisite specimen of the silversmith's art, being a scale model in silver of the Grahame-White biplane used by Mr. Birchenough, the winner of the trophy. This trophy was presented by the distributors of Shell Motor Spirit for a special speed contest. The model is the work of Messrs. Mappin and Webb, Ltd., of Oxford Street.

A Note on Raynham's Glide.

With reference to the paragraph in our issue of the 7th inst. recording Raynham's climb on the Avro to 15,000 ft. and his 20 mile glide from Brooklands to Hendon, it should be made clear that Mr. Harold Blackburn only accompanied Raynham on the way back to Brooklands, and was not with him during the long glide.

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

1. **Meeting**—The eighth meeting of the present session will be held on Wednesday, March 4th, at 8.30 p.m., when Mr. Mervyn O'Gorman, C.B., M.I.M.E., A.F.Ae.S., will preside. Mr. Archibald R. Low, M.A., A.F.Ae.S., will read a paper on "The Rational Design of Aeroplanes," followed by a discussion.

2. **Nominations for the Election of Council.**—The last day for the acceptance of nominations for the Council will be Wednesday, February 25th next. Candidates for election must be nominated by two voters and no more (*see* Rules 6–13). In the event of nominations being received, ballot papers will be posted to voters on March 7th, and must be returned to the Secretary by 12 noon on March 18th, 1914.

Under Rule 7 the retiring members of Council are:—

Col. J. E. Capper, C.B., R.E.
J. H. Ledeboer.
Maj.-Gen. R. M. Ruck, C.B.
J. W. Dunne.
F. K. McClean.
Lieut.-Col. F. H. Sykes.

Under Rule 14:—

Dr. T. E. Stanton.
Dr. R. Mullineux Walmsley.

3. **Annual General Meeting.**—The annual general meeting of the Society will be held on Wednesday, March 18th, at 8 p.m., at the Royal United Service Institution, Whitehall, S.W. (Rule 39).

The last day for the receipt by the Secretary of notice in writing from any voter wishing to propose any subject for discussion at the annual general meeting is March 3rd.

B. G. COOPER, Secretary.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending February 6th:—

Flying Depôt. S. Farnborough.—Some reconnaissance and photography of troops were practised. Repair and experimental work continued.

No. 2 Squadron. Montrose.—The officer pilots were employed in making long reconnaissance flights across country.

No. 3 Squadron. Netheravon.—Various experimental work was done, and several long cross-country flights were made.

No. 4 Squadron. Netheravon.—A considerable amount of flying was carried out throughout the week. Another aeroplane was also flown from Farnborough for use with the Squadron.

No. 5 Squadron. S. Farnborough.—The first four days of the week were devoted to flying, and the remaining days to overhaul and repair work.

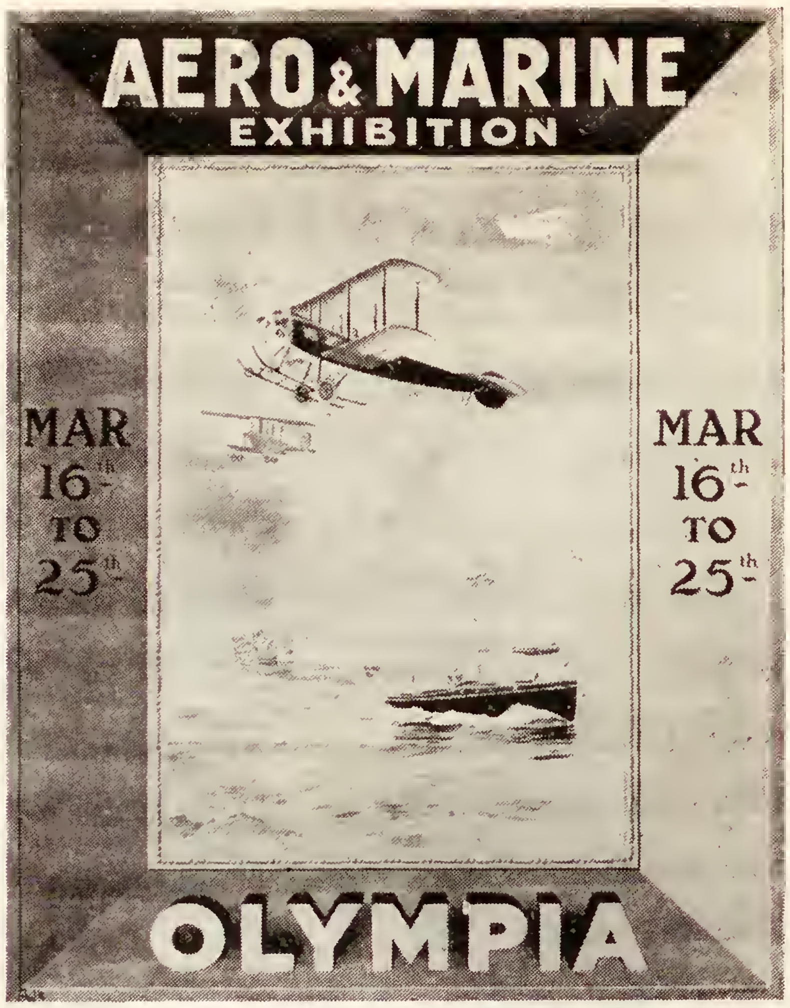
No. 6 Squadron. S. Farnborough.—The week was devoted to organising the squadron. Some flying was done.

For week ending February 13th:—

Flying Depôt. S. Farnborough.—Repair and experimental work was continued as usual. There was some flying done on B.E. machines.

No. 2 Squadron. Montrose.—The officer and N.C.O. pilots were out daily during the week. On Monday, the 9th inst., 1,393 miles were flown by the Squadron.

No. 3 Squadron. Netheravon.—Training was continued.



The poster which is to advertise the forthcoming Aero and Marine Exhibition at Olympia from March 16th to the 25th inclusive.

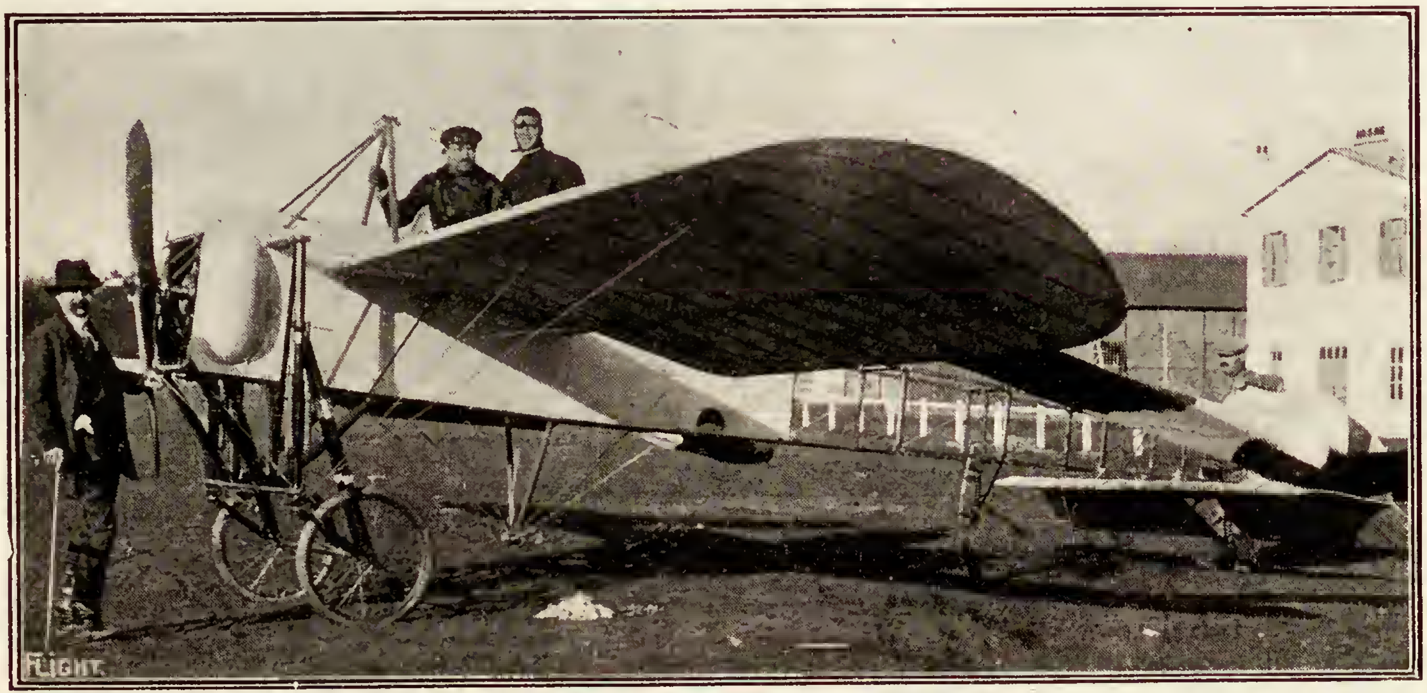
No. 4 Squadron. Netheravon.—In spite of some rough weather a considerable amount of flying was done by the officer pilots of the squadron. One machine was flown from Farnborough for use with the squadron.

No. 5 Squadron. S. Farnborough.—Some good practice was put in during the week, and much experience gained in flying in strong winds.

No. 6 Squadron. S. Farnborough.—The formation of the squadron was continued, and some flying done on B.E. and Maurice Farman machines.

British Team for the Gordon-Bennett Race.

IT is very gratifying to record that there is every prospect of Great Britain being adequately represented in this year's Gordon-Bennett Race. The Avro, Sopwith and Bristol firms have entered, and a formal entry for a full team of three has been forwarded to the Aero Club of France.



In connection with M. Blériot's candidature for the Seine General Council, as we mentioned last week, Blériot monoplanes were utilised for the dissemination of handbills and other election literature on behalf of M. Blériot. Above is seen one of the machines used at Buc, on the left being M. Blériot and in the pilot's seat M. A. Bidot, who piloted this 80 h.p. military machine in a 90 kilometre wind, the handbills being thrown out by Mr. T. Elder Hearn, who is also seen in the above machine.

FOREIGN AIRCRAFT NEWS.

A Height Record from Argentina.

BY cable from Buenos Ayres, we learn that on the 11th inst. George Newbery succeeded in getting up to a height of 6,220 metres on his Morane-Saulnier machine. Although this is higher than Legagneux's world's record of 6,120 metres, it cannot be recognised as a world's record, because it is not at least 150 metres more than the preceding record, which is the minimum required by the rules of the International Federation.

A Passenger Height Record in Germany.

THE height record for pilot and four passengers made by Garaix the other day was beaten by Thelen, at Johannisthal, on the 11th inst., when on an Aviatik biplane he took four passengers up to 2,850 metres. Garaix's record was 2,750 metres.

An Italian Passenger Record.

AT Turin, on the 10th inst., Sergeant Pettuzzi on a Maurice Farman biplane with 70 h.p. De Dion motor, and with a passenger, beat the Italian height record by getting up to 3,380 metres.

A Spanish Height Record.

SENOR DE POMBO HIBARRA, who last year made a fine flight from Santander to Madrid and has since started a flying school at Santander, last week beat the Spanish height record by going up to 3,000 metres. On Saturday week he made a flight of 120 kiloms. round Santander with a passenger.

The Duration Record Nearly Beaten.

ALTHOUGH it failed by the narrow margin of 20 mins. a splendid attempt was made on the 11th inst. by Langer to regain the world's duration record. Starting from Johannisthal he flew to Konigsburg, and was well on his way back when he had to stop owing to his fuel supply giving out at Kreuz near Posen. He had then been in the air for 16 hours. Ingold's record, referred to in last week's FLIGHT, was 16 hours 20 mins.

Pegoud at Buc.

ON Thursday of last week, Pegoud paid a visit to Buc and tested two Blériots, one a single seater fitted with a 50 h.p. Gnome, and the other a two-seater with an 80 h.p. Gnome motor. On both these machines he made some very fine flights, and showed that his looping and upside-down flying is now much more finished.

Testing a Parachute.

SINCE making some experiments with a parachute from one of the platforms of the Eiffel Tower about a year ago, M. Jean Ors has been searching for an aviator willing to take him up and allow him to throw himself from the machine in mid-air. Arrangements were at length made with Lemoine, who has a 100 h.p. Anzani-engined Deperdussin monoplane, and the experiment was successfully made at Juvisy on the 11th inst. With his parachute arranged under the *fuselage* and himself sitting in a temporary seat in the chassis of the machine, Ors was taken to a height of 300 metres and then threw himself out. The parachute quickly opened, and carried the daring experimenter safely to the ground in 40 secs. As far as could be seen, the balance of the machine was not seriously affected by being suddenly relieved of the weight of the passenger.

No More Looping Over Paris.

IN view of the fact that two aviators have recently looped the loop above the city of Paris, the police authorities have issued an order forbidding aviators when crossing the city to deviate from their normal flight.

Bielovucic Joins the Loopers.

HAVING obtained a Morane-Saulnier monoplane, with which he proposes to take part in the principal events of this year, Bielovucic has been practising upon it at Villacoublay. On the 12th he succeeded in looping the loop four times in succession.

PARMELIN'S FLIGHT OVER MONT BLANC.—A photograph showing a portion of this snow-clad height, over which M. Parmelin passed, a Deperdussin monoplane, on which the feat was accomplished, being seen in the photograph.

Night-Flying in France.

Spurred on by the splendid records which have been made in Germany, special efforts are being made in France with a view to regaining the world's duration record. A great deal of attention is being paid to the question of continuing to fly after dark, and on the 10th inst. Maurice Farman, with the Marquis de Lareinty Tholozan as passenger, started from Etampes at 8.45 p.m., and making his way by Chartres, the Gallardon valley, Rambouillet and Versailles, landed safely at Buc, after flying for 1 hr. 5 mins. He had flown over to Etampes from Buc earlier in the day in 1 hour. On the previous Sunday Maurice Farman made several trips after dark over the country round Etampes.

A Challenge by Chevilliard.

Before his departure for Egypt last week-end, Chevilliard issued a challenge to the winner of the Hamel-Garros match, which is announced to take place at Juvisy to-morrow (Sunday) afternoon.

Another Blériot Looper.

On Monday at Buc, Guinard, who was attached to the Greek forces during the Balkan war, and has recently been practising at the Blériot school, succeeded in looping the loop three times.

Death of Emile Brodin.

Emile Brodin, who served as an aviator with the Servian Army for some time during the Balkan war, died in the Isle of Adam hospital on the 3rd inst. from injuries received while testing a machine fitted with an automatic stability device, on the previous day.

Johannisthal Barred to Military Pilots.

In view of the several serious accidents which have occurred to machines when flying at Johannisthal, the German military authorities have forbidden any Army pilot from flying at the aerodrome for the present.

Marc Pourpe at Suez.

Continuing his travels in Egypt by aeroplane, Marc Pourpe on the 12th inst. started from Cairo and flew the 300 kiloms. to Suez.

Aerial Services for Egypt.

Considerable interest has been taken by Lord Kitchener in the flying of Marc Pourpe in Egypt. It is reported from Cairo that in response to a request from Lord Kitchener, Pourpe has drawn up a report on his flight from Cairo to Khartoum and back.

Turkish Officers Flying to Cairo.

Continuing their flight the two Turkish officers, Capt. Fethy and Lieut. Nouri, who are flying from Constantinople to Alexandria, reached Konia on the 11th inst., while the next day Capt. Fenti flew across the Taurus mountains and arrived at Tarsus, and on Sunday he reached Beirut.

Parmelin's arrival at Aosta, after crossing Mont Blanc, on his Deperdussin monoplane. A snapshot taken within three minutes of his touching earth.

Parmelin at Turin.

After his splendid flight across Mount Blanc, as recorded in our last issue, Parmelin intended to fly on from Aosta to Turin, but as during the next day there was no sign of the fog lifting, he decided to go on to Turin by train. He made some exhibition flights on his Deperdussin over the racecourse at Turin on Monday.

Flying Across the Straits of Gibraltar.

Two Spanish officers, Capts. Ortiz and Herrera, succeeded in flying across the Straits of Gibraltar on a Morane-Saulnier monoplane, on the 14th inst. They started from Tetouan and landed at Seville, where they delivered to King Alphonso a message from the Spanish Commissioner in Morocco.

Waterplane Contest for Norway.

Arrangements are being made in Norway for a competition for hydro-aeroplanes which it is proposed to hold in August next. The provisional programme is: August 22nd, Warnemunde to Copenhagen; August 23rd, Copenhagen to Aarhus; August 24th, rest; August 25th, Aarhus to Skagen; August 26th, Skagen to Gothenburg; August 27th, rest; August 28th, Gothenburg to Tonsberg; August 29th, rest; August 30th, Tonsberg to Christiania. The total distance would be about 900 kiloms. It is anticipated that the prizes will amount to at least £2,800.

Another U.S. Naval Aviator Killed.

The new headquarters at Pensacola, Florida, of the flying corps of the U.S. Navy has started under sad auspices. On Monday, Lieut. Murray was flying above the bay when his machine fell from a height of about 800 ft. and before help reached the unfortunate officer he was dead.

A New Balloon Record.

A balloon, piloted by the German engineer Berliner, left Bitterfeld, near Leipzig, on Sunday last, and eventually landed on Wednesday about 150 kiloms. beyond Perm, in Russia. The distance traversed is given as 2,850 kiloms.—a new world's distance record. The previous record was 2,700 kiloms. in 87 hrs., to the credit of Hugo Kaulen, who also started from Bitterfeld.

MR. HUCKS IN BIRMINGHAM.

It is evident that, among aviators, the Birmingham public regard Mr. B. C. Hucks as their own hero. His popularity in Birmingham dates from the summer of 1912, when at a few hours' notice he flew from London to Birmingham to take the place of another pilot who did not like the prevailing conditions.

Then, at the beginning of last year, Mr. Hucks gave further successful demonstrations at the Tally-Ho Grounds, and later on, although he was just beaten by Mr. Gustav Hamel in the cross-country race round the city, he had a great reception.

Last Saturday, he gave demonstrations of looping the loop and upside-down flying at the same *rendezvous*, and from the large attendance one could easily see how Mr. Hucks ranks in the estimation of the Birmingham public. The programme was timed to start at 2.45, and for a long time before then a ceaseless stream of motor cars entered the ground. In spite of the unfavourable weather, by 3 p.m. at least 20,000 people lined the enclosure. A 40-mile-an-hour wind was blowing, and it was gusty, too. At 3 o'clock Mr. Hucks had his 80 h.p. passenger-carrying Blériot wheeled out, and did some fancy flying, after which he took up as a passenger Mr. Norman Holder, son of Sir John Holder, and during the course of that flight circled Sir John's residence.

Then the looping Blériot was brought out, and Mr. Hucks quickly ascended to a height of 2,000 ft., where at different intervals he made a total of six splendid loops. Descending, he was accorded a most enthusiastic ovation. Later, he ascended once more on the looper, and starting from a height of 2,000 ft. and flying across the wind, made a series of six loops in quick succession. This is claimed to be the first time on record that the feat has been accomplished.

Mr. Hucks gave another demonstration on Wednesday last before a crowd of about 6,000. There was a gusty breeze ranging between 30 and 40 m.p.h. Mr. Hucks was up first on the two-seater, reaching, in a slight shower of snow, a height of 4,000 ft., and came down by a fine spiral *vol plané*. Afterwards he was up for 10 mins. on the looping machine, and made six loops, which carried his total number of loops to 170. He was then forced to land owing to a defect in the oil feed to the engine. He was unable to execute any more loops, but made a fine trip on the two-seater with a passenger over the outskirts of Birmingham.

Mr. Hucks to Visit Oxford.

On Thursday, Friday and Saturday next, the 26th, 27th and 28th inst., Mr. Hucks will be at Oxford. Exhibitions will be given each day, commencing at 3 p.m., from the Swimming Mead at the end of Whitehouse Road.

PROPELLERS.*

BEING A CO-ORDINATION OF SOME EXPERIMENTAL RESULTS AND THE DEDUCTIONS DRAWN FROM THEM.

By FRANCIS H. BRAMWELL, B.Sc., Associate Fellow.

THE material for this paper was collected for a written communication to the Research Committee for publication in the *Aeronautical Journal*, in the form of a brief annotated account of the work of a number of experimenters on the performance of the screw propeller in air and water; but, at the request of the Council, a month ago, the article has been re-cast in the form of a paper.

As can be readily understood, such a catalogue would be extremely boring to those who have so kindly come here to-night to listen, so that it was considered preferable to give only some general conclusions with sufficient experimental evidence to attempt to justify them. The short *résumé* has, however, been retained in the form of an appendix, for the use of those who desire to refer to it.

It is proposed to deal first with the question of corresponding speeds, which includes the consideration of how far results obtained in water or on model propellers in air or water may be taken as applicable to full-size air propellers.

The Application of the Laws of Similitude.—It is necessary, in order to make a strict comparison between the results obtained from any two propellers, that they should be exactly similar; that is, the one propeller should be, as it were, a photographic copy of the other, either larger or smaller.

This being so, the expressions for the thrusts of the two propellers, working in different fluids, are

$$t = \rho_1 \, l^2 \, v^2 \, f\left(\frac{v}{ln}, \frac{vl}{\gamma_1}, \frac{v}{V_1}\right)$$

$$\text{and } T = \rho_2 \, L^2 \, V^2 \, f\left(\frac{V}{LN}, \frac{VL}{\gamma_2}, \frac{V}{V_2}\right)$$

where l and L are any similar lengths in the two propellers, and may be taken as the diameters; v and V are their translational or forward speeds; and n and N their rotational speeds. ρ_1 and ρ_2 are the mass densities, and γ_1 and γ_2 the kinematic coefficients of velocity of the two fluids; V_1 and V_2 are the velocities of sound in the two fluids, these being a measure of the compressibility in the two cases. f is simply a general function of the three independent, non-dimensional variables $\frac{v}{ln}$, $\frac{vl}{\gamma}$ and $\frac{v}{V}$.

Similar expressions to the above can be written down for the torques on the two propellers.

These formulæ look sufficiently complicated to make it appear difficult to see how they can be simply applied. Some experimental evidence will be brought forward, however, to show that the dependence on the viscosity and compressibility is so slight as not to introduce any serious errors if it be neglected entirely; the experimental evidence available on this point is still somewhat scanty, but that which has been collected confirms this view.

Under these circumstances the above equations reduce to

$$t = \rho_1 \, l^2 \, v^2 \, f\left(\frac{v}{ln}\right) \text{ and } T = \rho_2 \, L^2 \, V^2 \, f\left(\frac{V}{LN}\right)$$

which may be re-written

$$\frac{t}{\rho_1 \, l^2 \, v^2} = f\left(\frac{v}{ln}\right) \text{ and } \frac{T}{\rho_2 \, L^2 \, V^2} = f\left(\frac{V}{LN}\right)$$

It now the propellers be compared, when they are revolving in a similar manner, which is expressed by the statement that v ÷ ln is equal to V ÷ LN, then it is seen that $\frac{t}{\rho_1 \, l^2 \, v^2} = a$ (a non-dimensional number) $= \frac{T}{\rho_2 \, L^2 \, V^2}$.

And under the same conditions we have for the torque $\frac{q}{\rho_1 \, l^3 \, v^2} = b$ (a non-dimensional number) $= \frac{Q}{\rho_2 \, L^3 \, V^2}$.

Also the efficiencies of the two propellers are the same, being $\frac{a}{2\pi b} \cdot \frac{v}{ln}$ and $\frac{a}{2\pi b} \cdot \frac{V}{LN}$ respectively, which are equal as v ÷ ln is equal to V ÷ LN.

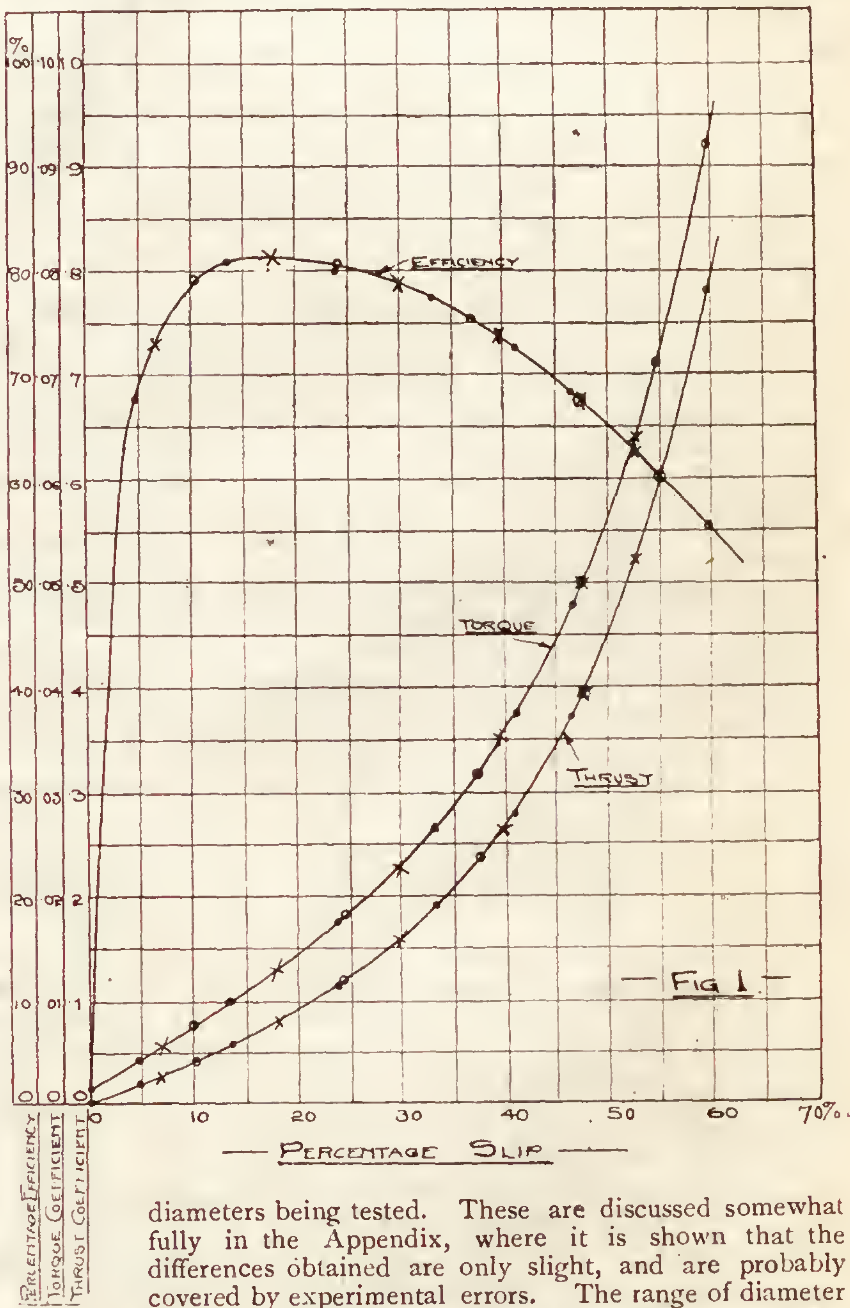
The use of these two non-dimensional numbers or coefficients is so convenient that it is desired to draw special attention to them. As has been pointed out, they are independent of the size and speed of the propeller, and also apply equally well to water and air, so long as the square law holds sufficiently well. They have also another special advantage; that is, being non-dimensional, they have the same values in any system of units, and are thus available for comparing directly the results of tests carried out in any country. The only essential is that the units employed must be consistent among themselves.

For expressing the results of static tests, or tests at a fixed point, where v is zero, two other coefficients are suggested; these are

$$a_0 = \frac{t}{\rho \, l^4 \, n^2} \text{ and } b_0 = \frac{q}{\rho \, l^5 \, n^2}.$$

Not only are these coefficients non-dimensional, but they are constant for similar propellers of any size and at any speed and in any fluid, so long as the square law holds sufficiently closely.

Evidence of Non-importance to Screw Propellers of Viscosity and Compressibility of Air or Water.—Turning now to the consideration of some of the experimental evidence supporting the view that the effects of the viscosity and compressibility of both water and air may be neglected in so far as they affect the performances of screw propellers, results obtained on similar propellers in water were published by D. W. Taylor in 1906, three sets of five propellers of different diameters being tested. These are discussed somewhat fully in the Appendix, where it is shown that the differences obtained are only slight, and are probably covered by experimental errors. The range of diameter in these experiments was three to one. Several experimenters have published isolated cases of comparison between two similar propellers working in air. Thus E. Dorand in 1910 gave particulars of tests, with two similar propellers, of 2·5 metres and 4·3 metres in diameter respectively, carried out on a moving carriage, at speeds up to 12·5 metres per second. He showed that the forces on the two propellers varied as the square of the speed and the square of the diameter very closely indeed, for the same value of the ratio $v \div ln$. G. Eiffel in 1911 also showed that this was true to a close approximation, but the precision of his experiments was sufficient to indicate a slight discrepancy in some cases. This discrepancy was chiefly attributable to the distortion of some of the propeller blades at high speeds; and it is interesting that the



— FIG 1 —

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* Abstract from a Paper read before the Aeronautical Society of Great Britain at the Royal United Service Institution, Whitehall, S.W., on February 18th, 1914.

results from two propellers of 2·97 ft. and 8·90 ft. diameter agreed almost exactly, when they were tested at the same tip speed, at which the deformations of the two propellers were the same. This can be shown very easily by a further extension of the method of dimensional equations.

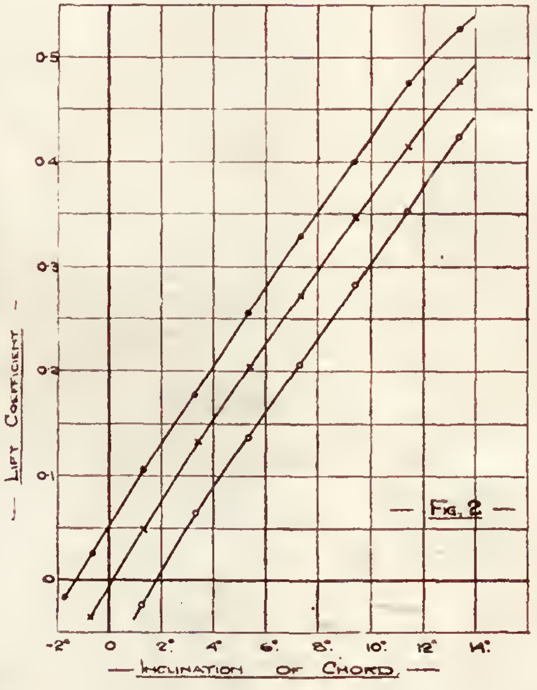
In the report of the Advisory Committee for Aeronautics for 1910–11, one comparison was given between the results of tests with a model propeller, two feet in diameter, on the whirling arm at the National Physical Laboratory, and with a similar propeller, 15 ft. in diameter, on Messrs. Vickers' whirling arm. The results showed very good agreement indeed. The speaker himself has not carried out any tests on similar propellers at different diameters, but has tested the same propellers at different speeds, which is exactly equivalent. The results of such tests on a particular propeller are shown in the following figure.

Here the thrust has been divided by $\rho l^2 v^2$ and the torque by $\rho l^2 v^2$. In the figure, curves of these thrust and torque co-efficients and of the efficiency have been plotted against the percentage slip, which is merely a function of the ratio $v \div ln$. The open circles refer to tests at a translational speed of 1,800 feet per minute, the crosses to 2,200 feet per minute, and the black dots to 2,600 feet per minute. It is seen that the points all lie extremely well on one set of curves, which shows that the departure from the square law is extremely small within the range of speed considered. It is admitted that this speed range is only small; but the experiments on this point are so few that every bit of evidence must be considered; and from a consideration of all the evidence available it is felt to be justifiable to say that there is none at present to indicate that any serious errors will be introduced if propellers are assumed to follow the square law exactly. This is especially so, as the difficulties in most propeller tests are so great as to make it very hard to discover experimental errors; and where slight departures from the square law have apparently been discovered, it is generally found that the experimental errors are very likely of the same magnitude at least. Before leaving the consideration of this figure, attention may be drawn to one or two points.

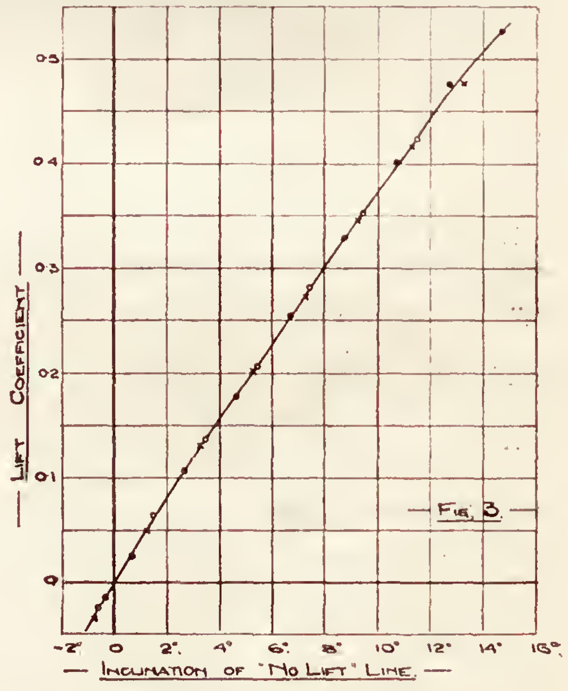
Relation between Efficiency and "Slip."—It is generally found that the higher the maximum efficiency of a propeller the less the value of the slip at which it occurs. This means that with a propeller giving a high maximum efficiency, the thrust corresponding to the conditions of maximum efficiency is so small that advantage cannot be taken of it in an actual aeroplane. From a consideration of the conditions under which the propellers on actual aeroplanes work, it has been found that the usual value of the thrust coefficient lies between 0·15 and 0·20; hence the efficiencies of different propellers should be compared when they are operating between these limits of thrust. The results given in the figure show that this particular propeller is very good in this respect, as the efficiency at a thrust coefficient of 0·18 is still 78 per cent. Another point, which might with advantage be impressed on many would-be inventors, is that for this propeller the maximum efficiency is about 82 per cent.; and there are probably very few aeroplane propellers in use at the present day that do not reach a maximum efficiency of 70 per cent., and an efficiency under working conditions of about 60 per cent. This tends to make one very suspicious of inventions claiming to improve the efficiency of propellers by any considerable percentage.

What is the "Pitch" of a Propeller?—It is now proposed to discuss briefly the question as to what should be taken as the pitch of a propeller; most people have their own views as to the meaning of this term, and this is one of the points on which the speaker expects to have to defend his conclusions against a number of criticisms. Therefore the arguments to show that the value adopted is the most rational one have been given somewhat fully.

If two propellers of the same diameter be tested, no details of the design being known in either case, and it is found that the thrust and efficiency are the same for each, at the same values of translational and rotational speeds; then a rational value of the pitch is defined as that value, which makes the curves of performance of the two propellers identical.



— Fig. 2 —



— Fig. 3. —

The definition of pitch adopted is that known as either the experimental mean pitch, the conventional pitch or the aerodynamic pitch, which is the advance per revolution of the propeller when it is giving no thrust. Another definition of pitch very largely used is obtained by considering the pressure face of the propeller only. Then if a narrow strip of the blade be considered at a distance, r, from the axis of the propeller and with the chord of the pressure face inclined at an angle ϕ to the plane of the propeller, the pitch of this strip is defined as $2\pi r \tan \phi$, which is the advance of the strip per revolution, when the pressure face only is considered as screwing itself into a solid medium. In most propellers used in aerial work this pitch is different at every radius, and thus a mean value has to be taken to express the pitch of the complete propeller. It is not certain how this mean should be taken, as the efficiency of the blade, from the point of view of thrust producing power, increases with the radius.

Now consider two propellers of the same diameter, with the pitch, as defined in this manner, the same in the two cases. But let one of them have thin blades and the other much thicker blades; then the performances of the two propellers, at the same value of the slip, will be very different in the two cases; and the value of the advance per revolution, to give no thrust, will also be very different.

It is very analogous to the case of two aerofoils for which the rate of increase of lift with angle is the same, but one starts to lift at a less inclination of the chord than the other. This is shown for three aerofoils in Fig. 2, where the lift coefficients, at the same wind speed, are plotted against the inclination of the chord to the wind direction.

If the lifts of these three aerofoils be compared at the same inclination of the chord to the wind direction, their performances are apparently not at all equal. But an inspection of the figure indicates that the performances are very similar, and this is brought out clearly if the curves are plotted against inclinations measured from the position of no lift. This has been done in Fig. 3, from which it is apparent that the behaviour of the three aerofoils is practically the same in the three cases.

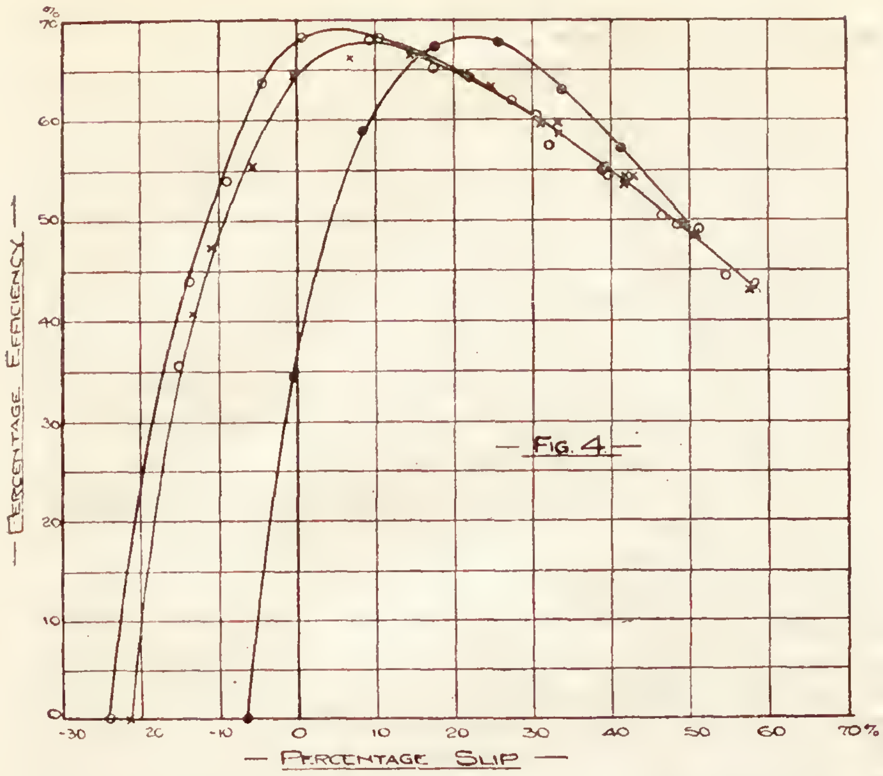
Similar reasoning applies to the case of propellers. In Fig. 4 are shown the efficiency curves obtained for three different propellers plotted against the slip determined by using the mean chord pitch. Here again, from a comparison of the efficiencies of the three propellers at the same value of the slip, there is apparently a large difference between them.

The curves have, however, been replotted in Fig. 5, using the experimental mean pitch to determine the slip; and from these it is seen that the efficiency curves are extremely alike, and there is very little to choose between the three propellers.

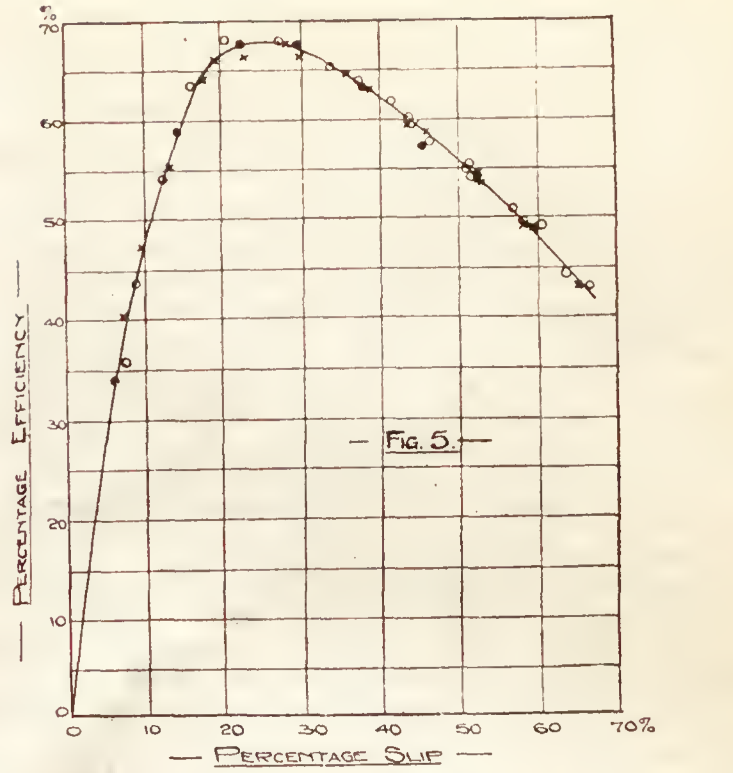
In Fig. 4 it is seen that the curves for two of the propellers are fairly close; this is merely because the blade sections are almost identical for these two propellers. The ease of comparison between different propellers, obtained by using this experimental mean pitch, chiefly accrues from the fact that the curves for all propellers are made to agree at one value of the slip, that is for zero value of the slip; at which value both the thrust and efficiency of any propeller are zero, which is itself an additional advantage.

Having now pointed out some of the advantages of the use of this value of the pitch, it remains to examine the objections that may be taken to it.

It is claimed that, when once the method of calculating the mean of the chord pitches of a propeller at the different radii has been determined, this mean chord pitch has one definite value for a given propeller; and it has been urged that the experimental mean pitch varies for a given propeller at different speeds. If this contention be examined theoretically, however, the equation previously given for the thrust $\left[t = \rho\, l^2\, v^2\, f\left(\frac{v}{ln}\right) \right]$ shows that the value of the ratio $v \div ln$ which makes the thrust zero at any speed, does so at all



— FIG. 4 —



— FIG. 5. —

speeds. And, therefore, if the square law assumptions hold with sufficient accuracy, the experimental mean pitch is constant; that is, it is a constant multiple of the diameter, in the same way as the mean chord pitch. Another way of putting the same thing is that the closeness of the experimental mean pitch to a constant value at different speeds is only a further indication of the degree of approximation to which the square law assumptions are true.

In the course of his paper before this Society last year, Mr. Low gave some figures taken from the Bulletin of the Koutchino Laboratory, which only showed a variation of ± 2·5 per cent. in the value of the experimental mean pitch over a considerable speed range; this variation is probably covered to some extent by experimental errors.

In the course of the propeller experiments carried out at the National Physical Laboratory, it has been found invariably that the experimental mean pitch for a propeller is constant within the limits of experimental accuracy for a speed range of 15 to 50 feet per second. Very little experimental data is available on this particular point, but that which has been quoted indicates that the departure from the square law is very slight under these conditions, and that the experimental mean pitch may be taken as constant for practical purposes.

Another objection advanced is that it is impossible to determine the value of the experimental mean pitch during the course of the design of a propeller. But recent experiments all tend to show that the value obtained by actual test differs very slightly from that obtained by calculation from the no lift lines of the various sections, which are used instead of the pressure face chords to determine a mean value of the pitch for design purposes.

Methods of Propeller Design.—It is well to give a little consideration to the various methods that are in use for designing propellers; these may be divided roughly into two groups. The first of these, which has been used for the design of almost all existing water propellers, is to design from previous experience. When a new propeller is required to work under conditions differing slightly from any previously encountered, a propeller that has actually proved itself to be successful under somewhat similar working conditions is chosen as a model. The new propeller is then designed by making slight alterations from this selected model. This method has proved very successful for marine propeller work, the only limitation in the method being that the variation made between any two successive propellers must, of necessity, be small. It must not be forgotten that there is, at the present time, a big difference between the sciences of marine and aerial propulsion, which difference is merely a question of the relative ages of the two sciences.

No doubt one of the chief reasons for the success of this method, when applied to the design of water propellers, is that the number of different propellers working successfully under various conditions is very large; and it is generally an easy matter to select a propeller that shall serve as a model for slight alterations or variations. But aerial propulsion is not yet in this happy state; the science is so new that there has not been time for sufficient data to accumulate to allow this method of design to be applied with certainty of success.

The Aerofoil Analogy.—The result has been that a new and more powerful method of design has been evolved by aeronautical engineers; this method may be termed the blade element theory. This was first developed by Lanchester and Drzewiecki, but has since been considerably modified by subsequent designers. The method is so well known and was so ably expounded by Mr. Low, in a paper read before this Society last year, that it is only necessary to mention the chief points at present.

The root assumption underlying the theory is that any small element of a propeller blade (cut off by two cylinders, concentric with the shaft) is subject to the same forces as an element of an aerofoil of equal length (cut off by two planes parallel to the wind direction), the resultant velocity of the element and the inclination of the element to the direction of the resultant velocity being the same in the two cases. In the case of the propeller blade element the velocity considered is the resultant of the translational velocity and the peripheral velocity at the radius of the element. It is immediately apparent that this is a very far-reaching assumption, and it is now necessary to investigate to what extent it is justified by the results obtained. This practical test, as to whether the method gives satisfactory results when carefully applied, must always finally decide the application of theories of this kind.

The method, as developed by Drzewiecki and others, goes a little farther than the above assumption. It is shown that the efficiency of a propeller will be a maximum, when every element is inclined at such an angle to the direction of its resultant motion that, if used as an aerofoil, it would give a maximum value for the ratio of lift to drag. Hence it has been usual to assume a sort of mean section for the propeller blade; and from experiments on aerofoils in a wind channel, to determine the inclination of this mean section, such that it will give a maximum value of the ratio of lift to drag.

The propeller is then so designed that, under its working conditions, every element of the blade is inclined at this best angle of attack to its resultant velocity, so that under these conditions the over-all efficiency of the propeller shall be a maximum. The forces on each element can then be determined and the total force on the propeller blade be obtained by integration. In Mr. Lanchester's method the integration is graphical in order that the width of the blade may be varied to fit in with other considerations. Drzewiecki, however, worked out his equations on the assumption of a blade of constant width; and Mr. Low last year showed us the equations with the width of the blade expressed as a function of the radius. The object in both these cases was evidently to obtain expressions for the forces on the elements of the blade that could be integrated without resource to graphical methods.

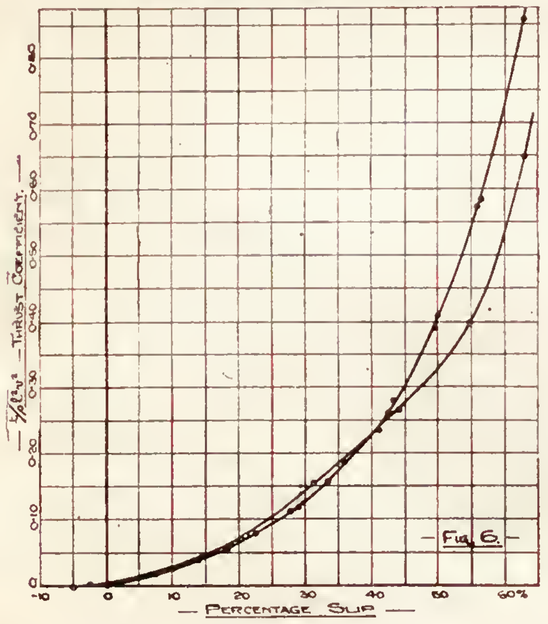
The speaker would like to put in a plea for a further extension of the method, as one strong objection to the method in its present form is that the section of a large portion of the blade must differ very considerably from the mean section taken; this is necessary from considerations of strength and stiffness. But results of tests on so many aerofoils, of very widely varying sections, have now been published, that it should not be difficult to pick out a series to represent almost any propeller blade at various points along the radius. The resultant force on the blade could then be obtained by graphical integration with a much closer approximation to its actual value than is possible by the method of taking a mean section for the blade. If this source of error be eliminated in this manner, the comparison between the forces obtained on a propeller and those obtained by integration from the results of tests on the appropriate sections in a wind channel would be a determination of the extent to which the root assumption mentioned is justified by experiment.

The Aerofoil Analogy Tested by Experiment.—In order to test this the speaker carried out a series of experiments last year at the National Physical Laboratory; the detailed account of these experiments will be published very shortly now in the Report of the Advisory Committee for Aeronautics.

The propeller used was two-bladed and two feet in diameter; only one set of blades were used, but these were mounted so that they could be rotated, and the tests were carried out with the blades in four positions. The propeller was very similar in design to the Normale propellers, such as are designed for Messrs. Ratmanoff Frères by Drzewiecki. For the purpose of most of the work, the use of four positions of the blades was equivalent to the use of four distinct propellers, and yet errors in workmanship between the different propellers were eliminated by this means. The mean section of the blades was such that the maximum value of the ratio of lift to drift was obtained with the chord inclined at approximately 4° to the resultant velocity. The propeller was so designed that, at one particular value of the ratio of speed of translation to speed of rotation, the chords of all parts of the blades were moving parallel to their resultant velocities.

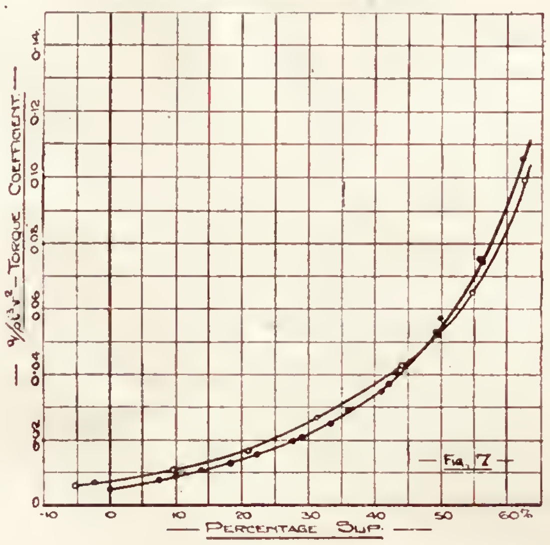
Tests were carried out with the blades in this position, and also with the blades rotated successively through 4°, 8° and 12°. Then for the one particular value of the ratio of the speed of translation to speed of rotation, all parts of the blades were moving with their chords inclined at 4°, 8° and 12° respectively to their resultant velocities. Then according to Drzewiecki's equations, the propeller should give its maximum efficiency with the chord of every portion of the blade moving at 4° to its resultant velocity.

—THRUST-SLIP CURVES—



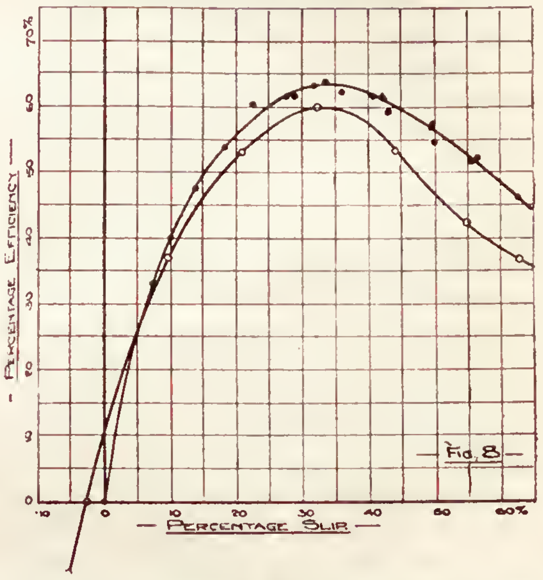
—Fig. 6.—

—TORQUE-SLIP CURVES.—



—Fig. 7—

—EFFICIENCY-SLIP CURVES.—



—Fig. 8—

From the tests on the four propellers, it was found that one with an extra angle of approximately 9° gave the maximum efficiency; but a consideration of the results showed that, when this propeller was giving its maximum efficiency, the angle of attack of the whole of the outer half of the blade varied by less than one degree from the theoretical value of 4°; and the further work carried out showed that the effect of the blade inside half radius was only a small fraction of that of the outer half. Also the whole difference in the maximum efficiencies of the propellers with the extra angles of 4° and 9° was only 2·5 per cent. Therefore, in this respect, the tests indicated that the agreement was quite reasonably close.

In order to complete the more exact comparison on the lines already suggested, a series of aerofoils were made to exactly the same sections as those employed for the propeller blades. Six sections in all were made and tested, these being taken at every two inches of radius of the propeller. In order to eliminate errors of workmanship as much as possible the same templates were used in the manufacture of the propeller blades and of the aerofoils. Also, to avoid the effects of distortion on the propeller blades, no attempt was made to design the most efficient propeller; but the blades were made sufficiently stiff not to suffer any appreciable distortion during the tests, although a more efficient propeller could have been designed by adopting thinner blades.

As is well known, the aspect ratio of an aerofoil has a very considerable effect on the values of the forces obtained on it at any particular speed, so that it was necessary to make some assumption with regard to the aspect ratio to be adopted for the aerofoils. This was done somewhat arbitrarily by making each aerofoil of the same width as the propeller blade at the appropriate section, and 1 ft. long, that being the length of one propeller blade.

These six aerofoils were then tested in the wind channel, and measurements made of the lift and drag forces for different angles of attack, in a wind of 30 ft. per second. From these figures the forces on the blades were obtained by graphical integration for the four propellers at various values of the slip. Allowance was of course made for the different speeds of the various sections. In making the calculations, reliance was not placed on the designed inclinations and angles of attack of the various sections, but the actual inclinations of the blades at the various radii were accurately measured up, both before and after the tests, and the mean values so obtained were used in the calculations. This eliminated errors due to the warping of the blades, either from the forces on them during the tests or from damp and temperature changes in the atmosphere.

It is not proposed to give here the detailed results of these experiments, but Figs. 6, 7 and 8 have been prepared to show the type of agreement obtained on one particular propeller.

These show the values of the thrust and torque coefficients and the efficiency plotted against the slip. The black dots are the experimental values and the open circles the values obtained by integration. In order to make the comparison correct, the same value of the pitch has been used in determining the slip for both sets of results; for this purpose it is immaterial what particular value is used, so long as it is the same in the two cases, for the conditions are fixed by the ratio of the speed of translation to the speed of rotation, and the pitch is merely a convenient factor in the reduction and presentation of the results.

From the curves it is apparent that the agreement is not exact; but as it has been generally stated by several experimenters that Drzewiecki's theory is in good agreement with experimental results, it appears necessary to examine whether such discrepancies as are here apparent would be detected by any method of comparison previously applied. In the first place, it is not necessary to make the comparison over the whole range of slip, as, from consideration of the conditions under which the propellers on actual aeroplanes work, it has been found that the usual value of the thrust coefficient lies between 0·15 and 0·20; this limits the range for comparison very considerably. It is seen that the efficiency discrepancy is chiefly due to the calculated torque being greater than that obtained by experiment. It is believed to be usual for propeller designers to allow in their calculations for these discrepancies by making fixed percentage corrections to the values of the lift and drag coefficients obtained from experiments on aerofoils.

There is one other point that is of interest in this respect which can be best illustrated by means of a concrete example. Suppose the propeller, the results for which are shown in the figures, to have been designed to give a thrust coefficient of 0·164 at a slip of 32·5 per cent., and let the engine speed corresponding to this slip be 1,150 revs. per minute. An inspection of Fig. 6 will show that under these conditions the actual thrust coefficient obtained would only be 0·150. If, however, the engine speed be allowed to run up until the slip is 34·0 per cent., the required thrust coefficient of 0·164 will be obtained. The new engine speed under these circumstances will be

$$1{,}150\left(\frac{1-0{\cdot}325}{1-0{\cdot}340}\right) = 1{,}176 \text{ revs. per minute.}$$

In other words, the increase of thrust of 9·3 per cent. has been obtained by an increase in the engine speed of 2·3 per cent. It would be easy to suppose that there was very close agreement between the calculated and experimental values under such circumstances, or if the matter be regarded from another point of view the discrepancies between the calculated and observed values are not of great importance, as a small variation in engine speed will bring the thrust coefficient to the required value. If the engine had been designed from the calculated values, it would have to be run with the throttle slightly closed, as the experimental efficiency would be higher than that calculated.

Causes of Discrepancies in Test Results.—It is well to note a few of the most obvious causes of the discrepancies that are observed in these tests. In addition to the question of aspect ratio, which has already been mentioned, the air speed in the channel experiments was only 30 ft. per sec. or 1,800 ft. per min.; whereas the resultant velocities of some of the sections were very high (the tests being carried out at translational speed of 1,800, 2,200, and 2,600 ft. per min., with, of course, much higher values for the peripheral speeds of the blade tips); this may account for some of the reduced efficiencies.

On the other hand, it is more probable that most of the discrepancies are due to the centrifugal forces on the air in contact with the blade; this must alter the character of the flow round the blade very considerably, and it is perhaps a matter for surprise that the agreement between the calculated and experimental values is as close as it is, and not that they do not agree exactly. In the complete account of the tests some further minor comparisons were made; but perhaps enough has now been said to show that, although the method is not strictly correct, yet in the hands of a careful designer it is probably by far the best method that can be used for the design of aerial propellers, in the present state of knowledge.

In the appendix already referred to, the author gives a connected summary of the results obtained in experiments with the screw propeller in water by Froude, Taylor and Durand, and in air by Turnbull, Bejeuhr, Dorand, Riabouchinsky, Eiffel, and at the National Physical Laboratory. The conclusions which may be drawn from Durand's tests in water are given in the experimenter's own words for comparison with the author's summary of the results obtained from the N.P.L experiments in air.

Durand concluded that:—

(A) The general character of the efficiency curve for varying slip, the pitch ratio and area being constant, is well known . . . , such curves . . . indicate a low value of the efficiency for low values of the slip, rising to a maximum in the neighbourhood of 20 to 25 per cent., and then falling off more gradually for increasing values of slip.

(B) In general there is an indication that the propeller of very small area reaches its efficiency at a relatively high slip, usually 25 per cent. or over; while that of large area reaches its best at about 20 per cent. and slightly below.

(C) The highest values seem, furthermore, to be only slightly dependent on either area or pitch ratio; by far the larger number of the propellers under test reaching, at some value of the slip, an efficiency close to 70 per cent., with, in general, the best results for fairly high values of the pitch ratio and moderate areas.

(D) In general, propellers of high pitch ratio reach their best efficiency at a somewhat higher slip than those of low pitch ratio.

(E) For low values of the slip, such as 10 to 15 per cent., and low pitch ratios, increase of area is accompanied first by increase in efficiency and then by some falling off; while for higher values of the pitch ratio and low slip there is a general improvement of the efficiency up to some value at which it remains nearly stationary.

(F) For high values of the slip there is, in general, a continuous though slow decrease in efficiency with area through the range under investigation.

(G) Intermediate between these extremes we find, for moderate values of the slip, but slight change of efficiency with area.

(H) For propellers, lying within the more common ranges of pitch ratio and area, and operating at values of the slip between 20 and 30 per cent., it appears that the efficiency will vary but slightly over the midfield range thus indicated, and that any proportions corresponding to operation within these general limits may be freely chosen without fear of any important drop in efficiency below the limits of 68 or 70 per cent.

The general deductions made from the N.P.L. tests are as follows:—

(A) The efficiency-slip curves are of a similar shape to those found for water propellers; the maximum value of the efficiency occurs at a value of the slip between 20 and 30 per cent.

(B) A propeller of width ratio 0·22 reaches its maximum efficiency at a slip of 25 per cent.; while a similar propeller of width ratio 0·55 reaches its maximum efficiency at a slip ratio of 20 per cent.

(C) In this series of tests the total variation of efficiency is small. The maximum value of the efficiency in all cases lies between the limits of 71 per cent. and 77 per cent., with, in general, the best results for fairly high values of the pitch ratio and moderate areas.

(D) In these tests the slip at which the propellers attain maximum efficiency appears practically independent of the pitch. (Subsequent work shows, however, that, in general, the propellers of higher pitch attain maximum efficiency at a less value of the slip than those of lower pitch.)

(E) At a slip of 20 per cent., and a pitch ratio of 0·675, a width ratio of 0·30 gives an efficiency of 65·8 per cent., and a width ratio of 0·47 gives an efficiency of 69 per cent. (As only two values of blade width were tested at this pitch, it is impossible to say whether this is in agreement with the results on water propellers or not.) At a slip of 20 per cent. and a pitch ratio of 0·80, a width ratio of 0·30 gives an efficiency of 73·9 per cent., and a width ratio of 0·47 gives an efficiency of 70·8 per cent.

(F) No comparison has been made for slips higher that 30 per cent.

(G) The changes of efficiency with area are fairly small at all places.

(H) This statement for water propellers may be paraphrased, in view of the present series of tests in air, as:—A propeller may be designed of any reasonable form, pitch, and area, lying within the range of common practice, without danger of the efficiency falling outside the limits of, say, 65 and 75 per cent., although it may attain to a value of, say, 77 per cent.

[Recently, a considerably higher efficiency than this has been obtained, the value being approximately 82 per cent.]

The author observes that a detailed comparison of the above conclusions with the corresponding conclusions drawn by Durand from the results of his tests in water, shows to what a remarkable degree the same conclusions apply to the results obtained in the two different media; and as a result of a very careful consideration of all the available experimental information on propellers, the following brief summary of general conclusions was drawn up:—

(1) The "square law" assumptions are obeyed very closely indeed by propellers, so that the results of model tests and of tests in water may be applied directly to full-size propellers in air.

(2) The method of design usually adopted for air propellers (*i.e.*, considering the blade as an aerofoil) is sufficiently accurate to give good results in the hands of a careful designer.

(3) The best ratio of blade width to radius of propeller appears to be about 0·30. This figure may require considerable modification, as a remarkably high efficiency has been obtained with a four-bladed propeller, having a blade width ratio of only 0·12.

(4) The ratio of pitch to diameter of propeller to give maximum efficiency appears to be anything between 0·8 and 1·4. This is the value that gives the maximum efficiency, but it will probably be found better to use a propeller of less pitch ratio, as the coarse pitch propellers give their maximum efficiency at such a low value of the slip; so that the thrust corresponding to maximum efficiency is too small to enable advantage to be taken of the maximum efficiency on actual aeroplanes.

(5) The propeller should have narrow blade tips, for most efficient working, and to avoid vibration.

(6) Attention should be paid to the shape of the back of the blade; the section of the blade should be such that, if used as an aerofoil, it would give a high value of the ratio of lift to drag.

The paper concluded with a list of published papers and articles dealing with the subject of screw propellers in water and in air.

A Lecture on Aviation.

ARRANGEMENTS have been made by the Essex Motor Club for a lecture on "Aviation" to be given by Mr. J. H. Ledeboer, in the Associates' Room of the R.A.C. in Pall Mall, S.W., on Thursday next. The meeting will commence at 8 p.m., and the Committee will welcome any visitors who are interested. Special attention will be paid by the lecturer to the subject of wind pressure and the resistance of moving bodies.

The D.F.W. at Farnborough.

THE D.F.W. machine, which was flown over to Farnborough last week to show off its qualities to the War Office representatives, after having gone through its evolutions, was flown back by Herr Roempler to Brooklands without incident.

Another New Zeppelin Ready.

THE twenty-third Zeppelin airship to be built at the Friedrichshafen works is now ready for her trials. When these have been completed the vessel will be taken over by the military authorities and numbered Z8. She will be temporarily stationed at Treves until the new station which is being built at Dusseldorf is ready.

A New Clement-Bayard Airship.

THE French military airship previously known as the "Clement-Bayard VI," and now re-named "Eugene Montgolfier," paid a visit to Paris on Monday. Leaving Lamotte Breuil at 9 a.m. she passed over Issy two and a quarter hours later, and after circling above Paris, returned to Lamotte Breuil, where she was safely docked at 1.30 p.m.

Models

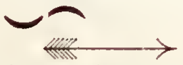
Edited by V. E. JOHNSON, M.A.

Mr. F. Handley Page's Lecture: The Discussion.

MR. H. H. GROVES asked the lecturer: (1) What was the real cause of failure in full-sized Canard-type machines; (2) Why should there be end losses in a plane (or wing), since the air is sucked in, in the case of a propeller, and a plane is analogous to a propeller with an infinite radius.

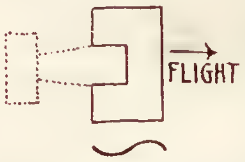
Mr. G. P. Bragg-Smith said he quite agreed with the lecturer, and considered that he had set a good example in recognising that the model had a scientific value. In dealing with the discussion, he thought that although he held different views with regard to lateral stability, he was certainly not confined to the idea that there was only one way of obtaining it. As regards experiments with gliders, undoubtedly they were of scientific value; but he thought that experiments with a model fitted with a propeller had a greater value, since such enabled you to take into account the propeller thrust, which was one of the most important factors to be reckoned with in a full-sized machine. Taking the case of an automatically controlled aeroplane, the effect of the propeller if placed in the correct position in the vertical plane, which he considered is such that the centre of pressure, centre of gravity and centre of propeller thrust are in a line, then when the propeller stopped, the machine automatically assumed its gliding angle. He quite agreed with Mr. Handley Page's remarks *re* propeller behind, and he also believed that if the Canard type of machine were fully developed it would prove far superior to the ordinary type of full-sized machine, with its large plane forward. One reason why the propeller is best placed absolutely in the rear is that the propeller draught not coming in contact with any tail planes, did not affect its stability. In conclusion, he was convinced that the model would prove of greater value in aeronautics, if its lessons were properly appreciated than in any other engineering science, and that, had manufacturers paid more attention to it and recognised its merits, they would have saved themselves a considerable amount of trouble and expense.

Mr. F. Mayer: Mr. Handley Page had said that the aim of many designers of stable aeroplanes was the ultimate production of a machine without either front or rear stabilizing planes, with the necessary outrigger or body to support them. The lecturer spoke of having made a step in this direction in his experiments at Hendon, when the *empennage* of the Handley Page biplane was removed. The speaker had also made some experiments with the same idea in view. The main surface of the models experimented with was of the double curve or S section.



Direction of flight.

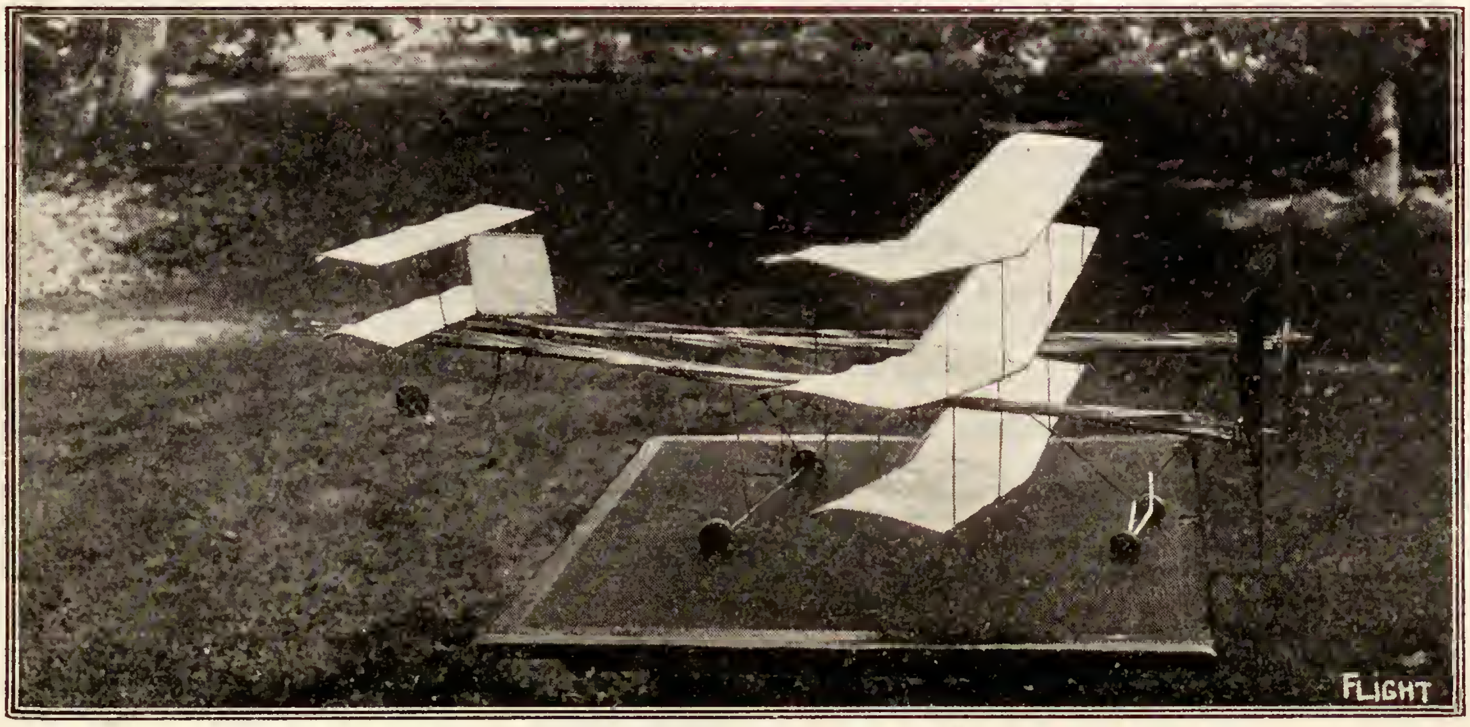
He found that he was able by such means to produce very stable gliders of 3 to 10 ozs. in weight. These gliders were quite a success without the use of either any front or rear elevator or damping surface. The next step was the building of a power-driven model fitted with one of his early petrol motors, which it was hoped would possess the same characteristics. After a few adjustments and experiments the model did actually fly, but so many difficulties were met with that we were forced to take a backward step and fit a tail plane. This had the effect desired—*i.e.*, the resultant model flew well, but the tail plane completely upset the stability of the ⌣⌢ curve of the main plane, so we removed the turned-up back edges of the main plane, which were really large flaps, and had then left a plane of the ordinary camber. This was found to be an improvement so far as stability was concerned. It seemed as though the ⌣⌢ sectioned main plane on their own account were very stable, but in conjunction with a tail the stability did not appear to be nearly so good. Referring to the question of weight carried per unit area at a given speed on large and small planes, Mr. Mayer said he had tried two models—one a power-driven one, and the other a model driven by rubber. The rubber-driven model was exactly a quarter the size of the other, and both flew at almost exactly the same speed, which, as near as could be measured, was about 17 miles per hour. The large model carried from 2 to 3 oz. more per square foot than the smaller one. This he partly put down to the fact that the angle of incidence of the rubber model was rather larger than is usual for models of this kind. Both models flew at the same time and in the same attitude. The plan of the surfaces of the S curve model was as per rough sketch.



How Long Ought Rubber to Last?

A correspondent writes as follows: "Could you kindly tell me how long model aeroplane rubber ought to last? I use ¼-inch strip rubber (8 strands), and I have tried several lubricants, but can never get the rubber to last more than a week or two, sometimes the strands burst separately, but several times all eight strands have gone simultaneously, after only being in use a day or two. The rubber used was quite new, and seemed in good condition. My model is 30 ins. long, and I never wind my rubber motor up more than 450 turns. The rubber does not go near the hooks, so these cannot have worn; it generally breaks in the middle. I should much like to know the best way of preserving it and how long it ought to last?"

Your rubber under such circumstances as the above ought to last quite a good time, with care. We can only conclude it is not good rubber. Refuse any and all rubber which when bought will not stretch to *at least* eight times its own length without fracture; in other words you should be able to pull out a piece some 3 ins. long to a length of about 24 ins. I have just performed this actual experiment with some (unused) rubber which I have had for nearly a year (kept in a tin).

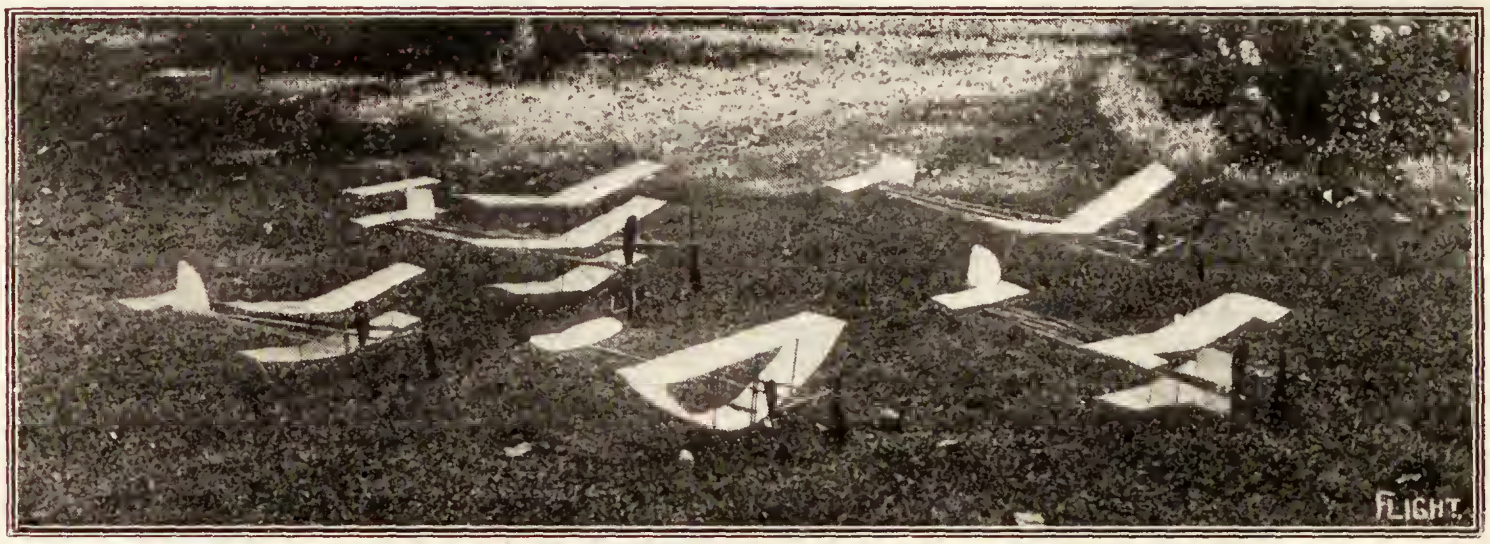


Large triplane model by Mr. L. S. Wyatt.

If your lubricant contains any grease or vaseline, it will, of course, quickly ruin your rubber. Harmless recipes have been given in back numbers. The rubber must be *well* lubricated. After you have been out flying your model, remove the rubber and keep it in an air-tight tin. Never leave it in the sun any longer than you can help. Keep the tin in a *cool* place. Use valve tubing over your rubber and propeller hooks. You get rather better results weight per weight with strip than square-sectioned rubber, but the writer's experience is that the latter is more durable. Don't join your rubber by tying knots in it, but by means of thread. Overlap the two ends for about an inch, get someone to pull or stretch these as far as possible and tie *when stretched*. Trim the ends with a pair of scissors.

A Large Triplane Model.

A correspondent, Mr. L. S. Wyatt, sends us the following interesting particulars of a somewhat uncommon type of model. The model is all steel except the motor rods, which are bamboo. Chief dimensions: Total length 40 ins., span of main plane 30 ins. Chord 4·5 ins. Gap 4 ins. Elevator, span 12 ins., chord 3·25 ins., gap 3 ins. Propellers 10 ins. in diameter and 22-inch pitch. Middle plane set at negative angle; the others at a slight positive angle of incidence. Motors, twin gear of 12 strands of ¼-inch strip rubber; centre of gravity 2 ins. in front of the leading edge of the main planes. Average flight 150 yards off the ground. Weight 1 lb. 2 ozs. The model is very stable and flies quite straight.



A few of Mr. L. S. Wyatt's models.

Mr. Wyatt also sends the following particulars of another triplane constructed by him: Length of fuselage 38 ins., A-frame design, material bamboo. Span of two top planes 30 ins., of the lower 22 ins. Chord 4·75 inches. Double elevator 12·5 by 3·25 ins. The trailing edge of the elevator is mounted on two wire bridges, the front pair of uprights being carried down through slots, for elevation purposes. Diameter of propellers 10 ins., pitch 22 ins., each worked by ½-inch gear wheels. Four strands of ¼-inch strip rubber to each wheel, making 16 strands in all. Weight 15 ozs. As in the other model, everything is steel save the motor rods. The wheels are turned from solid blocks of red fibre. Four of them weighing ¼ oz. The model rises after a run of about 15 ft. and flies rather low for an average distance of 100 yards. I am fitting floats for trials off the river Ouse. This is my 25th successful motor.

Aero Silk for Models.

We have received from Mr. G. P. Bragg-Smith some samples of his latest aero silk fabrics for models. Mr. Smith informs us that Mr. Louch, whose model made the as yet unbeaten records of 2 mins. 49 secs., was covered with this fabric, and that it is also used by Messrs. Slatter, Houlberg, and several other record holders. Personally, the writer has almost invariably used one of these fabrics, and found them perfectly satisfactory in every respect. We certainly know of none better.

Messrs. J. J. Griffin and Son's Catalogue.

The above firm, of Kemble Street, Kingsway, London, send us a copy of one of their catalogues of scientific apparatus. The book, which consists of over 1,000 pp., and an enormous number of illustrations, is entitled "Scientific Handicraft," and deals fully with all kinds of scientific physical apparatus as well as tools. As we have before remarked, the science of aeronautics is so intimately bound up both in theory and practice with the other physical sciences, that a more or less intimate knowledge of other branches besides those of an aerodynamical nature are essential if real progress is to be made. The only real, safe and sure knowledge is that founded on experience, based on experiment. For experiments we must have apparatus either purchased or home made. In the pages of the volume referred to is a veritable mine of information concerning all sorts and kinds of experimental scientific apparatus, which cannot fail to be of the greatest use to anyone carrying out any scientific work, no matter of what kind.

How to Determine the Static Thrust of a Propeller.

A correspondent writes asking the best way to ascertain the above. One of the best is probably the following: Mount the propeller on the shaft of an electric motor, of sufficient power to give the propeller up to 1,500 r.p.m. if of fine pitch. If coarse, say half that number; a suitable accumulator or other source of electrical energy will be required; also a speedometer or speed counter, as well as a voltmeter and ammeter; a stop-watch is also very useful.

Place the motor on a pair of scales or on a suitable spring balance (the former for preference), the axis of the motor vertical, with the propeller attached. Rotate the propeller so that the air current is driven *upwards*. When the correct or desired speed (as indicated by the speedometer and a watch) has been attained notice the difference in the readings if a spring-balance is used, or, if a pair of scales, place weights in the scale pan until the downward thrust of the propeller is exactly balanced. This gives you the thrust in ounces or pounds.

Note carefully the voltage and ampèrage. Let us suppose the former 8 and the latter 10 = 80 watts; remove the propeller and note carefully the number of volts and ampères consumed in running the motor alone; that is, to excite itself and overcome friction and air resistance, suppose this to be 8 volts and 2 ampères = 16; the increased load when the propeller is on is therefore 80 − 16 = 64 watts. All this increased power is not, however, expended on the propeller. The lost power in the motor increases as C^2R, where R is the resistance of the armature and C the current. If we deduct 10 per cent. for this, then the propeller is actually driven by 56 watts. Now 746 watts = 1 h.p. $\therefore \frac{56}{746} = \frac{1}{13}$ h.p. approx. at the observed number of revs. per min.

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration ...	D. Driver...	... 85 secs.
Twin screw, do.	Distance ...	R. Lucas ...	... 590 yards.
	Duration ...	G. Hayden	... 137 secs.
Single screw, rise off ground	Distance ...	W. E. Evans	... 290 yards.
	Duration ...	W. E. Evans	... 64 secs.
Twin screw, do.	Distance ...	L. H. Slatter	... 365 yards.
	Duration ...	J. E. Loucb	... 2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance ...	C. C. Dutton	... 266 yards.
	Duration ...	J. E. Louch	... 91 secs.
Do., off-ground	Distance ...	C. C. Dutton	... 190 yards.
	Duration ...	J. E. Louch	... 94 secs.
Single screw hydro., off-water	Duration ...	L. H. Slatter	... 35 secs.
Single-tractor, do., do. ...	Duration ...	C. C. Dutton	... 29 secs.
Twin screw, do., do. ...	Duration ...	L. H. Slatter	... 60 secs.

Gift of Trophies.—The Council desire to thank the President and his wife (Sir John C. Sbelley and Lady Shelley) for their gift of valuable trophies for competition during 1914. Sir John's is for power-driven aeroplanes, and Lady Shelley's is for power-driven hydro-aeroplanes; both trophies are to be won outright, and are not challenge trophies. They will be on show at Olympia.

Kite Section.—The committee of the Kite Section desire to thank Major B. Baden Powell for the gift of a kite winch and cable for use with the No. 1 Section of the Volunteer Kite Squadron.

Wellcome Scientific Expedition.—A letter has been received from the Sudan stating that good kite work has been done by a member of the expedition, and some very interesting photographs, &c. have been obtained. Fuller details will be published, and a lecture given, if possible, on his return to this country This will be interesting news to the Kite Section.

Aero Show.—As a great number of letters have been received on the loading question, the Hon. Secretary wishes to state for the guidance of exhibitors that the total projected area will count with exception of vertical fins, but Mr. Johnson has kindly consented to deal fully with this in his Model columns.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (N. Branch) (27a, Sedgemere Avenue, East Finchley, N.)

Feb. 21st, flying at Finchley 3 p.m., and Feb. 22nd, 10 a.m.

Leytonstone and District Aero Club (64, Leyspring Road).

Feb. 22nd, flying Wanstead Flats, 10 a.m. If wet meet at club room. If there are any members who have not sent in their entry forms for Olympia, will they please send same to the Secretary at once, as it is necessary he should apply for sufficient space.

Paddington and Districts (77, Swinderby Road, Wembley).

Feb. 21st, flying at Sudbury.

UNAFFILIATED CLUBS.

Edinburgh Aero Club (13, Hermand Terrace, Edinburgh).

It has come to my notice that several communications which have been addressed to "The Secretary, Edinburgh Aero Club" have not been delivered by the Post Office owing to the above address being a common stair, and it appears to be one of the Post Office regulations that no such communication can be delivered unless addressed to individuals. Will anyone who has had any communications returned please address them to me, John T. Ramsay, Hon. Sec., personally?

Finsbury and District (52, Lambton Road, Hornsey Rise, N.).

Feb. 21st, flying at Finsbury Park (kite ground), 3 p.m. Feb. 28th, competition meeting, commencing 3.30 p.m.

Ilford Model Ae.C. (83, Endsleigh Gardens, Ilford).

The first annual social and dance of the above club will be held at the Kensington Hall, on Wednesday, March 4th, 1914, at 7.30 p.m. sharp. Tickets: Singles, 1s. 6d.; doubles, 2s. 6d. Tickets can be obtained from the Secretary. Feb. 22nd, flying at Newbury Park 10 a.m. (weather permitting).

S. Eastern Model Ae.C. (1, Railway Approach, Brockley).

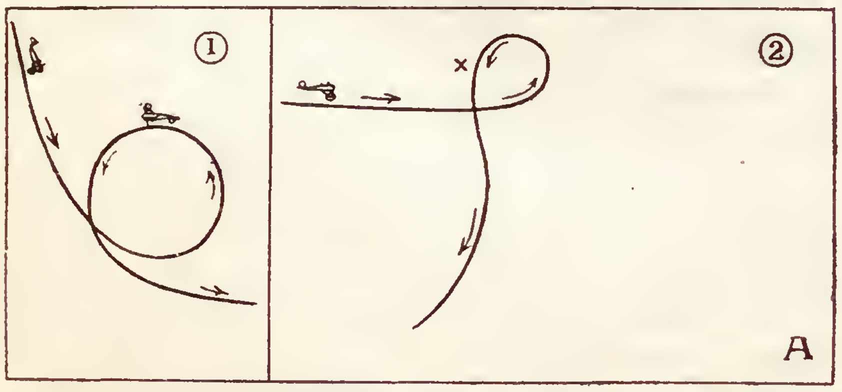
Feb. 21st, at Woolwich Common, 3 p.m. to 5 p.m.; 22nd, at Blackheath, 8 to 10 a.m.; 22nd, at Lee Aerodrome, 10.15 a.m. to 12.30 p.m.

* * * *

CORRESPONDENCE.

Looping the Loop.

[1839] I was very interested in Hamel's performance before the King at Windsor on Monday, February 2nd; but although it was certainly a very thrilling show, it was not quite what I expected. From what I have gleaned from various papers, including FLIGHT, I think I have understood that "looping the loop" was, as seen in Diagram 1—a steep nose-dive, flattening out, climb, upside down, and another dive. But, as far as I could see, Mr. Hamel did not do the above, but something like what is seen in Diagram 2—no dive, but a sudden climb, upside down, dive and flattening out. To an observer at A, when he reached the point X, the plane was certainly upside down, as could be seen by the white circles. He seemed to fly along quite steadily, then sort of jerked the machine over his head, fell and dived. I should be much obliged if you could enlighten me on this point, and also on one other, namely, why he does not "side-slip" when he banks so steeply.



Windsor, February 10th. "PRESENT ETONIAN."

[Our correspondent's letter re-opens a much debated question. Half-a-dozen experts watching from the ground will each give a different version of what they think really happens, according to the point of view. Even so, there is not much doubt that Mr. Hamel's looping is of a different nature to that of Mr. Hucks. Hucks generally turns the nose of his machine down to gain impetus, and bringing it sharply up, goes over backwards and completes the loop in the same line of flight, coming out of it right way up in his original direction of flight. Hamel, on the other hand, so far as we have been able to see, follows the same evolution as Hucks, till the top of the loop is reached, but instead of continuing right over, comes over on a forward side-slip, later turned into a nose-dive, and regains his right-side-up position at right-angles to his path of flight when climbing, something after the form of a section of a spiral spring. Hucks making six loops in succession under normal conditions, would continue in a straight line of flight; Hamel doing the same would proceed in a circle. Both are magnificent exhibitions, but they are dissimilar. The answer to the second query is that the machine banks at the correct angle according to the speed.—Ed.]

The R.A.F. and the Industry.

[1840] If the writer of letter 1838 had read my letter a little more carefully I do not think he would have written to you. I have no very great objection to the Government carrying out experiments, but I do object to a Government Department acting as designer, buyer and seller at one and the same time. It is expecting too much of human nature.

What is good for a business man—who has only his own pockets to consider—is not necessarily good for a country whose interests are far wider. In my own business I may employ foreigners, if it suits my own pocket; but if I am acting in the capacity of an M.P. it is the country's general welfare that must be considered, and not only their immediate pocket.

When I look around me I cannot help but note that the designers of aeroplanes in this country are woefully short. Is it that we have no such brains? Can it be because the country have been content to engage half a dozen men or so at the R.A.F., and given them the control of the money which has been voted by the country for buying aeroplanes? If a healthy outside competition had been encouraged, I am sure we would have had a number of clever designers giving forth their very best for their country. I cannot think that we have cornered in the R.A.F. all the talent that here exists.

February 17th, 1914. OCTOPUS.

* * * *

"First-Aid" for Aviators.

Many little unforeseen accidents befall the aviator, such as a scratch or a barked shin, but until the injury can be properly treated, it is as well to avoid the danger of more serious consequences by adopting prompt antiseptic precautions. Tincture of Iodine is recognised as the best first-aid antiseptic, and it has recently been put up in a most ingenious form by Messrs. Burroughs Wellcome and Co. "Vaporole" Tincture of Iodine is held in a small hermetically-sealed glass container, the point of which is swathed in absorbent material, which, on breaking the point with a sharp tap, becomes saturated and converted into an antiseptic swab, which can at once be applied to the injury. It is sold in two sizes—the 20-drop size, in boxes of six, price 1*s.* 6*d.*; the ½-oz. size, in a wooden protecting tube, price 8*d.*

* * * *

PUBLICATION RECEIVED.

Annuario dell' Aeronautica, 1914. Milan: Touring Club Italiano, Via Monte Napoleone, 14.

* * * *

NEW COMPANY REGISTERED.

Northern Aircraft Co., Ltd., Saville House, Saville Row, Newcastle-on-Tyne.—Capital £2,000, in 1,900 ordinary shares of £1 each and 800 founders' shares of 2*s.* 6*d.* each.

* * * *

Aeronautical Patents Published.

Applied for in 1913.

Published February 19th, 1914.

1,909. N. A. Thompson. Constructions for aircraft.
6,592. P. Grosser. Hydroplanes and flying machines.
6,829. W. B. Quick and — Talbot. Hydro-aeroplanes.
6,869. N. A. Thompson. Airships.

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Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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CONTENTS.

Editorial Comment: PAGE
Military Aviation in Parliament ... 207
War Office Tests for Military Machines ... 208
Men of Moment in the World of Flight: Mr. C. Gordon Bell ... 208
Holes in the Air ... 210
Some American Flying Boats ... 212
Royal Aero Club. Official Notices ... 214
From the British Flying Grounds ... 215
British Military Aviation ... 217
The Kantner-Moisant Monoplane ... 219
Eddies. By "Will o' the Wisp" ... 220
Flying at Hendon ... 221
The Aerodynamic Effects of Gusts on Wings, and of Oscillating Wings. By Prof. Herbert Chatley ... 222
Airship News ... 223
British Notes of the Week ... 224
Foreign Aircraft News ... 225
Models. Edited by V. E. Johnson, M.A. ... 227
Model Clubs Diary and Reports ... 228
Correspondence... 230

EDITORIAL COMMENT.

Military Aviation in Parliament.

One of the most interesting, and at the same time by far the most satisfactory, statement that has fallen from a Minister of the Crown in relation to military aviation, was that made by Col. Seely, on Wednesday evening to the House of Commons. It may be that the record of work actually accomplished is not such as will satisfy to the full the most hypercritical of those observers who are at the same time students of the aerial defence problem, but at least, the War Minister's statement indicated that the seriousness of that problem is being realised by the Government and its advisers. It is scarcely necessary for us to refer in detail to the facts laid before the House by Col. Seely, since we publish in other pages of this issue of FLIGHT so much of the reports of the discussion as are germane to the issues.

After generalising upon the policy of the War Office, Col. Seely proceeded to justify the handing over to the Navy of the airships which have hitherto been under the administration of the Military Wing. The reasons given for the change are, to our mind, entirely satisfactory, but there is just this one point of criticism to be made. He told the House that in time of necessity the Navy would hold at the disposal of the Army such lighter-than-air craft as would be required. We should have liked some more definite assurance as to this, for it is quite conceivable that when the time comes the Navy will discover that it needs all these craft for its own purposes, and that the Army will thus have to go short. That is somewhat disquieting, assuming that airships are, equally with aeroplanes, an essential part of the equipment of an army in the field, and they should assuredly be of use.

Col. Seely next assured the House that the Military Wing was now in possession of 161 machines, and that the full establishment aimed at was 250, of which 200 would be required for the squadrons, and 50 for the Central Flying School. He further pointed out that the British Army, under such an establishment, would be better equipped in proportion to its numbers than that of any other Power. That is in itself satisfactory, but it would have been much more so had he told us what plans have been made for equipping the Home Defence forces with the necessary aerial service in case of invasion when the Expeditionary Force is employed overseas. The reply to this question was that the matter was engaging attention, but while we are quite prepared to concede that a good deal of progress is being made, and has been achieved, we are inclined to look somewhat askance at this phrase, which falls with such facility from politicians with awkward things to explain. We are quite well aware that the doctrine is that while the Regular forces are out of the country it is the business of the Navy to see that our shores are kept inviolate, but it has been proved by the naval manœuvres of the past two years that invasion is not at all a remote probability even with our Fleet intact. That being so, it is surely necessary that the Second Line should be properly equipped to deal with invasion, and without aircraft in commission it cannot be said to comply with the conditions. However, it may be that Mr. Churchill will have something to tell the country later on with regard to the aerial preparedness of his own Service which may exercise some modifying influence on these opinions.

Col. Seely expressed the opinion that the British industry was now quite capable of supplying all the aeroplanes we want, and a great many more. In earnest of this, it was stated that of 100 machines acquired since last July 89 were built in this country. How many of these 89 are fitted with British engines? Not even the odd nine! Therefore, it is playing with facts to say that we can turn out all the machines required. It is true, as Col. Seely said, that before long we shall be able to produce engines in sufficient numbers, but the point is that we are not so doing now, we never have done, and could not at the moment. To a great extent this is due to the want of encouragement given by the Government to the British engine builder. True, this it is hoped to remedy through the Government trials in April, but even here a distinct *faux pas* has been made by the issue of a circular letter to the competing firms, drawing attention to the fact that the winners of the first prize will not necessarily secure the big contract that was held out as a bait to entrants. We do not particularly quarrel with the War Office for putting itself in a safe position, but it does seem to be a pity that such a disquieting document was issued at the present juncture. One of the effects inevitably produced is that of giving rise to the fear that the War Office may do as it has been accused of doing in the matter of the aeroplane itself—appropriate the best features of design and have engines built in the R.A.F. We do not for an instant believe that there is any *arriere pensee* of the kind—but there is the fact.

It is encouraging to note that the future policy is to have the larger proportion of machines required constructed by private firms. Col. Seely also announced that a proportion would be constructed in the R.A.F., these being machines of a special type, the details of which it is desired to keep secret. We confess that we do not like this at all. The purpose of the R.A.F. is to carry out experimental work and repairs—not to act as a building department at all. Surely, it is possible to ensure that the details of Government work given out to private firms shall be kept secret. No difficulty is experienced in any other Government department in this matter, and we are at a loss to know why this branch of the Government services should present any points of difference from, say, naval construction. Naturally, something depends on the relative proportions, but we desire to emphasise the opinion we have already expressed, that the R.A.F. ought to be confined to the work for which it was designed.

However, in spite of these possibly minor points we must express ourselves as being fairly well satisfied with the statement as a whole, for after all a full realisation of the importance of aviation and its vital consequence to the State is the best guarantee of future progress, and that was certainly manifested by the statement of the Secretary for War.

◆ ◆ ◆

War Office Tests for Military Machines.

Last week we published a War Office *communique* relating to the tests to be undergone by privately constructed aeroplanes intended for military use, in which were set out in full the conditions of speed, fuel capacity, climbing capabilities, and other miscellaneous qualities which the military authorities consider are required of the machine which is efficient from their point of view. In the light of all the criticism which has been passed upon the War Office as to the methods which obtain when that department is dealing with the private constructor, the schedule is of more than passing interest, showing, as it does, that the military authorities are fully alive to the fact that the aeroplane is a machine which is still in process of development, and of which too much must not be asked at the present juncture. For instance, in the matter of fuel capacity, the War Office stipulates that there must be an endurance quality of from two to three hundred miles, according to the type of machine employed. This is not by any means asking too much, since the fuel endurance capacity of the average machine is fully up to, and in many cases exceeds, the stipulation. Then in the matter of useful load, the requirements do not seem to us to be at all excessive. "Light scouts," for example, are only asked to carry the pilot *solus*, which is about the irreducible minimum that can be asked. "Reconnaissance aeroplanes" must be capable of carrying pilot and observer, plus 80 lbs. for wireless equipment, again a minimum below which it is inconceivable such a machine should be asked to comfortably carry. In the case of "fighting aeroplanes" the requirements are necessarily more extensive, since the minimum stipulated for is the weight of pilot and gunner, plus 300 lbs. for weight of gun and ammunition in the case of machines of class (a) and 100 lbs. in the case of (b).

Again, in the case of climbing requirements we find that the capability is assessed in the ratio of 700 feet per minute in the light class, ranging down to 350 feet per minute in the case of "Fighting Aeroplanes (a)," certainly not an excessive figure in the light of ascertained performances of analogous types. And so on throughout the whole set of conditions—it seems to the observer that in laying down these conditions the War Office authorities have had before them the salient fact to which we have already drawn attention, that the aeroplane is a machine which is even now in constant process of evolution, and is therefore a type to which every allowance consistent with the requirements of efficiency must be made.

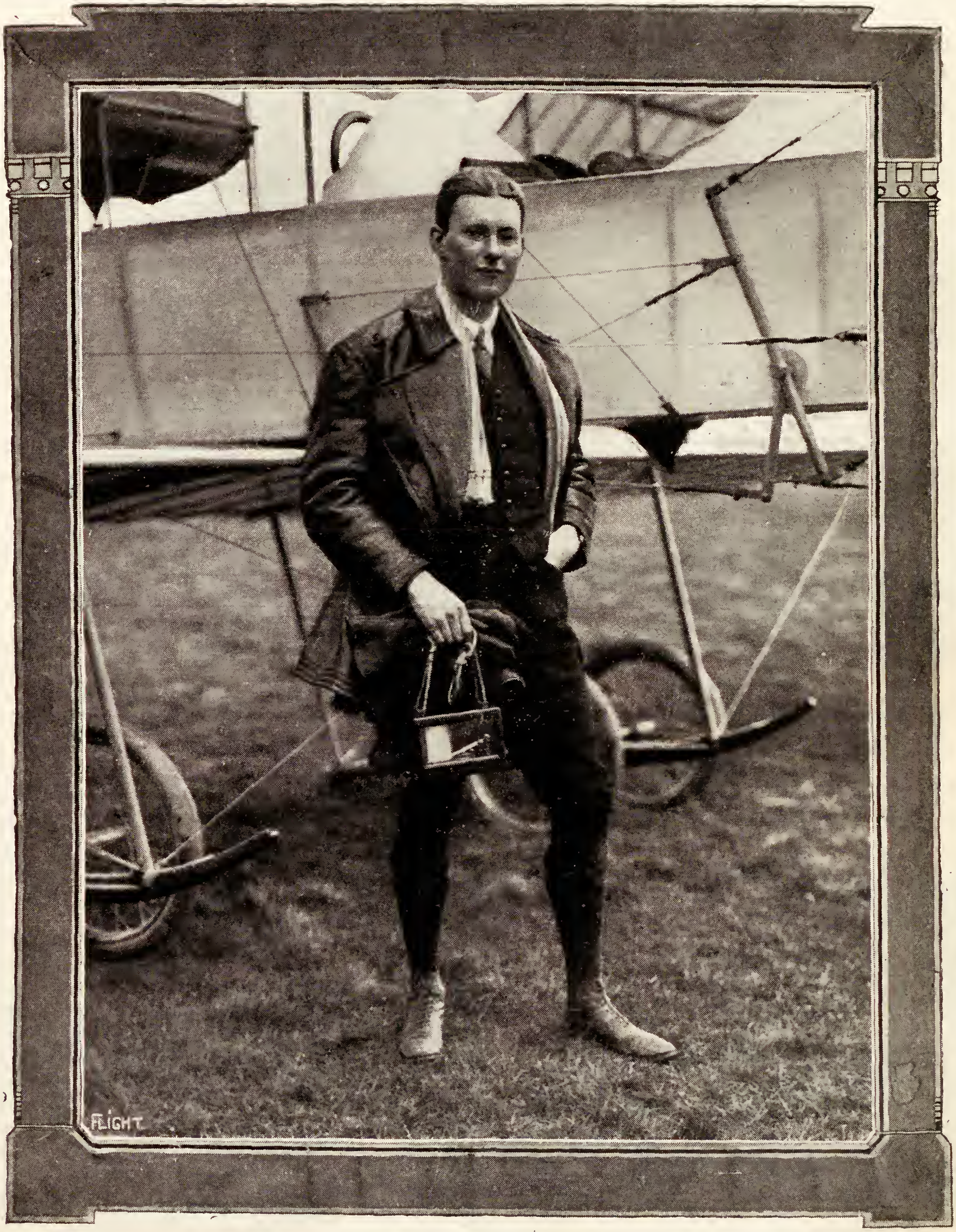
Nor are the actual tests set forth in the *communique* to which each machine submitted for approval must be subjected unduly onerous. A thorough examination for workmanship and material, a rolling test, and one hour's flight are certainly not tests which err on the side of undue severity. Nothing less, indeed, ought to be exacted from machines of a type upon which it is quite conceivable our success in war may one day depend. As a matter of fact, we should not take it a matter requiring adverse criticism at our hands if the authorities had made the test far more stringent than they have seen fit to do.

C. GORDON BELL.

A UNIQUE experience is Gordon Bell's, for since he took up aviation in November, 1910, he must have flown more makes of machine than any other pilot. His first experiences in the air were with the old Avro triplane, but he actually secured his certificate on the famous Hanriot "Henrietta," at Brooklands. He then became manager and *chef pilote* of the Deperdussin school at Brooklands, and later piloted the Martinsyde monoplane. Being engaged by the R.E.P firm, he was for some eight months in France, varying this with a trip to Turkey for the purpose of organising a military school, while he made the first flights over Constantinople, and from Europe to Asia. In the British military trials he was on a 100 h.p. Deperdussin, and gained a third prize, following this up by flying as a Lieut., Military Wing, R.F.C., in the Army manœuvres. For the last eighteen months he has been head pilot to Messrs. Short Brothers, of Eastchurch, chiefly engaged on waterplane work. In between whiles he is game to fly any machine which comes his way. Beyond his bad smash at Brooklands, he has been fortunate in keeping clear of mishap.

THE HAWK.

MEN OF MOMENT IN THE WORLD OF FLIGHT.



MR. C. GORDON BELL.

HOLES IN THE AIR.

IN the recently issued Annual Report of the Smithsonian Institution, Washington, U.S.A., a paper is contributed by Professor W. J. Humphreys of the U.S. Weather Bureau, in which he examines the structure and the cause of air pockets, and suggests where and when they are most likely to occur. He states that holes in the air, in the sense of vacuous regions, do not exist; but conditions in the atmosphere favourable to precipitous falls, such as would happen in holes, are present, and these he divides into two groups, with respect to the method by which they may cause an aeroplane to fall in the following manner :—

(*a*) Vertical Group.

1. *Aerial Fountains.*—Uprushes of air, most numerous during warm clear weather and over barren soil, especially above conical hills, are disconcerting and dangerous to the novice, but do not greatly disturb an experienced aviator.

2. *Aerial Cataracts.*—Downrushes of the free air, like the uprushes with which they are associated in a vertical circulation, though less violent, must also be most frequent during warm weather when the ground is strongly heated. They, too, however annoying to the beginner, should not be dangerous to the experienced man, because even when strong enough to carry the machine down for a distance their descent necessarily becomes slower and their chief velocity horizontal before the surface is reached. Downrushes of weighted air over precipices, analogous to waterfalls, must be strictly avoided.

3. *Aerial Cascades.*—The lower wind, in following as it must surface contours, sweeps down to the leeward of hills and mountains in cascade-like falls, and the stronger the wind the more rapid the cascades. But they are of no danger to the aeronaut so long as he takes the precaution to keep above the eddies and other surface disturbances.

4. *Aerial Breakers.*—The choppy, breaker-like winds of thunderstorms that surge up and down and in all sorts of directions are as much to be avoided by aerial craft as are ocean breakers by water craft. Hence a flight should positively not be attempted under any such circumstances.

5. *Wind Eddies* (*forward side*).—The air on the forward side of a strong eddy has a rapid downward motion, and therefore should be avoided. If caught in the down current of an eddy the aeronaut should head lengthwise of the hill or mountain to which the eddy is due. By heading away from the mountain he might, to be sure, get entirely out of the whirl, but the chances are just as great that instead of getting out he would only get the deeper in and thus encounter downward currents swifter and still more dangerous than those he had sought to shun.

(*b*) Horizontal Groups.

1. *Wind Layers.*—The atmosphere is often made up of two or more superimposed layers moving each with its own velocity and direction. Such a condition is a source of danger to the aeronaut because transition from one of these layers to another more nearly coincident in direction and velocity with his aeroplane is certain to result in at least a sudden decrease in the magnitude of its supporting pressure and in the effectiveness of the balancing devices. Under certain extreme conditions this transition, even when the winds are parallel, is well nigh inevitably disastrous. When the layers move more or less across each other, as they usually do, the turmoil of the resulting short and choppy billows, by rendering equilibrium difficult, add an additional danger all their own.

Dangerous wind layers are most frequent at flying levels during the transition of fair to foul weather.

2. *Wind Billows.*—Wind waves analogous to water waves are set up at the interface between two layers that are moving with different velocities. If both layers are moving in the same direction, the resulting waves are long and regular; if in different directions, they are short and choppy. Therefore, other things being equal, it obviously is advisable to keep within the lower layer, or at least to get away from the billowy interface, either above or below, and to avoid crossing it oftener than is absolutely necessary.

3. *Wind Gusts.*—The horizontal velocity of the wind near the surface of the earth is exceedingly irregular and fluctuates from second to second at times by as much as the whole of the average velocity. In such a wind, if at all swift, the support to an aeroplane is exceedingly erratic and both its launching and its landing full of danger.

Obviously, too, the stronger the wind the higher, because of these surface disturbances, one should fly, if at all.

4. *Wind Eddies* (*central portion*).—Eddies, or horizontal rolls in the atmosphere, are found on both the windward and lee sides, especially the latter, of cliffs and steep hills and mountains. When the wind is strong a landing should not be attempted in any such place. If forced to land in a place of this kind, the machine should be headed along and not at right-angles to the direction of the hill.

5. *Aerial Torrents.*—Steep barren valleys, especially of clear still nights and when the upper reaches are snow covered, are the beds of aerial drainage rivers that at times amount to veritable torrents. Therefore, however quiet the upper atmosphere and however smooth its sailing, it would be extremely dangerous to attempt to land an aeroplane at such a place and such a time.

Note.—All the above sources of danger, whether near the surface like the breakers, the torrents, and the eddies, or well up like the billows and the wind sheets, are less and less effective as the speed of the aeroplane is increased. But this does not mean that the swiftest machine necessarily is the safest; there are numerous other factors to be considered, and the problem of minimum danger or maximum safety, if the aeronaut insists, can only be solved by a proper combination of theory and practice, of sound reasoning and intelligent experimentation.

* * *

More Funds for Naval Aeronautics.

ON Wednesday a supplementary estimate for a further sum of £2,500,000 required for the Navy for the year ending March 31st, 1914 was issued. Of this sum, £5,000 is required for the accommodation of seaplanes at Sheerness, and £42,000 for airship accommodation.

* * *

Armament for Airships.

QUESTIONED in the House of Commons as to how many of the new airships were equipped with firing platforms above the envelope for the purpose of attacking aeroplanes, Mr. Churchill said that a suitable armament will be provided, but no technical details could be given.

Photograph by Capt. J. C. Halahan.

THE FRENCH HEADQUARTERS SHIP FOR SEAPLANES—THE "FOUDRE."—In this photograph will be noticed the aeroplane hangar on the deck abaft the rearmost funnel. She is now stationed in the Mediterranean at St. Raphael, which adjoins Frejus. In the right-hand photograph is a party of "blue jackets" belonging to the naval station, engaged in a few exercises during an "off" afternoon.

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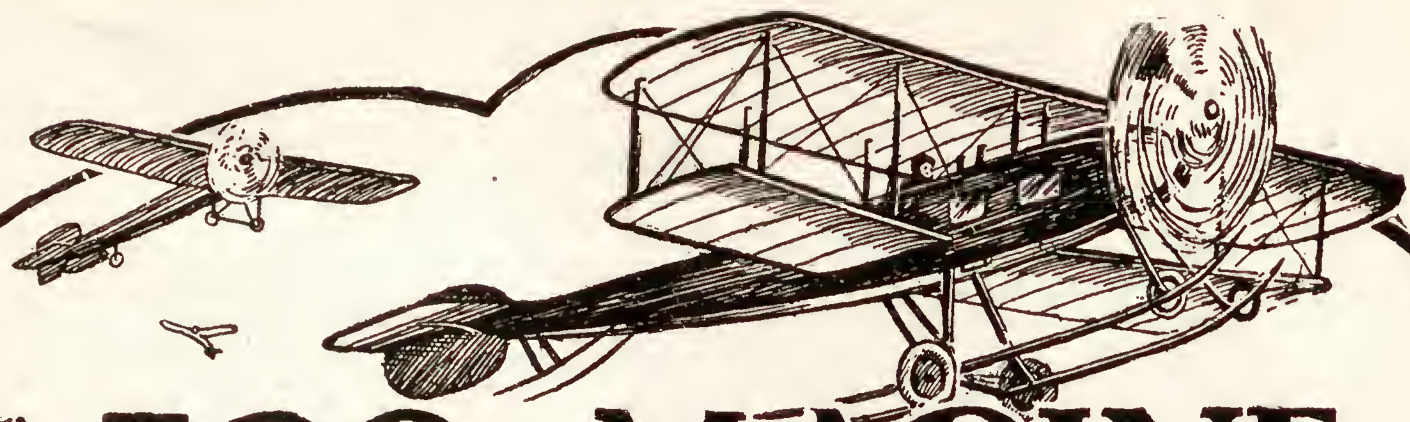

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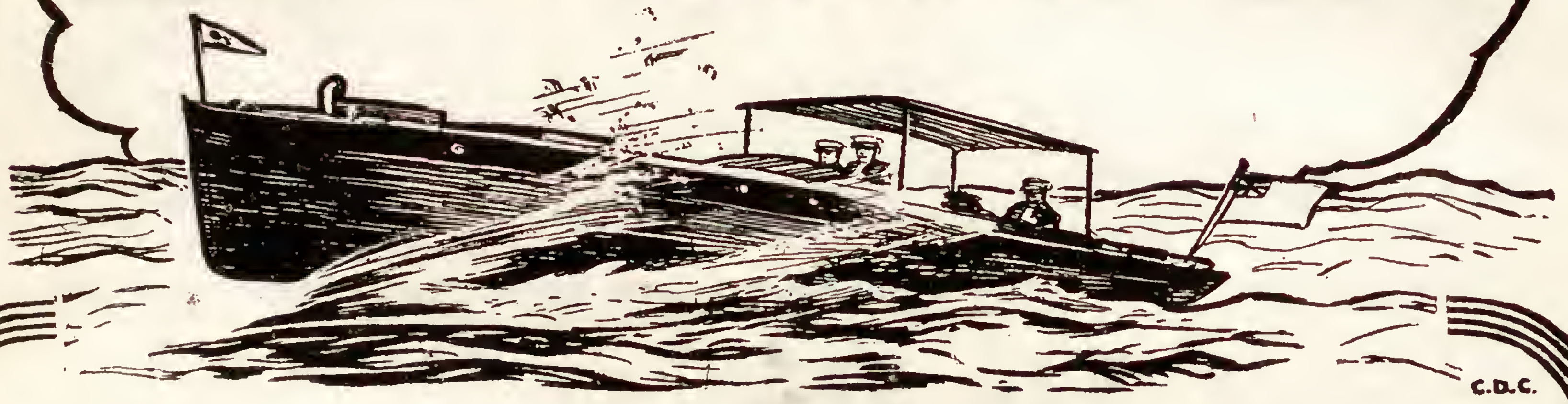

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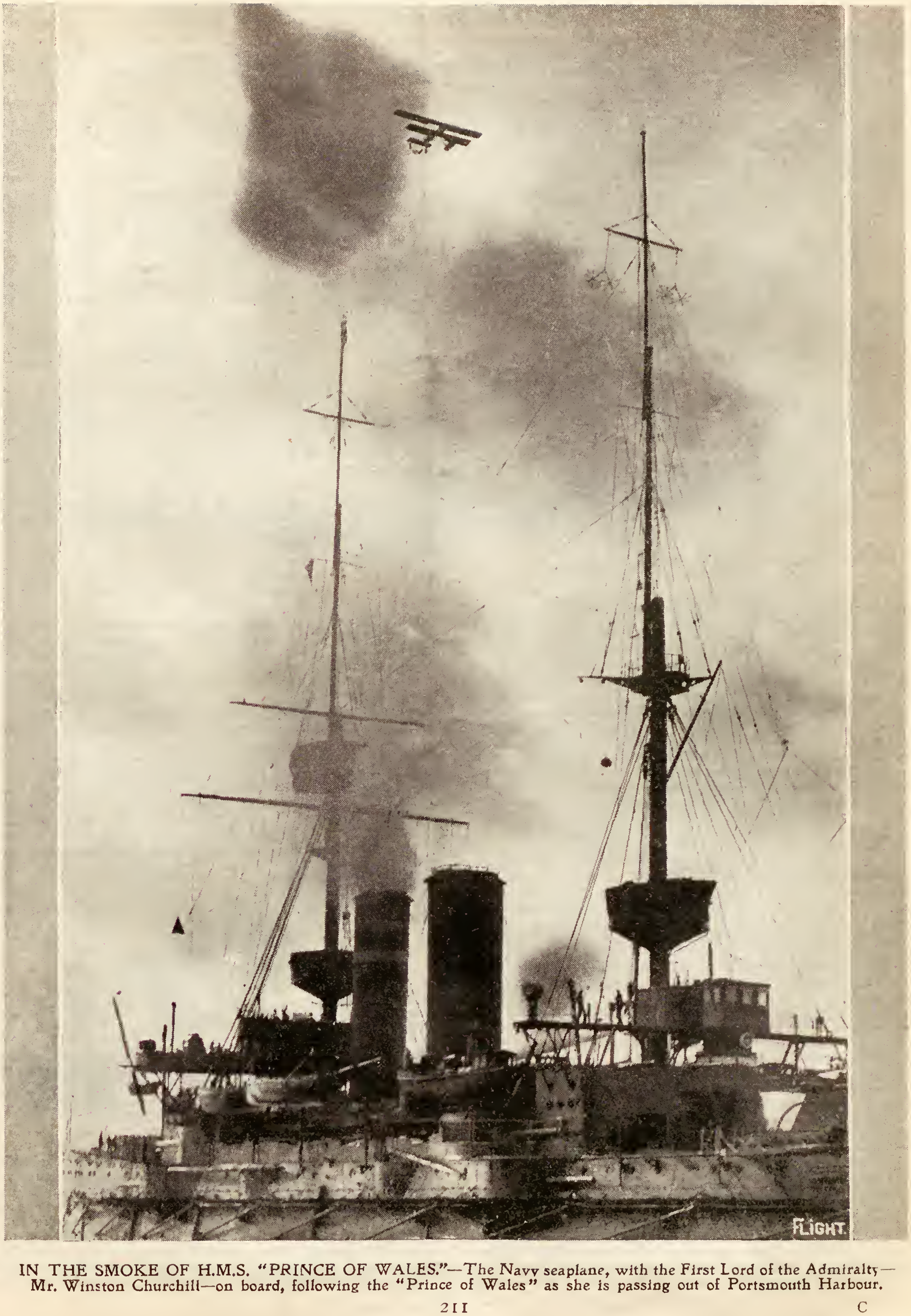
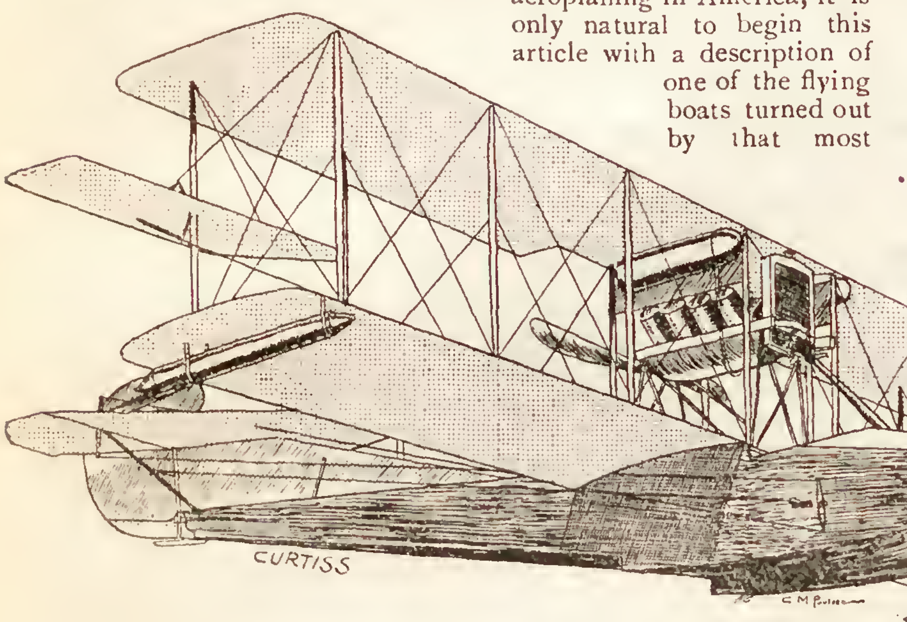


IN THE SMOKE OF H.M.S. "PRINCE OF WALES."—The Navy seaplane, with the First Lord of the Admiralty—Mr. Winston Churchill—on board, following the "Prince of Wales" as she is passing out of Portsmouth Harbour.

SOME AMERICAN FLYING BOATS.

In view of the announcement that an attempt is to be made during the coming summer to cross the Atlantic in a Curtiss flying boat, and bearing in mind the popularity this type of aircraft has attained in the United States, the following brief descriptions of some of the most successful American flying boats will enable our readers to form some idea of the stage to which this form of hydro-aeroplane has been developed. It is a fairly safe guess that for any attempts made under American auspices machines of the flying boat type will be employed, for in no other country have so many different constructors turned their attention to this particular type.



The Curtiss flying boat.

Since the Curtiss flying boat is the first to be entered, and as moreover its designer, Mr. Glenn Curtiss, is the pioneer of hydro-aeroplaning in America, it is only natural to begin this article with a description of one of the flying boats turned out by that most versatile constructor, more especially in view of the fact that the Curtiss machines are now being constructed in this country by Messrs. White and Thompson, Ltd., of Middleton, Bognor, Sussex. It is not easy to choose a model for description, for the dope has hardly had time to dry on the planes of one machine before a new and improved one is put through its trials. However, the flying boat built by the Curtiss Company for Mr. Harold F. McCormick, of Lake Forest, Ill., is fairly typical, as it embodies standard Curtiss features as well as several innovations which will be adopted in future machines. The boat, which is 23 ft. 7 ins. long, is built up of longitudinal members of ash 1 in. square, and placed 6 ins. apart, carrying the ribs, which are spaced 3 ins. apart. Over this framework is secured the planking, which for the sides of the boat consists of a thin spruce skin, whilst the bottom is covered with a planking of $\frac{5}{16}$ in. thick mahogany and $\frac{1}{4}$ in. spruce laid diagonally and having a sheet of very thick fabric, set in marine glue, between them. The whole outside of the hull is then covered with watertight canvas. Eight bulkheads divide the boat into watertight compartments, each of which is provided with an inspection door, which permits examination of the interior of the boat. Two of these compartments are claimed to possess sufficient buoyancy to keep the machine afloat should the remaining seven, for some reason or other, spring a leak. The bottom of the boat has a step of rather unusual shape. Instead of the usual box step, the step in this machine is of triangular form when viewed in plan, and has its apex pointed forward. Air is admitted to the step by two 1½ in. copper tubes extending upwards through the hull. From the step the boat slopes upwards in order to facilitate getting off without the rear portion dragging. The body tapers to a vertical knife's edge at the rear, where are mounted the tail planes, consisting of fixed tail planes mounted a short distance above the hull and a divided elevator, hinged to the trailing edge of the fixed plane, a vertical fin and the rudder.

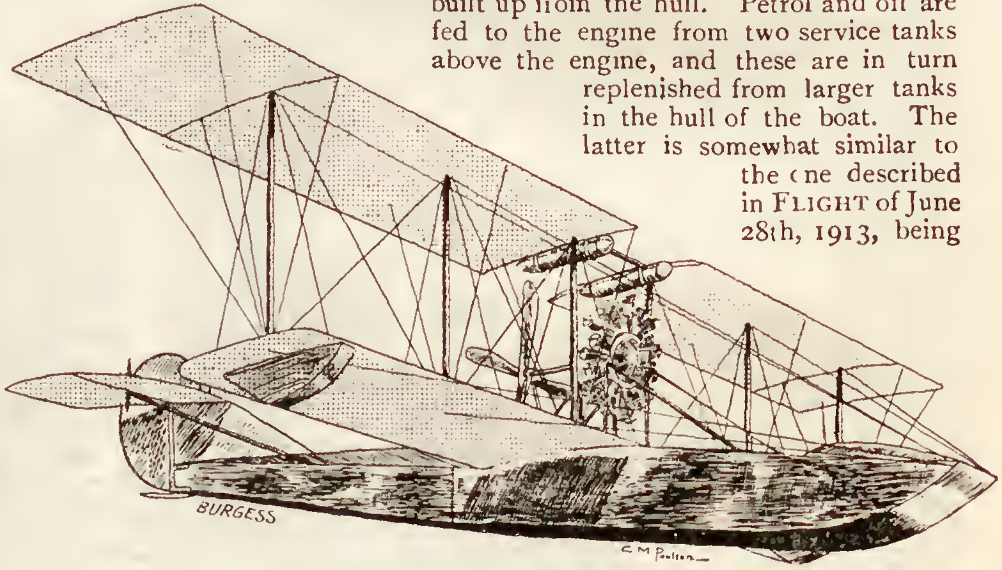
Just in front of the lower plane, and arranged side by side, are the pilot's and passenger's seats. In front of them are the dual controls, which consist of two rotatable hand wheels mounted on a single column, so that the machine can be controlled by either pilot or passenger at will. A to and fro movement of the wheel operates the elevator, whilst rotation of the hand wheel actuates the rudder.

The *ailerons* are operated by means of the shoulder yoke fitted as standard on all Curtiss machines, but any other control may be fitted. The deck of the boat in front of the occupants is swept upwards to form a wind shield. The gap between the main planes, of which the lower one is mounted on the upper *longerons* of the boat, is 5 ft. 6 ins., and the chord is 5 ft. 7 ins. Mounted on very strong bearings between the planes is the engine—a 100 h.p. 8 cyl. Curtiss—driving directly a propeller situated behind the main planes. A very stout oblique strut runs from the front part of the engine bearers to the upswept nose of the boat, and serves to transmit the strains due to momentum from the engine to the boat on alighting. On either side of the engine, and slung from the struts by means of steel straps, are the two tanks which contain the fuel, of which a supply sufficient for a six hours' flight can be carried. Outside the tanks, and immediately under the top plane are situated two blinkers, the object of which is to counteract, to a certain extent, the side area of the boat. The *ailerons*, which are of the usual Curtiss type, are pivoted approximately at their centre of pressure, so that little or no power is required to operate them, and they are interconnected in such a manner that the drag on that of the lower wing is the same as that on the higher wing, so that there is no necessity to use the rudder in conjunction with the *ailerons* in order to maintain the direction of the boat. The general dimensions of the machine are:—

Span ...	... 42 ft. 2 ins.	Area ...	... 400 sq. ft.
Length	... 23 ft. 7 ins.	Weight ...	... 1,520 lbs.
Chord ...	... 5 ft. 7 ins.	Speed ...	... 53 m.p.h.
Gap ...	... 5 ft. 6 ins.		

The High-Powered Burgess Flying Boat.

Although in its general arrangement the Burgess flying boat is somewhat similar to the Curtiss, it differs very materially from it both constructionally and aerodynamically. One of the most characteristic features of this machine is the method employed for wing bracing. It will be seen from the accompanying sketch that only a single row of struts separate the main planes. It will be remembered that this method of construction is employed in the Breguet biplane, but whereas in the Breguet the necessary stiffness is provided by springs between the spars and the ribs, in the Burgess this is accomplished by cables running from the leading edge and rear spar of the upper plane to the main spar of the lower plane. This construction does not impress one as being particularly strong, especially in a machine with so powerful a motor as the 220 h.p. Anzani engine installed in this machine, but according to reports the makers do not seem to have experienced any trouble from this source. Each wing is built up on a tubular steel spar 3½ ins. in diameter, a wood entering edge hollowed out for lightness, and a thin wood stringer parallel to the spar. The ribs are of wood, and are placed a foot apart. The upper plane is fitted with 5 ft. extensions, and has a span of 41 ft. 4 ins. The span of the lower plane is 33 ft. 4 ins., and the gap between the planes is 7 ft.



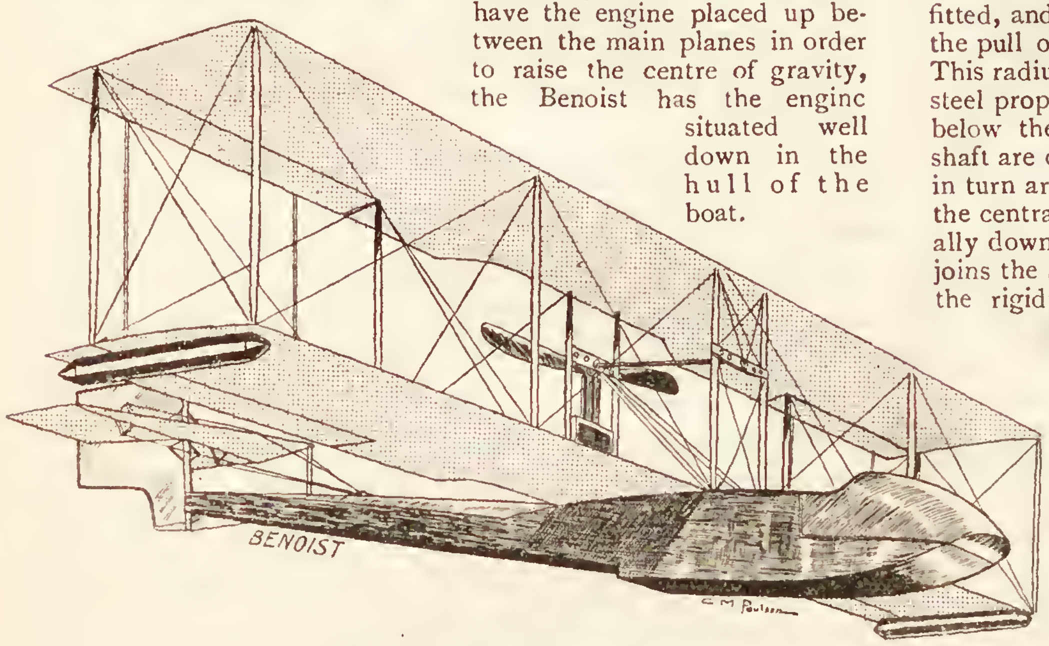
The Burgess flying boat.

The 20-cyl. Anzani engine is mounted between the planes, and drives directly a four-bladed propeller through an extension of the crank-shaft supported on ball-bearings on a steel tube structure built up from the hull. Petrol and oil are fed to the engine from two service tanks above the engine, and these are in turn replenished from larger tanks in the hull of the boat. The latter is somewhat similar to the one described in FLIGHT of June 28th, 1913, being of the plain non-stepped type. It is built up of mahogany planking over a framework of oak, and is divided by bulkheads into numerous watertight compartments. In order to facilitate shipment, the boat is built in two sections, which can be easily dismantled and erected. The tail planes are similar to those of the machine already referred to, and they, as well as the heel of the boat, are protected by a small tail skid or skeg mounted under the stern of the boat. The pilot's and passenger's seats are arranged tandem fashion, the pilot occupying the rear seat. As the lower plane has been left uncovered for a distance of about 6 ins. each side of the boat, the pilot has a very good view in a downward as well as all other directions. From the passenger's seat an even better view is obtained. The controls are of the Wright type, consisting of two levers, one of which controls the warp and rudder simultaneously, whilst the other operates the elevator. The general dimensions are :—

Length	30 ft. 6 ins.	Gap	7 ft.
Span, upper plane	41 ft. 4½ ins.	Weight... ...	2,050 lbs.
Span, lower plane	33 ft. 4½ ins.	Speed	75 m.p.h.
Chord	5 ft. 6 ins.	Area	373 sq. ft.

The Benoist Flying Boat.

The Benoist flying boat represents an entirely different practice in flying boat design from that employed in the Curtiss and Burgess types. The respect in which the difference is mostly manifest is one of weight disposition, for whilst the two types mentioned above have the engine placed up between the main planes in order to raise the centre of gravity, the Benoist has the engine situated well down in the hull of the boat.



The Benoist flying boat.

This, of course, gives this machine a comparatively low centre of gravity, and while this may, or may not, be a disadvantage in flight, it certainly renders the craft very stable on the water, and in modern machines, such as the Morane-Saulnier "Parasol," we have seen that a low c.g. is not prohibitive for good flying qualities.

The boat itself, which has a length of 23 ft., is built up of double spruce planking over a skeleton of spruce longitudinals and ribs. In the nose of the boat the bottom is swept upwards in order to assist the boat in getting into its skimming position in the shortest possible time. A single step, 5 ins. high, occurs at a distance of 9 ft. 8 ins. from the nose of the boat, and from the step to the stern the hull slopes upwards as well as tapering to a vertical knife's edge carrying the rudder. The deck is swept downwards very abruptly from the occupants' seats to a point behind the rear plane struts, in order to provide sufficient clearance for the propeller. In front of the seats is a cowl, formed by a structure of spruce stringers covered with canvas, the purpose of which is to protect the occupants from wind and water spray.

The method of mounting the engine is very interesting, as it serves at the same time to very materially strengthen the boat. Two strong spruce beams running parallel to each other practically the whole length of the boat serve as a support for the engine, and are spaced a distance apart sufficient to take the crank case arm bolts. The length of these beams is 17 ft., and in front of the step and under the engine they have a depth of 16 ins., and a thickness of two ins. From the step backwards they taper gradually to conform to the shape of the hull, and have been carefully proportioned for the various loads. Wherever possible, they have been lightened by hollowing them out. The engine drives through a chain transmission a single propeller situated behind the rear plane struts. The sprockets on the engine-shaft and propeller-shaft are of the same size, so that the gearing is 1 to 1. A tubular steel chain guard is fitted, and incorporated with it is a tubular radius rod which takes the pull of the chain, and provides easy adjustment of its length. This radius rod floats on ball-bearings at both ends. The tubular steel propeller-shaft is mounted between the main planes some 18 ins. below the trailing edge of the upper plane. Both ends of this shaft are carried on large combined radial and thrust bearings, which in turn are mounted on cast bronze retainers strongly supported to the central members of the *cellule*. Spruce struts running diagonally down to the leading edge of the lower plane, where that member joins the *longerons* of the boat, take the thrust reaction and preserve the rigidity of the rear bearing mounting. The propeller-shaft extension is fitted with a transverse pin, so that the engine can be started by the insertion of a starting handle. This operation is easily performed from either of the occupants' seats. The main planes, which are rectangular, as seen in plan, are both of equal span, and are built up in sections to facilitate transport. To the trailing edges of the outer sections of both planes are hinged *ailerons* of 8 ft. length, and a width of 1 ft. 8 ins. Mounted some distance above the deck of the boat is a fixed stabilising plane, to the trailing edges of which are hinged the two elevator flaps. The rudder is hinged to a post forming an extension of the stern post of the boat. A small portion of the rudder projects below the bottom of the boat, and serves as a water rudder when the machine is taxying on the water. The control levers are situated in front of the left hand seat (the seats are arranged side by side), and consist of a universally mounted lever operating the *ailerons* and the elevator.

Another lever actuates the rudder by a to-and-fro movement. The fuel tanks are placed in the hull on one side of the engine, and have a capacity for at least four hours' flight. All control cables are in duplicate, and are carried inside the hull, from which they emerge through a brass ferrule in the crown of the after deck.

The general dimensions of the Benoist flying boat are :—

Span	35 ft.	Length of hull ...	23 ft.
Chord	5 ft.	Weight, empty ...	1,190 lbs.
Gap	6 ft.	Speed, fully loaded	64 m.p.h.
Length	26 ft.		

(*To be concluded next week.*)

"PROPELLERS"—THE DISCUSSION.

IN opening the discussion on Mr. Bramwell's paper at the recent meeting of the Aeronautical Society, Mr. North commented upon the fact that Chauviere had said that the quality of the wood and other factors caused a variation of as much as 3 per cent. in the propeller efficiency.

Mr. Holdberg retailed some of his experiences with model propellers, and remarked that although in static tests with two propellers, the acting face of one being inclined forward, while that of the other leaned towards the rear, he had found considerable differences in their performances, yet in actual flight on model aeroplanes their efficiencies were practically equal. He said that he had obtained some very excellent results with propellers made simply by steaming the trailing edge.

Mr. Low congratulated the author upon his remark that the only essential in using the equations given in his paper was that the units employed must be consistent among themselves He thought that it would be a great advantage if the results of the investigations recorded in the Report of the Advisory Committee for Aeronautics were detailed in some consistent system of units. Mr. Bramwell had drawn attention to some values of the variation in pitch for zero thrust taken from the Koutchino Laboratory Bulletin, which showed a variation of 2·5 per cent. between the successive readings given ; he would like to say that this variation seemed to increase with speed and indicated that the pitch for zero thrust was an increasing function of the angular velocity of the propeller.

Dr. Glazebrook said that he thought Mr. Bramwell had given a very excellent paper. One of the reasons why the N.P.L. had undertaken experimental research on propellers was that there was not a great deal of money available for that purpose amongst private manufacturers, and he commented upon the excellent results which had been obtained with propellers of even the crudest design. He observed that the units employed in the Report of the Advisory Committee were those which he had been informed would be of the greatest value to the industry, but he would very much like to see a consistent system adopted. Dr. A. P. Thurston, after pointing out the differences in the mode of progression between an aerofoil and a propeller blade, asked the author whether any experiments had been made as to the improvement that might be obtained by the use of baffle plates, such as had been already employed in marine work.

The author, in his reply, said it was sometimes disheartening to find such remarkable efficiencies given by some propellers, and was not at all surprised that propellers made in the manner mentioned by Mr. Holdberg had done so well. He stated in reply to Dr. Thurston that so far they had not undertaken any such work, but had endeavoured to keep the propeller as free as possible from the effects produced by baffling or disturbing surfaces.

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OFFICIAL NOTICES TO MEMBERS

ANNUAL DINNER.

In consequence of the First Lord of the Admiralty having been commanded to dine with H.M. the King on the 27th inst., the Royal Aero Club Dinner fixed for that date, at which Mr. Winston Churchill was to be the principal guest, has been postponed until WEDNESDAY, MARCH 4th.

The Royal Automobile Club not being available on that date, the Dinner will be held at the SAVOY HOTEL, 7.30 for 8 o'clock.

The Marquess of Tullibardine, M.V.O., D.S.O., M.P., the Chairman of the Club, will preside.

Annual General Meeting.

The Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Tuesday, March 24th, 1914, at 4 o'clock, at 166, Piccadilly, London, W.

Notices of motion for the Annual General Meeting must be received by the Secretary not less than twenty-one days before the meeting, and must be signed by at least five members. Wednesday, March 4th, 1914, is the last day for the receipt of notices of motion.

Committee.

In accordance with the rules, the Committee shall consist of eighteen members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the committee are :—

Col. J. E. Capper, C.B., R.E.
G. B. Cockburn.
Maj. J. D. B. Fulton, C.B., R.F.A.
J. T. C. Moore-Brabazon.
Com. C. R. Samson, R.N.
A. Mortimer Singer.
T. O. M. Sopwith.
The Marquess of Tullibardine, M.V.O., D.S.O., M.P.
Roger W. Wallace, K.C.

Col. J. E. Capper, C.B., R.E., does not offer himself for re-election.

The following members have so far been nominated :—

G. B. Cockburn.
Maj. J. D. B. Fulton, C.B., R.F.A.
Com. C. R. Samson, R.N.
A. Mortimer Singer.
T. O. M. Sopwith.
Robert Loraine.
Fred May.
The Marquess of Tullibardine, M.V.O., D.S.O., M.P.

Any two members of the club can nominate a member to serve on the Committee, having previously obtained such member's consent. The name of such member so nominated, with the names of his proposer and seconder, must be sent to the Secretary in writing not less than fourteen days before the Annual General Meeting. Wednesday, March 11th, 1914, is the last day for the receipt of nominations.

Members are reminded that a ballot paper for the election of nine candidates to seats on the Committee of the Club will be forwarded to them at least seven days before the date of the Annual General Meeting.

Gordon-Bennett Aviation Cup.

The following entries have been made to the Royal Aero Club :—

Messrs. A. V. Roe and Co., Ltd. ...	Manchester.
Sopwith Aviation Co., Ltd.	Kingston-on-Thames.
British and Colonial Aeroplane Co., Ltd.	Bristol.
Cedric Lee Company	Shoreham (two machines).
Messrs. Vickers Ltd.	Erith and London.

The Race will be held in France in September or October next, and the Royal Aero Club will select from the above entries three competitors to represent the British Empire.

The date for receiving entries is now closed.

Garros Hamel Match.

This match which took place on Sunday last at Juvisy, and a report of which will be found elsewhere, attracted quite a large number of Members of the Club to Paris, including Lord Edward Grosvenor, Mr. Harry DelaCombe, Mr. A. Huntly Walker, Mr. Warwick Wright, Mr. A. Stern, Mr. W. E. de B. Whittaker, Eng.-Lieut. Wilfred Briggs, R.N., Mr. P. Maréchal, and Mr. Harold Perrin (Secretary).

Mr. Harry DelaCombe and Mr. Harold Perrin represented the Royal Aero Club on the Committee which had charge of the arrangements for the match.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

The First Lord of the Admiralty in Navy Seaplane No. 95 in Portsmouth Harbour prior to his ascent last Monday.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Monday, last week, dull but calm, fine day for flying, the Naval pilots taking full advantage of it, most of their machines being up. Lieut. Davies first on Sopwith, then on B.E., arriving home with engine at quarter throttle. Lieut. Briggs on 80 h.p. Blériot, 80 h.p. Caudron, flying well. Com. Samson solo and with passenger on 80 h.p. H. Farman; another Sopwith also up; and 70 h.p. Short with and without passenger. All machines were out in the afternoon. Com. Samson on new B.E., and climbing at half throttle. The 50 h.p. Avro seems marvellously efficient, and flies far better than some of the machines of greater horse-power.

Machines up all day Tuesday, including B.E., Bristol, 50 h.p. Avro, 2 Sopwiths, 80 h.p. Deperdussin, 80 h.p. Blériot, H. Farman, 2 Short biplanes, and M. Farman.

Wind and rain cleared up Wednesday about mid-day, when Com. Samson had Short 3 out, and Lieut. Briggs on the 80 h.p. Blériot.

Very windy and wet Thursday. Sopwith and Short machines only out.

Friday, fair. Lieut. Andrews left for Dover with passenger on Short biplane; when over the Swale at about 4,000 ft., the petrol pipe broke, and a forced landing was made at Harty. Having repaired same, he returned to the aerodrome and restarted. He reached Dover more or less uneventfully, but when over Dover, thinking the engine was failing, he landed. He again ascended alone to try the engine, but when turning on the top of St. Margaret's Hill, he stalled the machine and side-slipped, the tail and wing hitting the ground, the machine turning completely over. The pilot luckily escaped unhurt. B.E., 2 Shorts, H. Farman, Sopwith 2 flights, Blériot 2 flights in afternoon.

Saturday it was squally. Lieut. Courtneidge left for Portsmouth with passenger on 80 h.p. Sopwith, but returned after reaching Maidstone owing to bad weather. 80 h.p. Blériot and 2 Shorts also up. Sunday, wind and rain. No flying.

Civilian Flying.—Monday last week, Mr. Gordon Bell up with passenger on new side-by-side 100 h.p. (9-cyl.) Gnome-Short biplane. The Hon. M. Egerton made three good flights on his 50 h.p. Short biplane.

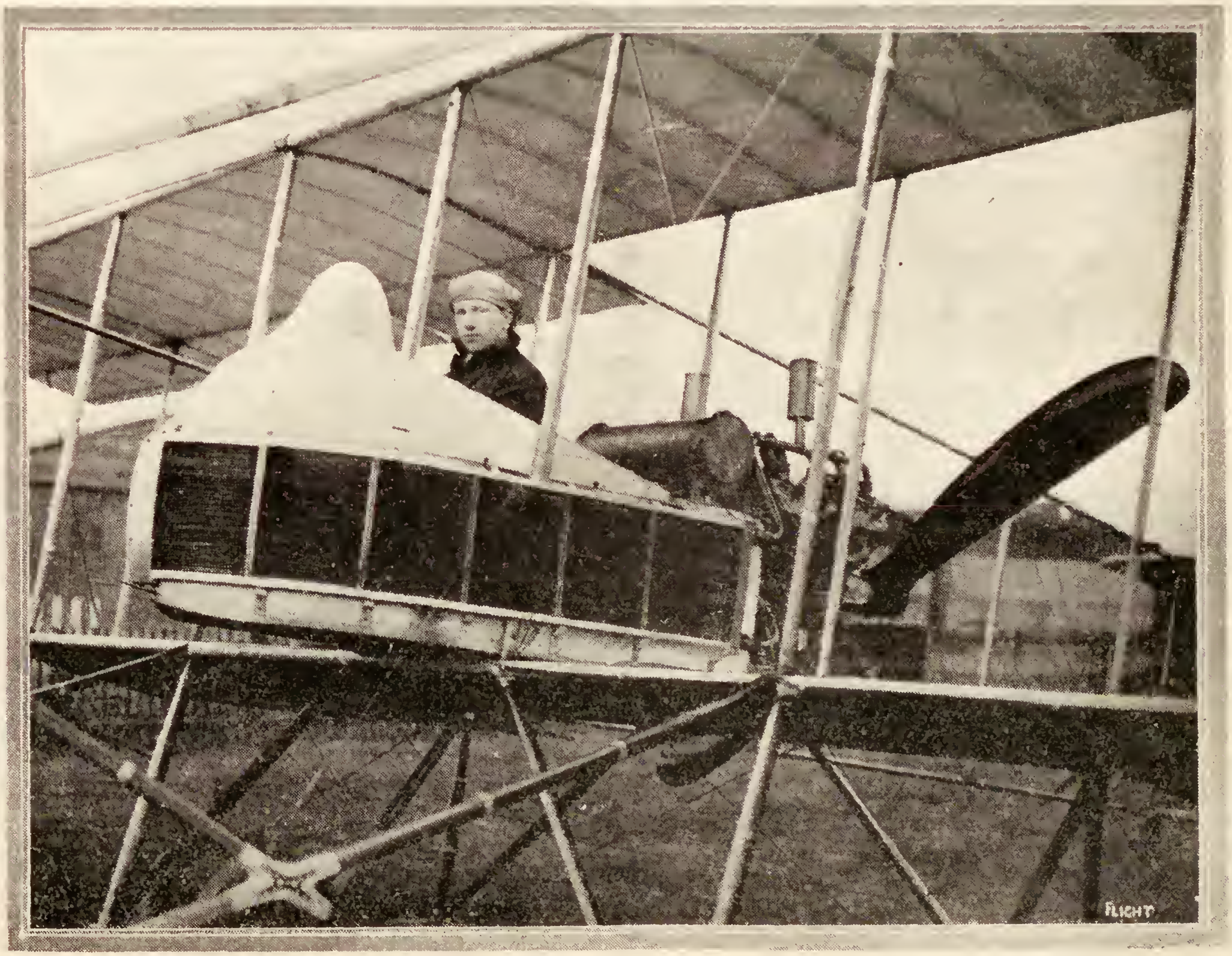
Mr. Gordon Bell again up Tuesday on 100 h.p. Gnome-Short biplane, with Mr. Fairey as passenger. The 80 h.p. Dunne biplane up with Mr. Percival as pilot, flying circuits. In landing, unfortunately, broke wing skid. Up again in afternoon with passenger, Mr. Pitt, in a very bumpy wind, but she was beautifully stable and Mr. Percival had perfect control.

Thursday, Mr. Gordon Bell up on 100 h.p. sociable Short (three flights), with Mr. Fairey as passenger, once in pouring rain.

Mr. Gordon Bell up Friday on 100 h.p. sociable.

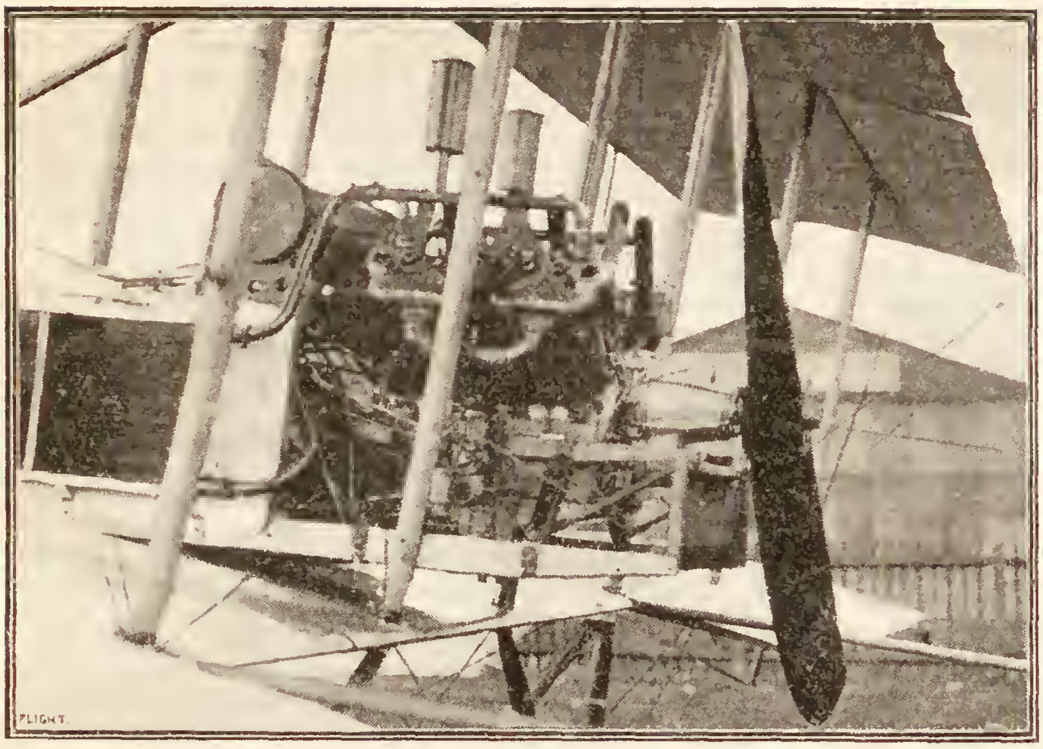
Brooklands Aerodrome.

On Monday last week with the wind varying between zero and up to only 12 miles an hour, a lot of flying was done. The Bristol and Vickers Schools were busy, two pupils from the latter, Lieut. Crosbie (remainder of test), and Lieut. Binney (full test; up to 1,000 ft. for altitude) passing their *brevet* tests in good style. Mr. Dukinfield Jones went up to 5,200 ft. on his Flanders biplane. Mr. Barnwell was out on the Vickers gun-carrying biplane. Mr. Alcock went to Staines Reservoir and back on the Maurice Farman (100 h.p. Sunbeam) biplane, reaching an altitude of 2,400 ft. Mr. Pixton had the new "tweenie" Sopwith biplane (100 Gnome) ordered by the Admiralty out for the first time, the machine flying right away without any adjustments. In the afternoon the new Martinsyde monoplane (with Lieut. Blatherwick as a passenger) went up to 3,600 ft. Mr. Dukinfield Jones was out again on the Flanders biplane with and without passengers. Herr Roempler was flying the D.F.W biplane. Mr. Alcock was again out on the Maurice Farman biplane with Mr. Coatalen as a passenger. Mr. Barnwell was out on the Vickers gun-carrier. At the Avro School, the new 50 h.p. Avro ordered for the Admiralty arrived, as also the 100 h.p. A.B.C. Avro., this being the first A.B.C. engine turned out by Messrs. Armstrong, Whitworth. Mr. Alcock took Lieut. Blatherwick on the Maurice Farman. Mr. Pixton, with Lieut. Spencer Grey as a passenger, put the "tweenie" Sopwith biplane through an



"Flight" Copyright.

Mr. J. Alcock, on the Sunbeam-engined M. Farman, about to make a flight at Brooklands Aerodrome.



"Flight" Copyright.

The Sunbeam engine power plant on the Maurice-Farman at Brooklands.

excellent hour's test, which was passed with a big margin to spare. Mr. Richard P. Creagh passed his *brevet* tests, reaching 500 ft.

The wind variation was up to 34 m.p.h. on Tuesday. The Vickers pupils were busy. Mr. Dukinfield Jones was flying with the Flanders biplane, both solo and with passengers. M. Marty, with a passenger, arrived from Hendon on a 50 h.p. Le Rhone-engined Morane-Saulnier, and returned to Hendon after a short stay.

On Wednesday the wind was blowing up to 30 m.p.h. The Vickers and Bristol schools were at work in the morning. Mr. Alcock took the Maurice Farman biplane up to 4,500 ft., carrying several passengers at different times. Mr. Raynham was on the 80 h.p. Avro, going to 4,500 ft., with Lieut. Blatherwick as a passenger. Mr. Dukinfield Jones made several flights on the Flanders biplane. There was less wind on Thursday, the variation being from zero to 18 m.p.h. The Bristol and Vickers pupils were busy. Mr. Alcock took Lieut. Blatherwick to 2,500 ft. Mr. Llan Davies' 50 h.p. Avro biplane arrived. In the afternoon Mr. Raynham was testing the new 50 h.p. Avro biplane ordered by the Admiralty. Mr. Pixton was out on the "tweenie" Sopwith biplane, which was then handed over to Lieut. Spencer Grey. Mr. Alcock on the Maurice Farman went to 1,500 ft. Mr. Barnwell took a pupil on a Vickers biplane, but the weather was too bad for much tuition.

On Friday the wind was distinctly gusty, as much as 41 m.p.h. being recorded; consequently no school work was possible. Mr. Jones attained an altitude of 3,000 ft. in a 20-mins. flight on the Flanders biplane. Mr. Alcock took a passenger up to 2,300 ft.

The weather was stormy and wet on Saturday. Mr. Raynham was out several times testing the new Admiralty 50 h.p. Avro. Mr. Jones made one or two flights on the Flanders biplane, and Herr Roempler was out on the D.F.W. biplane.

On Sunday, in spite of a strong wind, three machines made a number of flights. Mr. Alcock was first out on the Maurice Farman, followed by Mr. Barnwell on the new Martinsyde monoplane (on which the winner of the ballot for the free passenger flight—Capt. Gibbons, of Pine Grove House, Weybridge—had a trip), and Mr. Jones, who made a couple of flights in a bumpy wind on the Flanders biplane.

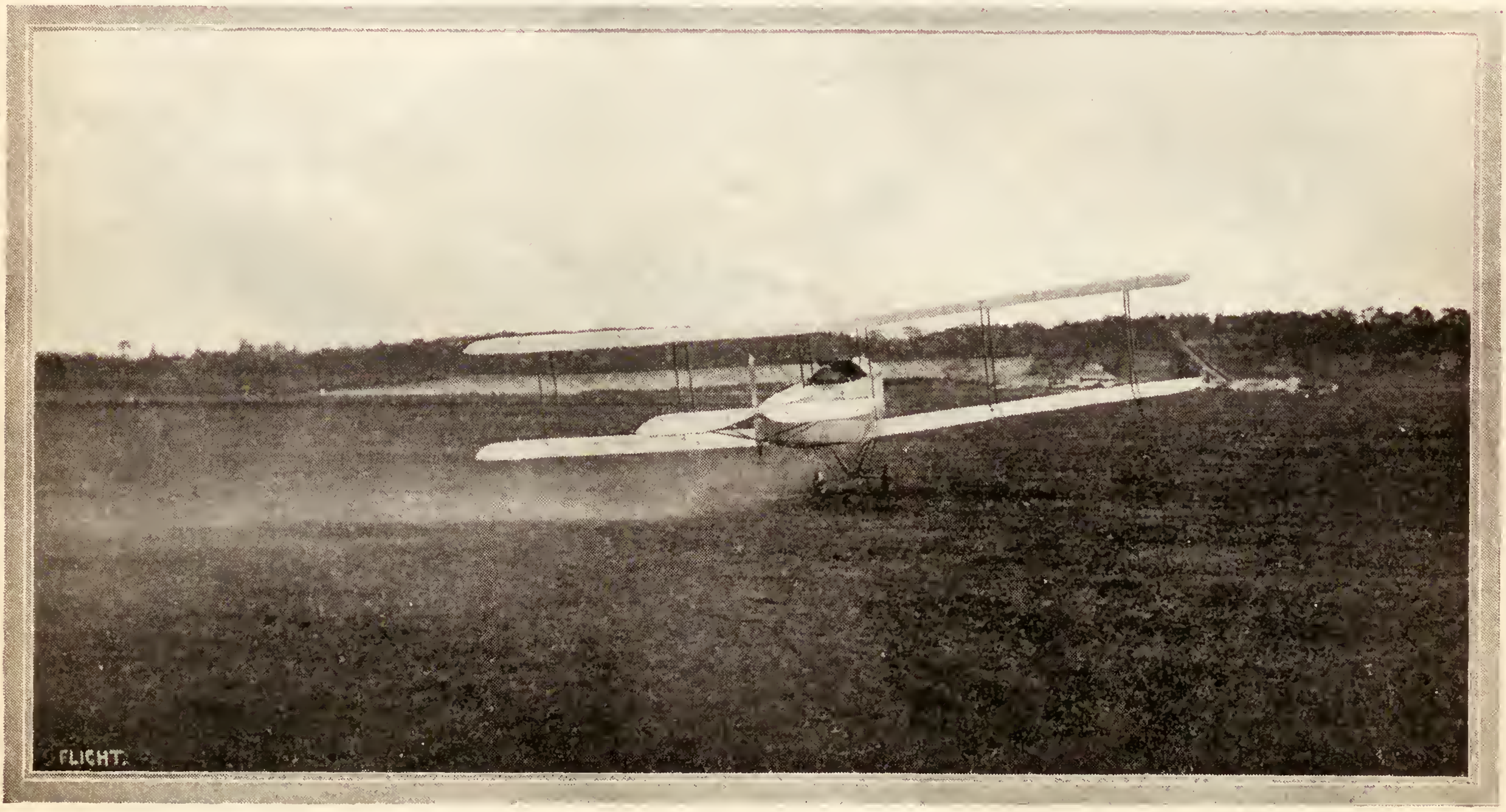
Bristol School.—Monday, last week, Halford with Lieut. Binney for a test flight, this pupil then taking over the machine and making several solo straights and circuits. Halford again with same pupil, who followed with some more solos, after which he went for his certificate, which he gained, flying at a height of over 1,000 ft.

No flying during the day, Tuesday, owing to high wind. Wednesday, the wind dropped about five o'clock, when Halford took Lieut. Fraser for tuition. This pupil continued on solos until dusk stopped tuition. Thursday, Halford with Lieut. Fraser, who followed with several solos. Halford tested a new machine, which was then handed over to Lieut. Fraser, who made his first solo circuit.

Lieut. Fraser as passenger with Halford, Friday, then flying numerous straights, circuits, and figures of 8 solo, after which the wind stopped further tuition for the day.

No tuition possible Saturday, owing to high wind all day.

Vickers School.—Monday, last week, Instructors Elsdon and Knight with Messrs. Creagh and Spencer-Warwick, also with Lieuts.



"Flight" Copyright.

OFF FOR EASTCHURCH.—Mr. Raynham starting away from Brooklands on Monday to deliver a 50 h.p. Gnome-Avro to the Admiralty at Eastchurch.

Crosbie, Jackson and Mansergh, and Capt. Ross Hume. Barnwell with Mr. Hurst. Lieut. Crosbie for second half of *brevet* tests. Mr. Barnwell on gun-carrying biplane. Lieut. Jackson solo on biplane, also Mr. Creagh, latter then for *brevet*.

Tuesday, Knight and Elsdon on biplanes with Lieut. Mansergh and Capt. Ross Hume.

Knight with Capt. Ross Hume on biplane, Wednesday, pupil then for solo. Lieuts. Jackson and Mansergh and Mr. Spencer-Warwick, solos. Thursday, Lieut. Mansergh solo on biplane. Capt. Ross Hume solo. Elsdon with Lieut. Jackson and Capt. Ross Hume.

Lieuts. Jackson and Mansergh, Capt. Ross Hume and Mr. Spencer-Warwick solo on biplane, Friday. Barnwell with passenger.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School. — Monday, last week, Messrs. Howarth, Lillywhite, Norris, Bjorkland, Clarke and Strange, solo circuits, &c. Lieut. Lindop and Messrs. Parker and Grahame, circuits with Mr. Birchenough. Mr. Stewart straights in Blériot with M. Marty. Mr. Clarke afterwards going in for *brevet* tests.

Messrs. Bjorkland, Lillywhite, Howarth and Norris, solos, circuits, &c., Wednesday. Messrs. Grahame, Barrs, Moore, Parker and Lieut. Lindop, circuits with Mr. Birchenough or Mr. Strange in the passenger seat.

Saturday, Mr. Norris, circuits with Instructor Cripps; Mr. Lillywhite solo circuits. Mr. Tapp and Prince Sapieha (new pupils), rolling with instructor and alone.

W. H. Ewen School.—On Monday, last week, school was out from 9 a.m. to 11.30 a.m., and from 3 p.m. to 4.30 p.m. Mr. Goodden test flight on 35 h.p. Caudron No. 1, Mr. Banks Price half-circuits, and Mr. Wiggett rolling.

The wind was too high on Tuesday for pupils' practice. Mr. Goodden made a fine flight on the 45 h.p. Caudron, lasting 30 mins.

On Wednesday the pupils were out from 4.45 p.m. to 5.20 p.m. After a test flight by Mr. F. W. Goodden on the *brevet* machine, Mr. Banks Price did straights. On the 35 h.p. Caudron No. 1, Mr. Curtis rolling.

Hall School.—Monday last week, in morning, Messrs. A. F. Arcier, A. L. Brookes, H. Gearing, 4 straights each. Meantime, L. Edgecombe Palmer made his first flight with J. L. Hall on Avro. H. Gearing had the misfortune to get stuck in recently excavated sewer at far end of ground, and made an upside down stunt unintentionally. H. C. G. Allen, who had previously made half a dozen good straights, was despatched to scene on 35 h.p. Blériot. Nothing however was damaged, owing to strong construction of machine. In afternoon Messrs. H. Gearing, A. L. Brookes, L. Edgecombe Palmer and A. F. Arcier, 4 straights apiece. In meantime, J. L. Hall, with Allen as passenger, flew over on Avro to Ealing, and returning later at a very high altitude, descended in a long spiral *vol plané*. In evening several passengers were carried.

As soon as mist cleared away, Tuesday, Messrs. Arcier, Gearing, Brookes and Edgecombe Palmer, rolling and straights about 4 times each. Later J. L. Hall flew over to Acton, but got caught in a squall, and decided not to continue on to Brooklands. Wednesday, wind and rain, but in evening, during temporary calm, H. C. G. Allen made some good straights, one with a graceful landing.

Thursday in morning, A. L. Brookes and H. Gearing 10 straights, both leaving ground at intervals. In afternoon, in pouring rain, a Mr. Finch was taken for a flight.

Messrs. A. F. Arcier, H. Gearing, A. L. Brookes and L. Edgecombe Palmer, 2 straights each, Friday morning before gale terminated school work. Saturday and Sunday, wind and rain.

Salisbury Plain.

Bristol School.—Voigt took Mr. Stutt for a passenger flight, Lieut. Barratt five flights, Capt. Walcot five flights, and Lieut. Harman one flight Monday, last week, after which the latter made his first solo, followed by Mr. Stutt. In the afternoon Voigt gave tuition to Capt. Walcot, Lieut. Barratt, Lieut. Myburgh and Lieut. Bolitho. Solos were made by Lieut. Harman and Mr. Stutt.

Tuesday, Jullerot and Voigt testing, the former then going out on the tractor biplane and the latter on the school biplane giving tuition to Capt. Walcot, Lieuts. George, Myburgh, Barratt and Bolitho, also Mr. Hay. Wind then stopped further work.

Sippe took Mr. Stutt for a trip on the tractor, Wednesday, but the wind was too high for any further tuition to be given.

Thursday, Voigt flying solo, afterwards giving tuition to Lieut. Myburgh. Jullerot took Lieut. George for tuition, but found conditions too bad for further flying.

No flying possible Friday, owing to wind and rain all day, and Saturday Voigt took Mr. Stutt for one flight, and Capt. Walcot for two flights. Mr. Stutt then made a solo in bumpy weather, after which no further flying was possible until late in the afternoon, when Capt. Walcot received four long tuition flights, and Mr. Stutt made four long solos with figures of 8.

BRITISH MILITARY AVIATION.

On Wednesday, the House of Commons went into Committee of Supply on the Army Supplementary Estimates, with Mr. Whitley in the chair. On the Vote of £196,000* for aviation, supplies and clothing,

Col. Seely (Secretary for War) explained that one of the main causes of the necessity for the Supplementary Vote was the necessary addition to the military aeronautical service. With regard to aeronautics, the Committee might well ask him to justify under-budgetting for a considerable sum. In a science so rapidly advancing it was not possible to forecast with accuracy what the demands might be. He believed that every other country interested in military aeronautics had found it necessary to make further provision owing to the growth of knowledge of aeronautics, and we had followed suit for similar reasons. There was, however, one reason for the increased vote which did not apply to other countries—namely, the transfer of the airship squadron of the Military Wing of the Royal Corps to the Navy Wing. It might be asked how the transfer involved a Supplementary Vote for the Army. The reason was that for the purposes of the transfer the airships and their plant were valued at £65,000, though, of course, no actual cash transfer took place between one Government department and another. But it would not have been proper for him, having obtained the sanction of the House to eight squadrons for the aeronautical service, to have reduced that number to seven, and therefore orders were given to put in the place of the airship squadron a squadron of aeroplanes, which were considered more suitable for Army purposes and Army administration and management. He consequently gave orders for the immediate provision of the necessary aeroplanes when the transfer was effected. These aeroplanes were all of a special type and designed for a special purpose. They were being constructed at the Royal Aircraft Factory, and would shortly be ready. There would be three flights of them, and he believed they would be of value to the Military Wing of the Royal Flying Corps.

The reason why they decided to transfer the airships from the Military Wing to the Naval Wing was that, in the progress of aeronautics, it became apparent that we must have not only more airships for the United Kingdom, but larger airships. Our military airships were remarkably efficient for their size, but as the science advanced it became evident that they would undoubtedly be at a disadvantage for various technical reasons owing to the great growth in the size of other airships. The question then was, should both the Navy and the Army take on this formidable business of increasing our lighter-than-air fleet, or should it be done by one Department? It seemed to them quite clear that in a matter of this kind, where they had one service, it was much better, if it could possibly be arranged, that it should be managed by one Department. The question was, which of the two Departments should manage the airship service. It seemed to him and those he consulted that without doubt it was more akin to the Navy to navigate great airships than to the Army. That did not mean in the least degree that our military officers had shown themselves incapable of managing our airships, for the exact contrary was the case. Whatever view might have been held with regard to the inadequate number we had, he thought there was general agreement that the record of our military officers who navigated airships was remarkable, both in regard to skilful navigation in what was the most difficult country for aerial navigation, and also for the quite astonishing absence of serious accidents either to the men or to the balloons themselves. That had been recognised by the First Lord of the Admiralty, in that he had given posts of great importance and responsibility in the airship service to those officers of the Military Wing who had transferred to the Navy Wing. Nor did it mean that the Army had finally decided that it did not require airships at all. That might well be the conclusion in years to come; it was not the final conclusion now. The difficulties of providing airships for an expeditionary army like ours, which must needs cross the sea, were very great, but were not perhaps insurmountable. Therefore, what this arrangement meant was that the Navy would hold at the disposal of the War Office such a number of airships, if any, and of such a character, as it might be decided the Army required for military purposes.

He believed that this division of functions would tend greatly to efficiency. The Army had devoted, and would continue to devote, its whole efforts to the heavier-than-air service. It might be asked what was this division of functions to which he had referred. No such statement could, of course, be final, but as at present advised the Government were of opinion that the proper division should be as follows.

The Naval Wing of the Royal Flying Corps should be responsible for the whole of the lighter-than-air, that was the airship, service. The Military Wing should be responsible for the whole of the heavier-than-air, that was the aeroplane, service, with the exception of the seaplanes, which seemed to be more suitable to the Navy.

These seaplanes would be specially designed to operate in conjunction with ships and in the neighbourhood of naval bases and ports and other naval purposes which could be best described by

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* The supplementary amount in the Army Estimates for aviation is £216,000—there being a sum of £100,000 to be deducted off the gross supplementary estimate of £296,000 in respect of appropriations in aid.

Mr. Churchill when, as he (Col. Seely) anticipated, he would be obliged to come to the Committee for a supplementary sum for the air service for his department. Speaking as the Chairman of the Air Committee, which had both services under its purview, he thought it was almost certain that this country was ahead of all other nations in its development of the seaplane. The other reasons for the supplementary vote were that it had been found necessary greatly to increase the number of spare parts, to increase the number of new aeroplanes, and to create an inspection department. The change of policy with regard to airships was in the direction of efficiency and safety. Other nations thought it desirable to keep the number of their airships secret. His Majesty's Government saw no advantage in so doing, at any rate so far as the aeroplanes for the squadrons and for the Central Flying School were concerned.

When he addressed the House on July 30th last they had 113 aeroplanes. Since that date they had struck off 52 of the older machines, and added 100 new aeroplanes, and therefore the present total was 161. He thought it was right to strike off such a large number—no other nation had done anything so drastic—in view of the great probability that risks to life and limb of the officers and men of the Royal Flying Corps would be minimised. Since July 30th the Military Wing of the Royal Flying Corps had flown well over 100,000 miles, taking part in military manœuvres over very difficult country. Excluding Saturdays and Sundays, which were not flying days, though in fact, flying often took place on Saturdays, there had only been six days on which flying had not taken place, and he was glad to say that during the whole of that time there had not been a single fatal accident to an officer or man. He regretted that there had been an accident to an officer under tuition, and a very sad accident to a civilian engaged in experimental work two days ago. So far as he had been able to ascertain, there had not been a single case of breakage of any main part of a machine in the air. One of the reasons for that was that a factor of safety had been insisted upon which was far higher than was the case in any other country. That was justified, not because they were more fearful of risks, but because they thought they ought not to take risks if no useful purpose was served, and also because this was a more difficult country to fly in than any of the Continental countries owing to the stronger winds and broken nature of the country. The absence of accident was due also in a large measure to the pilots, whose skill and daring had been acknowledged by all who had investigated the work of the aeronautical branch. The creation of the inspection department was part of the scheme for securing safety by testing every part of the aeroplane during manufacture. He was glad to say that with this Supplementary Vote, and with the provision which would be made in the Army Estimates, the Government would be able to complete the whole of the eight squadrons in men and machines by the end of the coming year. That meant that the country would require 250 aeroplanes—50 for the Central Flying School and 200 for the Military Wing. They had come to the conclusion that if the country required ten aeroplanes ready at any given moment they must have 20 in their possession. Therefore, 200 were required in order to have 100 ready at any given moment. The great majority of the machines were biplanes. It was a great mistake to suppose that biplanes were slow and that monoplanes were fast. They reckoned from experience that they could not count the life of an aeroplane more than two years. Therefore every year the War Office must replace one-half, or 125 of the 250 aeroplanes. Of the 100 aeroplanes obtained since July 30th he believed that 13 were obtained from abroad, and 87 in this country. Quite apart from any question of the relative merits of trading abroad or at home, it was undoubtedly necessary to get all warlike materials whenever possible within our own borders. He had satisfied himself that the condition of the industry was such now that we could quite easily get in this country all the aeroplanes we wanted to maintain the present standard and a great many more.

With regard to engines, a competition was to be held in the near future, with considerable prizes and orders to the amount of nearly £50,000 for a British-built engine. He could not prejudge the result of that competition, but he knew enough about what had been done to be able to say that we could also get all the engines required in this country within a very short time. The problem of getting aeroplanes and engines sufficient for our needs in this country was, in his judgment, solved. It was proposed that much the larger proportion of the Army aeroplanes should be constructed by firms, and the smaller proportion would be constructed, as it had been constructed lately, by the Royal Aircraft Factory, which would be thus left free to do work that was more important, namely, the construction of experimental machines of a special type, the details of which we did not wish to become known, and also repairs, which they could do very well at the Factory. He might be asked how it was that for the provision of a comparatively small number of aeroplanes, namely, 250, money amounting to many hundreds of thousands of pounds was necessary. The reason was that these machines must be regarded not as birds with a little mechanical power added, comparatively cheap as they were when the great pioneers of this industry, the Wright Brothers, first flew. They were now more like a modern high-power motor car, only much more expensive. The size and power of the engines increased daily. The average speed of the aeroplanes now in our possession was 65 or 66 miles an hour, a speed much greater, so far as his knowledge went, than the average speed of the aeroplanes of any other country. That meant high engine power, and, as anyone who owned a motor car knew, an engine of 80 to 100 h.p. was most expensive. Such an engine wore out far more rapidly in an aeroplane than in any motor car on the road. Then, again, every aeroplane must have two mechanics constantly attending to it. For all these reasons it could not be said that the War Office had been other than wise and economical in their management so far as it was possible to save money in a concern where every saving in strength or material might be an added risk to human life. He might be asked why this aeroplane service was required at all or why it should be such a big one. It was quite true that the proposals which he was putting before the Committee would give us an aeroplane service much larger in proportion to the size of our Army than that possessed by any other Power, but it was wise that such should be the case. Our Army was very small, and for that reason in matters of this kind it was well to be equipped on a greater scale.

Of the value of an aeroplane service there could be no doubt whatever. The range of vision from an aeroplane was astonishing. One was sometimes told by those who did not understand the subject that if a man in an aeroplane was near enough to the ground to see what was below him he would be brought down by the guns or rifles of the enemy. That was a complete delusion. At the height of 5,000 ft. one could see quite clearly on an ordinary day every detail of the landscape, not only roads and hedges, but whether there were two horses or one horse in a cart or wagon, and men could be seen walking along the streets of a town. How easy, therefore, was it to see what troops there were. In these circumstances he thought that military opinion would be disposed to share the view that if an army without aeroplanes was faced by an army with aeroplanes, and if things were anything like equal in other respects, the commander of the army without aeroplanes was doomed. He could not escape. Every movement except at night or in fog or in dense woodlands would be recorded. All this they saw in the manœuvres last autumn, and it would be still more marked in actual warfare. In manœuvres it was easy to have recourse to little *ruses de guerre*, such as hiding under hedges or blankets, and, as one general said, "making a noise like a mushroom." But these things could not be practised in war when there was always the element of hurry and haste to avoid disaster. Therefore it seemed clear that every large movement of troops in future would be absolutely known unless conducted in the dead of night or in dense fog or in thick woods. Whatever view hon. members might take of armaments generally, he felt sure that they would not like to see this country left behind in a matter of this vital importance. He honestly believed that the efforts made by the officers conducting the aeronautical service had been successful. We had pilots as good as any in the world—he believed that our aeroplanes were not less in number, they were certainly faster, much younger on the average, and more airworthy than those of other Powers. On the whole, we had made satisfactory progress; he hoped that we should make still further progress in the years to come, and he believed that we were now in possession of a military aeronautical service not unworthy of the British Army.

Mr. Joynson-Hicks, while conceding that the statement just made by Colonel Seely was more satisfactory than his previous statements on the subject, thought that the right hon. and gallant gentleman was not justified in appropriating all the plums to himself and describing our Army aeroplanes as being better than those of any other army in the world. It was certainly not desirable in our own interests that such statements should be made. He assumed that the officers of the inspection department would be independent of the Royal Aircraft Factory, and would inspect that factory with the same assiduity as they would private aircraft factories. Further explanation was needed as to why airships were no longer wanted in the Army. If an expeditionary force left this country for a European country, it would be at a time when the Navy also was at grips with the enemy. If the Secretary for War applied then to the Navy for a number of airships for the use of the land force, the Admiralty would, it was more than probable say: "We are very sorry. The protection of these shores is the first duty of the Navy. We must use our airships to compete with those of any foreign country coming here." Only nine months ago the right hon. gentleman made it perfectly plain that the Army did need airships, for he said that they had decided that the Army should have small dirigibles which could be packed in a box and sent wherever they were required. At the present time we did not possess such craft. Small airships would be very useful in Somaliland or on the North-West frontier of India in stopping raids. Both the French and the German armies had airships and were using them to an extent which would place our Army, if it were not also equipped with airships, at a great disadvantage. The number of airships possessed by Germany was 14, and by France seven. What were the negotiations between the Army and Navy before this change of policy was adopted, and had the right hon. gentleman any trouble with the Army Council in connection with the matter? There had been another remarkable change of front on the part of the Secretary for War. During the last 18 months the right hon. gentleman had given assurances that it was not his intention to manufacture aeroplanes at the Royal Aircraft Factory, and the statement had gone forth to the private manufacturers that they would not have to compete with the Government in this direction. It was of enormous importance to have here, as they had in France and Germany, a sufficient number of manufacturers who were prepared to supply aeroplanes for the use of the country. It was to be remembered that practically the only market for such machines was the Army and Navy. Yet within a year the number of men employed at the Royal Aircraft Factory had been increased from four or five hundred to about a thousand, and the right hon. gentleman admitted recently that he had, without giving notice of change of policy, issued an order for the manufacture of 24 aeroplanes at the Royal Aircraft Factory. He was not saying that it was not desirable to have a State aircraft factory, but it was only fair to other aeroplane manufacturers in the country that they should have full and definite knowledge of that fact. He suggested that the Secretary of State should give particular attention to the production of an English engine. In time of war we would not be able to get foreign engines, and it was essential to the well being of the aeroplane force that we should get an English engine. He did not wish to revive the controversy of last year as to the number of efficient aeroplanes possessed by the War Office. All he would say was that the figures which the right hon. gentleman had given to-day proved conclusively that he had not 100 efficient aeroplanes in the month of July last. Included in the list which the right hon. gentleman took credit for were 28 monoplanes. Between the rising of the House in August last and the following Christmas the whole of these were knocked off the War Office list. The right hon. gentleman ought not to have kept telling the House all last summer that he had a certain number of efficient aeroplanes, including these monoplanes, when he knew that as soon as the House rose he would knock these 28 machines off the list. The right hon. gentleman has now made the significant admission that for every working aeroplane there should be a spare one in dock. He had said we had 161 aeroplanes. That meant that we could not put more than 80 machines in full working order in the air at any moment, and he (Mr. Joynson-Hicks) doubted if any of the air squadrons could take the field up to full strength and fully equipped with transport, spare parts, &c. The House should take note of the strides made by Germany in the last twelve months with regard to her military aeroplane service. To-day she held records for flight distance for the whole world. During the last few months one German military aeroplane had been up for 16 hours 20 minutes in a non-stop flight; another had been up for 16 hours and 1 minute; and a third for 14 hours and 7 minutes. The right hon. gentleman knew that we had no aeroplane which could do the same. While the aeroplane service had considerably advanced during the last six months, the Government did not sufficiently realise the vital importance of that service being equal to any other in the world. Although he would like to see an increase of at least £250,000 in the amount spent on the aeroplane service, the only method of protesting against the insufficient Estimates was the ridiculous one of moving a reduction in them. He, therefore, moved to reduce the Vote by £100.

Mr. Dundas White urged the importance in the present transition stage of endeavouring to make progress by developing the type of aeroplane rather than spending wildly on multiplying the number of machines. He thought before long, instead of the air service being entrusted to the Army and the Navy, a distinct branch dealing with aviation would be required, and that the work of the department might ultimately be the most important part of the Services.

Mr. Lee said the statement which the Secretary for War had made that afternoon had been vastly more satisfactory than his statements to the House last year. At the same time, he did not wish the right hon. gentleman to infer that the Opposition regarded the present position as entirely satisfactory. He joined in the well-deserved tribute which the right hon. gentleman had paid to the officers engaged in this particular service. The right hon. gentleman had not given a satisfactory reason for the departure in his policy. He hoped the Army would not finally and definitely abandon the use of small airships for purely military purposes until the matter had received a great deal more consideration, and until the opinions of those who had to take part in small frontier wars had been obtained. Would the Secretary for War tell the Committee what would be the actual status of the officers of the Army Flying Corps who would be transferred to the Navy? Would they continue to be Army officers or would they be naval officers, and what would be their prospects with regard to promotion and pensions?

In his remarks concerning aeroplanes the right hon. gentleman had shown them that the position had been greatly improved by his policy of accelerating the completion of the eight squadrons for the Expeditionary Force, and it was a relief to know that within a measurable time the squadrons would be complete. He wished to know, however, whether they would be really on a war footing? But even if the Secretary for War had these eight squadrons on a war footing, what provision had been made for the equipment of the Home Defence Army with aircraft in case the Expeditionary Force were sent abroad? If the Home Defence Army were not provided with aircraft then no matter how well it was led and how strong the position they might hold against the invading enemy it would be doomed. It was more necessary that the Home Defence Army should be properly equipped in this respect than the Regular Army. Had the right hon. gentleman directed attention to this point?

Col. Seely: I have done so.

Mr. Lee, while not denying that statement, said that the right hon. gentleman had not vouchsafed any conclusion at which he might have arrived to the Committee, which was entitled to information on that point. Again, did the present Vote make any special provision for a larger and more adequate staff of mechanics? Without competent mechanics the best flying men in the world were exposed to unnecessary risks. He wished to express the strongest objection to this country raising a voluntary national flying fund or a fund for presenting Dreadnoughts to the British Fleet, or anything of that description. It was the business of the Government and the taxpayer to provide what was necessary, and it ought not to be left to private enterprise.

In conclusion he desired to join in the appeals which had been made to Colonel Seely and Mr. Churchill by the Press on their own side that having demonstrated, what it was unnecessary to demonstrate, that they were men of courage, they should not make it a constant practice to expose their valuable lives unnecessarily to the risks of what was no doubt an exceedingly delightful occupation. If it was a case of restoring confidence in the service owing to a serious accident he would applaud the action of the right hon. gentlemen, but, as Colonel Seely had shown, recruits were pouring in in as large numbers as could be desired for the Air Service, and he thought that the business of flying might now be very well left to those whose proper business it was to engage in it.

Major A. C. Morrison-Bell asked whether any, and if so, what progress had been made in the arming of aeroplanes.

Sir F. Banbury inquired how much of the original vote £2,027,000 was for aeroplanes. If the amount was not large, in view of the present Supplementary Estimate, it would indicate bad budgetting.

Mr. H. Baker (Financial Secretary to the War Office) said it was impossible to give the figure asked for by Sir F. Banbury. With regard to the 52 surplus aeroplanes which had disappeared since July there had been not only a question of their efficiency but one of their safety, which, in view of the present standard, was sufficient to condemn them. The best possible use had been made of these machines. Owing to the element of danger connected with them it would have been wrong to sell them in the open market. They had therefore been dismantled, and such parts as were serviceable had been set aside as reserve and spare parts. Mr. Lee had characterised the transfer of the Army airships to the Navy as a startling change of policy. Obviously it must be an essential part of such an arrangement that so long as the Army required airships, and at present it was believed it did require them, they must be provided by the Navy. The development of the aeroplane service would be all the more rapid if it was conducted under a single control. With regard to the position of the transferred officers which had been referred to by Mr. Lee, that question had not yet been finally settled, but he could give an assurance that the position of these officers would not be worse, but would probably be better, than heretofore. They had a perfectly free choice whether they would be transferred or not. As to British engines for Army aeroplanes, the number of British engines offered to the War Office was so small as to be almost negligible, but it was hoped that that would be remedied by the competition that was to take place in two months' time. Of the 100 new machines that had been added since last July 11 were made abroad and 89 at home, and of these 89 only 18 were made in the Army factory, 71 being ordered from private firms. It had been the unfortunate experience of the War Office that aeroplanes were not delivered as quickly as they would wish, this being partly due to firms over-estimating their power to deliver machines in time. There was no sort of intention on the part of the War Office to entirely cut off orders and manufacture themselves on a large scale.

Mr. Joynson-Hicks, by leave of the House, withdrew his motion for a reduction of the Vote.

Col. Seely said he would make a fuller statement with regard to the position of transferred officers when the Army Estimates for the coming year were presented.

The Vote was then agreed to.

EDDIES.

Chatting with Jack Alcock at Brooklands I heard glowing accounts of the doings of the 100 h.p. Sunbeam engine on his Maurice Farman biplane. Day in and day out it is his business to take the machine out, flying where and for as long as he likes, simply to thoroughly test the engine, so that it may show what it is capable of doing. Bench tests are all very well in their way, but after all, an aviation engine has to work in the air and not on a bench, and it seems that the Sunbeam method of testing is the right one—get the machine into the air every day, and stay there for hours on end. Alcock is himself delighted with the engine, and tells me that it gives out every bit of the power stated and more, while he has never had trouble with it in any way. On Monday he had a jaunt, with a passenger, to Windsor and back at an altitude of 4,300 ft., returning above the clouds. As a matter of fact, the regular musical sound of his engine could be heard for several minutes before the machine came in sight, descending in a steep *vol plané* out of a bank of thick black cloud. The War Office have, I believe, purchased an engine of the same power, and are now trying it.

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Alcock himself has quickly developed into a remarkably skilled and steady flyer, and is probably at the moment doing more actual flying than most pilots. Hardly a day passes but he is in the air most of the time; flying round the aerodrome or making trips over the surrounding country. He is just contemplating a round trip from and back to Brooklands *viâ* Eastchurch, Shoreham, and Eastbourne, driving his engine all out throughout the trip. It seems but yesterday that he took his ticket on Mr. Maurice Ducrocq's Farman school 'bus, but he now handles his machine with great skill and I look on him as one of the steadiest of our younger pilots.

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Speaking of Brooklands, I am glad to see that the Avro firm have again got a shed there. There seemed to be something missing with such old friends away. A very fine 50 h.p. school 'bus was flown to Eastchurch by Raynham on Monday, and I could not help but notice how well he got her off with a strong following wind, and how quickly she climbed to the required altitude for safety in cross-country flying—one circuit of the aerodrome and she was away. By the bye, I have never noticed the air so clear as it was then. For fully ten minutes we could see the Avro getting on her journey eastwards; until when only a speck, scarce a millimetre in size, it could still be discerned, although by that time, with a following wind, she must have been many miles away.

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There seems to be no end to the question of Vedrines' duel, which gets more complicated every day. Roux demanded satisfaction, but Vedrines refused to regard the incident as an *affaire d'honneur*. M. Quinton, President of the Ligue Nationale Aerienne, telegraphed to him "to fight or return." His reply was that he would return but only to fight M. Quinton himself. He sent his seconds, but after talking the matter over with M. Quinton they decided that there was nothing to fight for and that the matter was closed. Roux on hearing of the challenge to M. Quinton issued a statement in which he said that if any member of the Aero Club accepted Vedrines' challenge before he had crossed swords with him, he should consider it a personal affront. Vedrines has now asked two of the greatest duelling experts to form a jury of honour to try the case and taking into considerathe multitude of vexed questions to decide, these gentlemen should have enough to arbitrate upon to last them for some time. It is as well duelling in England is no more; it seems to be no end of a bother and takes up quite a lot of time; and after all I prefer the British method.

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A letter received from Mr. Compton Paterson informs us that he is again coming to England, and may be expected to arrive in a week or two. It will be good to see him once again, and no doubt he will have plenty to tell us of the prospects of aviation in the South African corner of the Empire. Our only regret is that poor Cheeseman is not returning with him; he had many friends in the old country, and his death came as a shock to us all.

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In these days of competition, much has to be done for the convenience of the paying public, as witness the enormous amount of money that has been expended at Hendon during the last twelve months. I feel sure that people look upon the distance from the paddock to the sheds as the great drawback to visiting Brooklands to view the flying. It is an awful drag right round the left side of the track, and if something could be done to eliminate this walk, I think it would go far to help things along. When people are offered a free ride in preference to walking, they are not, as a rule, over particular what they ride in so that they get there. The track people have a large motor wagon, which could be very cheaply fitted with seats, and if this ran backwards and forwards to the sheds from the paddock it would be much appreciated, and the journey would take but a very few minutes. Personally I should hail it with delight and climb in every time.

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An interesting experiment has lately been made in France by M. Guerre with a new device invented by him for the destruction of air-craft. It consists of an arrow fitted with a reservoir containing petrol, which is ignited when the arrow comes into contact with any obstruction. Experiments were made from the first platform of the Eiffel tower. A quantity of straw and wood were placed on the ground and two arrows dropped on to it, fire in each case being started. It is to be hoped the idea will not spread to Kingsway and fire the imagination of some of the ladies in that neighbourhood.

What a fine place the Blériot firm are making of the new works at Brooklands! By taking out the divisions between four or five sheds, they have secured quite a roomy workshop. The glazing of the frontage and end also tends to give quite a workmanlike look to the place. I was peeping in there on Monday, and saw a good deal of machinery being got into position, and everything looked very busy. It should make a difference to this splendid aerodrome, the only drawback to which is that it is rather a long way from town, to add another large school to those already in being. Brooklands has the unhappy knack of impressing one with the idea that there is nothing doing, whereas, as a matter of fact there is much real work always in progress. A new Vickers monoplane has arrived, but up to now I have not seen it in the air; it looks, however, a real business-like proposition. Everyone was on the *qui vive* on Monday, watching for the arrival of Sippe on a new tractor biplane from Bristol, but they were disappointed; probably, as it was raining hard, the journey had been postponed. The Isaacson-engined Flanders biplane has been doing some fine high flying recently. "WILL O' THE WISP."

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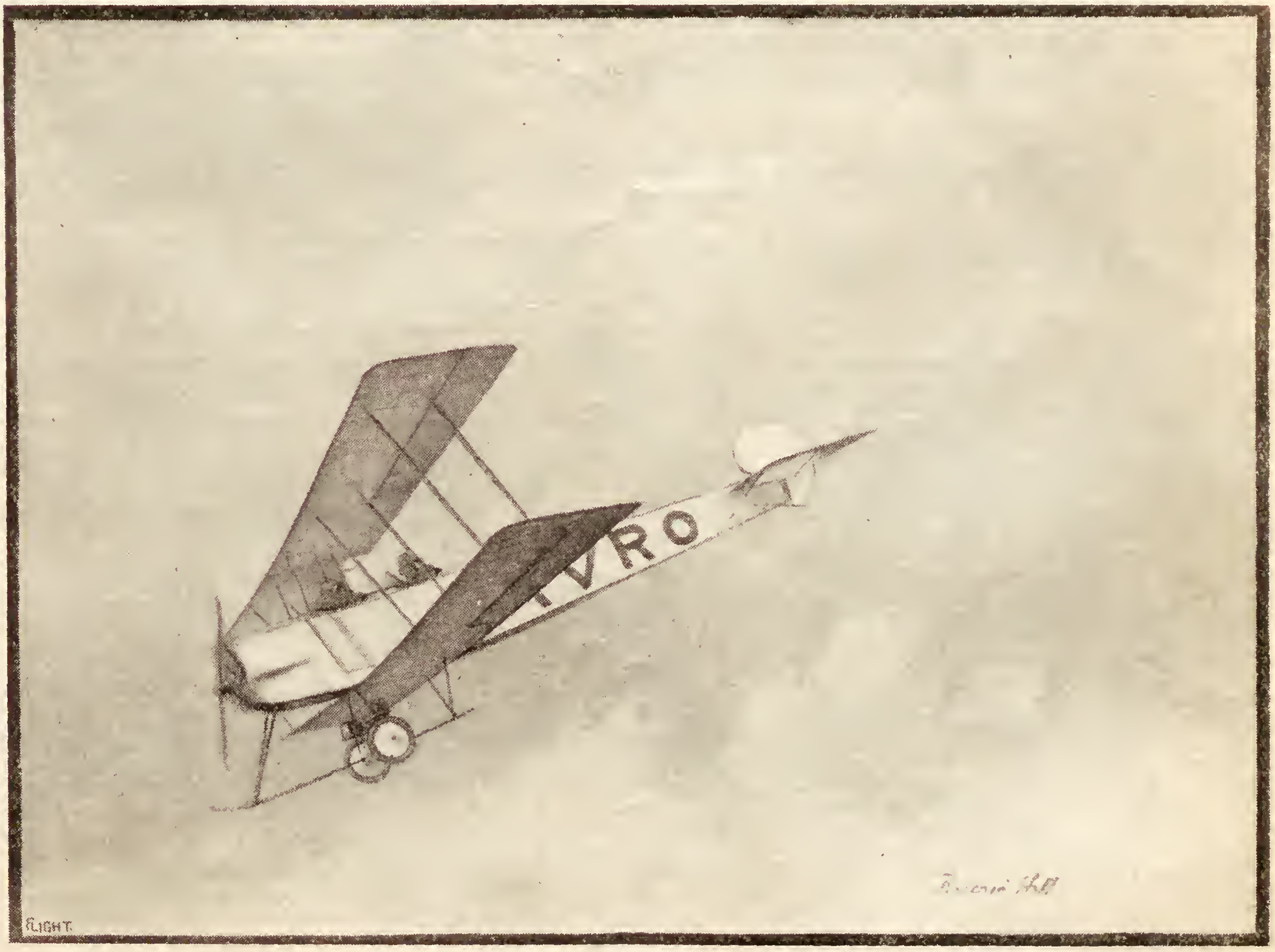
FLYING AT HENDON.

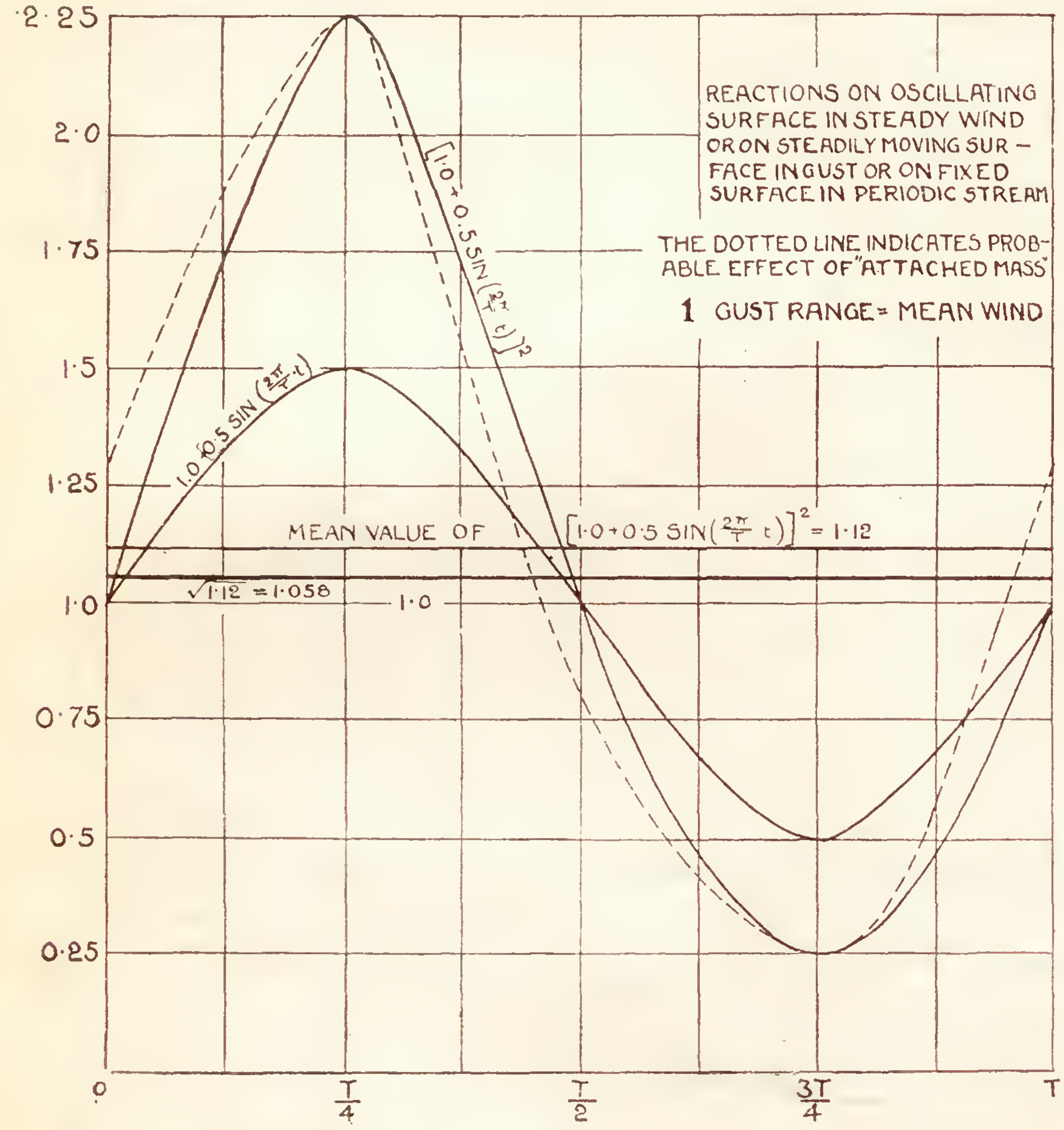
THE Suburban meeting at Hendon last Saturday opened with a sudden fall of the wind and an equally sudden fall of fine rain, which continued on and off during the afternoon. The cross-country handicap of 16 miles down on the programme, had, of course, to be abandoned, and exhibition flights took its place. The first out was R. H. Carr, who ascended, accompanied by a passenger, on the 50 h.p. G.-W. 'bus (twin rudder), and indulged in some fancy flying, at times disappearing from view in the haze that enveloped the aerodrome. Shortly after, J. M. Cripps came out on the 50 h.p. G.-W. 'bus No. 109, and put up several circuits of the aerodrome. In the meanwhile Carr had descended and had handed over the 'bus to W. Birchenough, who, together with a passenger, also made several circuits. Louis Noel then came out on the 80 h.p. Blériot monoplane, and made a very fine flight, with a passenger, in the rain. Noel has certainly shown himself to be as skilful a pilot of the monoplane as he is of the biplane. After this Carr went up again on the 'bus with another passenger, and performed some very erratic manœuvres, wriggling the machine about in all directions. It looked, in fact, as if he were doing his best to shake the biplane to pieces. No more flying was done until just before five o'clock, when Carr again went up on the 'bus, this time by himself, and made some final wriggles before closing the proceedings for the day. Sunday afternoon was much finer, although, perhaps, a little more windy, and several exhibition and passenger flights were made by the Hendon pilots. B. C. Hucks paid a visit to the aërodrome, and made a flight on the 80 h.p. Blériot with a passenger. Louis Noel also made several flights on the same machine, taking up passengers each time. Other flights were made by R. H. Carr and W. Birchenough on 50 h.p. G.-W. 'buses, Philippe Marty on the 80 h.p. Morane-Saulnier, and Pierre Verrier on a Maurice Farman, whilst F. W. Goodden put up some fine flying on the 45 h.p. Caudron. At one time the five machines were up in the air together. The Hendon Meeting, which opens this (Saturday) afternoon at 3 p.m., will include a Grand Speed Handicap of two heats and a final.



An impression of Raynham gliding on the 80 h.p. Avro. From an original drawing by Mr. Roderic Hill.

THE AERODYNAMIC EFFECTS OF GUSTS ON WINGS, AND OF OSCILLATING WINGS.

By Professor HERBERT CHATLEY, B.Sc. (Engrg.), M.I.C.E.I., A.F.Ae.S.



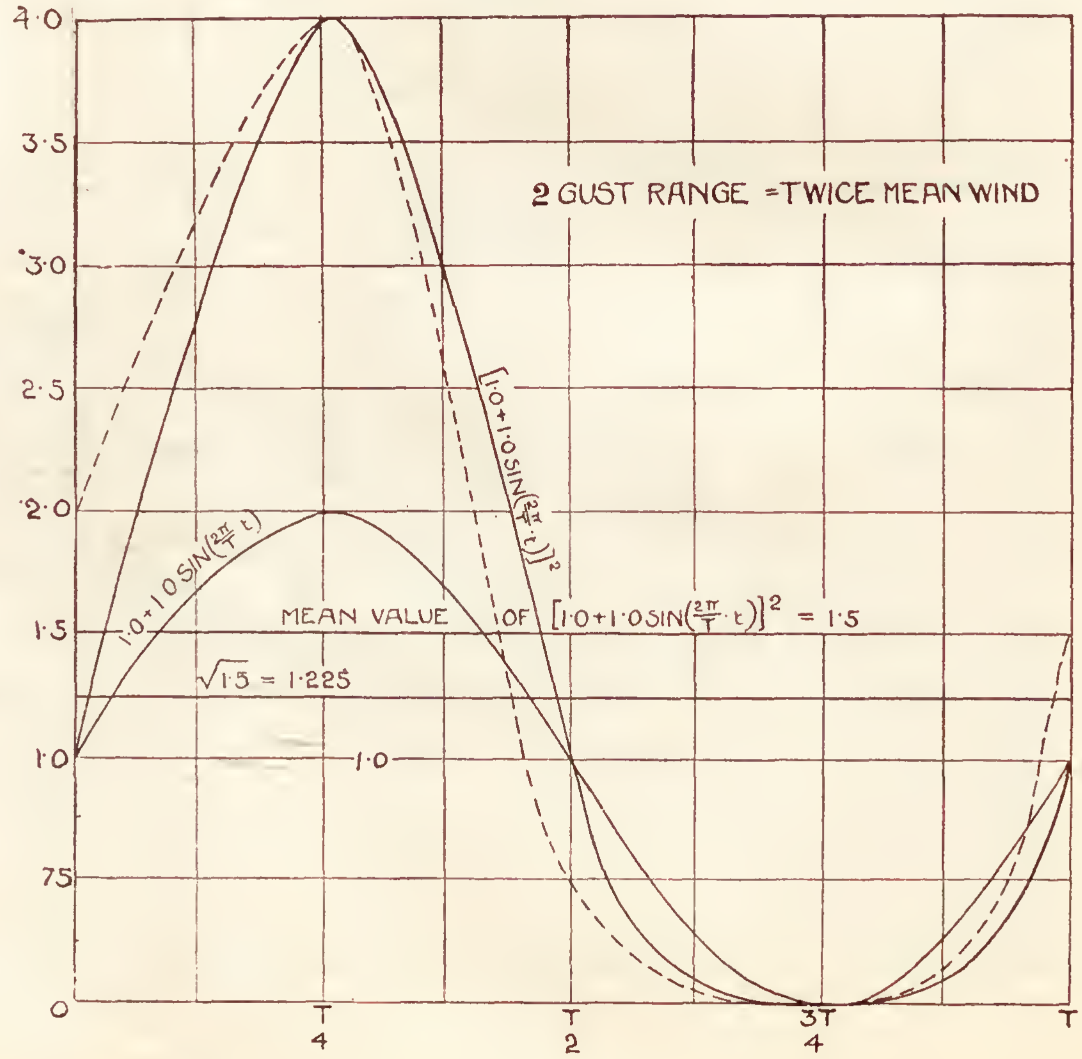
It is the object of this paper to call attention to a factor in dynamic flight which has received very little attention, and yet may prove to be of the greatest importance.

Observations of wind pressure on exposed structures (*e.g.*, The Forth Bridge) indicate that on small surfaces higher pressures are experienced than on large ones, but that, on the other hand, in a steady current, large surfaces tend to have a higher unit pressure than small ones. The latter fact is certainly due to dimensional causes. The effects of dimension have received considerable attention at the hands of the Advisory Committee for Aeronautics, and the manner in which the coefficient of resistance increases with dimension, and the relation of the dimensions to the velocity will be found in the Blue Books issued by the Committee. It remains, therefore, to account for the first fact. There can, of course, be no doubt that it arises from the unsteadiness of the wind, and the complexity of its structure. It would seem probable that the dimensions of the aerial vortices and waves which are termed "gusts" are comparatively small (elsewhere I have pointed out the serious effect this has on the mathematical computation of aeroplane stability) in one direction if not in both. In this connection I would remark on the vertical vortices known as "sand-pillars" (or, at sea, "waterspouts"). These, on a small scale, are very frequently seen in North China. The visible portion, *i.e.*, that within which the velocity is sufficient to keep the dust in motion, varies in diameter from two or three inches upwards. I have not seen them more than a foot or two in diameter. The height is twenty or thirty times the diameter, the structure becoming indefinite at the top. In a perfect fluid a vortex must terminate on a surface of separation if at all; this is true of the lower end of the sand pillar, but the upper end seems to spread out in spirals, in a manner similar to that which Lanchester conceives to occur at the trailing tips of pterygoid aerofoils. These pillars are generated in the "dead-water" on the leeward side of an obstacle with a vertical edge, and finally pass out into the stream and travel with it. I have seen them travel a mile or more at a comparatively low speed. Doubtless similar horizontal vortices frequently tend to be formed, but lack stability, on account of the absence of a vertical surface of separation. Have they ever been seen to travel up or down the face of a cliff?

Without reference to the question of flight, it would be of great utility to know what effect gustiness of a prescribed amount has on wind pressure, but beyond this the abnormally high pressures which occur, due to gustiness, suggest that a means is provided in this direction for obtaining higher loading on a dynamic flying machine at a given speed than is possible with the present purely gliding forms. Some temerity is needed to refer to the ornithopter after its continuous failure, but the aerodynamic success of the Nicholson and Pichou wheels is, perhaps, some indication that progress may occur in that direction.

The main thesis of this present paper is that:—(1) an oscillating wing may sustain a heavier loading than a gliding wing, the mean velocity being the same, and (2) if the virtual mass of air dragged with the wing during the downstroke can be feathered off at the bottom of the stroke, the upstroke being made "in the wind," there will be a further and possibly very appreciable increase in the loading possible.

Professor Maurice Fitzgerald was the first to call attention to the latter fact, in a paper communicated to the Royal Society by Lord Rayleigh in 1909 ("Proc. Roy. Soc.," A, Vol. 83, 1909.) He shows that the loading per h.p. due to this cause alone, varies as the ratio of the virtual mass to the actual mass of the machine multiplied by the frequency of "flapping."

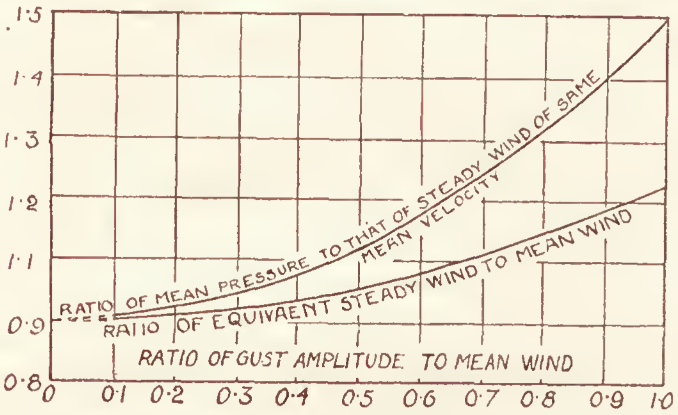


This effect is doubtless small when the angle of attack of the wing is small, but is probably of great value at high speeds and may perhaps largely account for the flying powers of many insects.

It is, however, the first point which I wish to call more special attention to, viz. :—

The *mean* pressure on a surface due to a stream whose relative velocity varies periodically is higher than that due to a steady stream whose velocity is equal to the mean velocity of the unsteady one.

A complete and formal proof of this statement is not possible, but if it be assumed that during a periodic change of velocity the conditions at any instant are the same as if the velocity at that instant were steady, then the mere fact that *the square root of the mean of a number of squares exceeds the mean of the roots of those squares* shows that the effect of variation in velocity is to increase the effective value of the mean velocity, the pressure at any instant being proportionate to the square of the velocity at that instant.



To illustrate this point with a simple numerical example, let it be supposed at a series of moments the velocity, in any convenient units, is 4, 5, 6, 7, 5, 3.

Then the mean velocity is the sum of these (30) divided by 6 = 5. Since, however, pressures (subject to the above mentioned assumption) vary as the square of the velocity at any instant, the mean *pressure* will be proportionate to the mean *square* = (16 + 25 + 36 + 49 + 25 + 9)/6 = 26·66, and the equivalent *velocity*, *i.e.*, that which, if steady, would give the same pressure, is sq/rt of 26·66 = 5·16.

In this case the equivalent velocity is 3·33 per cent. higher than the mean velocity, and the pressure is 6·66 per cent. higher than that of a steady wind of the same mean velocity.

This use of the "Root-mean-square" is similar to that which occurs in alternating current calculations, but it must be remembered that in the latter there is, as it were, nothing but gustiness, so that the formulæ in common use will not apply to this case.

It may be shown when the gustiness is "harmonic" in its variations that, subject to the above mentioned assumption, the mean pressure varies as the sum of the square of the mean velocity and half the square of the maximum excess or deficiency of a gust from that velocity, so that the equivalent steady velocity is

$$\overline{V} = \sqrt{V_0^2 + \tfrac{1}{2}\Delta V^2}$$

where V_0 = mean wind velocity,
and ΔV = maximum excess or deficiency of gust above or below mean wind velocity,

if we write $\Delta V = k.V_0$, then $V = V_0\sqrt{(1 + \tfrac{1}{2}k^2)}$
(k = ratio of excess or deficiency of gust above or below mean velocity to that mean velocity).

The following table and the three diagrams will perhaps be useful to illustrate the ideas involved :—

Coefficient of gustiness ("k").	Ratio of mean pressure to pressure of steady wind of same mean velocity.	Ratio of equivalent mean velocity to actual mean velocity.	
0·0	1·0	1·0	
0·1	1·005	1·0024	
0·2	1·02	1·0099	
0·3	1·045	1·0222	
0·4	1·08	1·039	
0·5	1·12	1·058	(See
0·6	1·18	1·086	Fig. 1).
0·7	1·245	1·116	
0·8	1·32	1·149	
0·9	1·405	1·185	
1·0	1·5	1·224	

Students of hydrodynamics will, of course, notice a certain weakness in the fundamental assumption. It has been assumed that in an unsteady stream at any instant the conditions are the same as in a steady stream in which the relative velocity of the wind surface to the general body of the stream is the same as that which occurs in the unsteady one at that instant. I believe the analysis of the stream-lines in this unsteady stream transcends the present powers of mathematicians, so that investigation along that line would seem to neither confirm nor deny the result given. Analogy suggests, however, that the reactions cannot well be less than the values suggested, and that almost certainly when the accelerations have been taken into account the reactions will be appreciably more.

This, then, leads us back to the question of the acceleration of the virtual mass. In my little book on the "Force of the Wind" (p. 24) I briefly referred to this problem, but did not clearly distinguish between the velocity effect and the acceleration.

During the increase of velocity there is an excess of pressure equal to the product of the virtual mass and the acceleration, and again during the decrease of the velocity there is a decrease of pressure.

The laws of harmonic motion show that the acceleration varies harmonically if the velocity does so and also varies as the product of the frequency and the amplitude. If the variation of velocity is harmonic (as in the case of a beating wing) then all that requires to be known is the mass of air affected. Doubtless experiment would provide some information as to this, and I suggest that laboratories possessing wind tunnels would do well to experiment with a pulsating stream. The discharge from a reciprocating air-pump might serve the purpose.

The results would probably be applicable to structural design as well as to aeronautics.

* * *

AIRSHIP NEWS.

The Britannia Airship Fund.

At a meeting of the Britannia Airship Fund Committee, Capt. Hawtrey Cox, who presided, said that a donation of £750 had been promised by the Marconi Wireless Telegraph Co., making a total amount of £1,900 received or promised in addition to the donation of Mr. Ralli announced at the inaugural meeting.

The "Montgolfier" at Maubeuge.

The new French military dirigible of the Clement-Bayard type, the "Montgolfier," on the 20th inst., went from Lamotte Breuil to her new station at Maubeuge. There were eight persons on board, and the journey was made in an hour and three-quarters, the average speed working out to 75 kiloms. an hour.

The "Adjudant Vincenot" at Lamotte Breuil.

By way of returning the call made at Issy by the new Clement-Bayard airship "Montgolfier," the "Adjudant Vincenot," which, it will be recalled, is of similar design, on the 17th paid a visit to the Clement-Bayard works at Lamotte Breuil, carrying eleven officers on board during the voyage to and from Issy.

Aerial Manœuvres at Cologne.

During last week some aerial manœuvres were carried out at Cologne, and a typical day's work was that on the 19th inst., when the Zeppelin "Z 2" went to Dusseldorf, Duisburg and Essen, and back to Cologne, while Lieut. Appell made a 4-hr. flight to Marburg-sur-Lahn, and Lieuts. Foly and Hantelmann, each with passengers, 3-hr. trips to Frankfort.

Oversea Voyage by the "Sachsen."

The Zeppelin airship "Sachsen," which is at the disposal temporarily of the German Naval authorities, made a trip from Hamburg to Heligoland and back in the small hours of Tuesday morning. She was seen passing Cuxhaven at 3.30 a.m., and an hour later exchanged flashlight signals with the airship station on the island. She arrived back at Hamburg at 8.30 a.m.

* * *

The Slack Fund.

The following further contributions have been received :—Messrs. A. M. Forman, £5 5*s.* ; S. Pickles, £2 2*s.* ; Glasgow I.C.S. Staff per W. Keer, £1 10*s.* ; M. Desoutter, C. J. Sabiston, J. W. Dunne, £1 1*s.* each ; Victor Lapeyre, F. Bjorklund, £1 each ; E. E. Clarke, A. D. Frampton, R. W. Fryer, F. W. Moore, R. D. Scoular, 10*s.* 6*d.* each ; R. P. Baker, W. W. Odell, E. B. Seymour Norton, Anonymous, H. S. Brough, Mrs. Parke, J. S. Batty, H. F. Jackson, 5*s.* each ; Miss K. Henn, 4*s.* ; Messrs. D. Y. Ferguson, A. Bourne, J. T. Holding, 2*s.* 6*d.* each ; Anonymous, 1*s.*

To Help the Benevolent Fund.

A practical move to assist the Benevolent Fund for aviators which has been started by the Royal Aero Club has been made by Mr. B. C. Hucks, who has decided to charge a fee of 6*d.* for each autograph which he gives, the money to go to the fund. Mr. J. C. Savage, manager for Mr. Hucks, estimates that during the last three years Mr. Hucks has signed his autograph over 9,000 times.

BRITISH NOTES OF THE WEEK.

THE ROYAL FLYING CORPS.

THE following appointment was announced by the Admiralty on the 18th inst.:—

Lieut. E. Mason, R.N.R., appointed Lieut. on Supplementary List, and reappointed to the "Pembroke," additional for the Isle of Grain Air Station as Flying Officer. To date February 1st.

The following promotion was announced by the Admiralty on the 24th inst.:—

Sub-Lieut. James Lindsay Travers, R.N.R., to be Lieutenant. Dated February 19th.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending February 20th:—

Flying Depôt. S. Farnborough.—Repair, experimental work, and assistance to the Inspection Branch were continued as usual.

No. 2 Squadron. Montrose.—The week was mainly devoted to reconnaissance of the country round about Montrose, and also of warships and submarines near the coast.

No. 3 Squadron. Netheravon.—The pilots were employed on experimental and instructional work throughout the week.

No. 4 Squadron. Netheravon.—The officer pilots of all three flights were busy flying daily. Three machines were flown from Farnborough for the use of the squadron.

No. 5 Squadron. S. Farnborough.—The officer and non-commissioned officer pilots had a considerable amount of practice on Sopwith and Avro machines.

No. 6 Squadron. S. Farnborough.—The B.E.s and M. Farmans with which this squadron is being equipped were flown frequently during the week. Several cross-country reconnaissances were made. The organisation of the squadron is being continued.

Five R.F.C. Squadrons to Camp.

DURING June the five aeroplane squadrons in the South of England will take part in a camp for combined training which will be held at Netheravon on Salisbury Plain.

The Cody Biplane for South Kensington.

THE biplane with which the late Col. Cody won the Military aeroplane trials in 1912 has now been sent by the War Office to the Science Museum, South Kensington, where it is being installed in the ship construction room, close to the "Baby" Wright biplane, lent by Mr. Alec Ogilvie.

Mr. Churchill on a Sopwith.

DURING a visit to Hendon on Friday of last week, Mr. Winston Churchill, First Lord of the Admiralty, went up with Lieut. Spencer Grey, R.N., on a Sopwith biplane. A strong wind was blowing at the time. On the previous day Lieut. Grey had piloted the machine from Brooklands, but owing to the mist and the rain he found considerable difficulty in finding his way. He took 2½ hours for the trip, and had to make four descents.

Mr. Churchill Over Spithead.

SOME more practical experience with seaplanes was included in the visit of the First Lord of the Admiralty to Portsmouth on Monday. He was taken up by Lieut. Longmore on one of the new M. Farman waterplanes, Mr. Churchill going on board the seaplane as it floated alongside the Admiralty yacht. A course was taken over the flotilla of submarines manœuvring in Spithead, after which a long flight was made round Portsmouth and over Whale Island before the seaplane again alighted alongside the Admiralty yacht, "Enchantress." A little later Mr. Churchill made another similar flight.

Wedding Bells.

CONGRATULATIONS to Commander Neville Usborne, R.N., of the Naval Wing of the Royal Flying Corps, who was married on Monday at St. Margaret's Church, Westminster, to Miss Betty Hamilton. Lieut. Malone was best man, and the Naval Wing, R.F.C., provided a guard of honour.

The Royal Aero Club Annual Dinner.

AS announced, the annual dinner of the Royal Aero Club, which was to have taken place yesterday (Friday) had to be postponed to Wednesday next, March 4th. Owing to the hall at the Royal Automobile Club not being available for that date, the function will be held at the Savoy Hotel. Mr. Winston Churchill, First Lord of the Admiralty, will be the principal guest.

British Team for the Gordon-Bennett Race.

SIX entries having been received by the Royal Aero Club for this year's Gordon-Bennett race, it will be necessary for the Club to arrange eliminating trials to select the British team of three. In addition to the entries of the Avro, Sopwith and Bristol firms, which have been already noted, Messrs. Vickers, Ltd., have sent in an entry, while Messrs. Cedric Lee have entered two machines.

The Fatal Accident at Wittering.

ONE of the new Army biplanes of the FE2 type was involved in a smash at Wittering, about seven miles from Chichester, on Monday. The machine was being piloted by Mr. Ronald Kemp, and carried Mr. E. T. Haynes as passenger. From the evidence given at the inquest, on Tuesday, it appears that the machine overbanked when making a steep right-handed spiral descent from a height of between 500 and 600 ft., and side-slipped. Mr. Haynes sustained a fractured skull and spine, and died shortly afterwards. Mr. Kemp, whose injuries included a broken leg, displayed remarkable fortitude, and directed the removal of the unfortunate passenger from the *debris*. A verdict of accidental death was returned at the inquest, and the jury expressed their sympathy with the relatives. At the time of writing, Mr. Kemp is reported to be progressing favourably.

No Naval Manœuvres this Year.

IT has been officially announced that there will be no Naval grand manœuvres this year, but a test mobilisation will be carried out in July.

The Sunbeam-M. Farman Visits Shoreham.

A FINE trip from Brooklands to the South Coast was made by J. Alcock with a passenger on the 100 h.p. Sunbeam-engined Maurice Farman on Tuesday, the machine arriving at Shoreham 7,500 ft. up. After taking up several passengers for trips to Brighton, Worthing and well out to sea, the return was made to Brooklands, the altitude, however, not exceeding 4,000 ft., as the clouds were low and it was very misty.

Annual Dinner of the London Aerodrome.

FRIDAY, March 20th, has been selected as the date of the first annual dinner in connection with the London Aerodrome, Hendon. The function will be held at the Royal Automobile Club, Pall Mall, S.W., and the Right Hon. the Earl of Lonsdale will be in the chair, while during the evening the trophies won during the past season will be presented.

Sunbeam Activity.

ON Monday, February 16th, Jack Alcock, on the 100 h.p. Sunbeam-M. Farman, made good cross-country flight to Staines and Windsor with passenger at 2,400 ft., also took up Lieut. Blatherwick and Mr. Coatalen, the designer of the Sunbeam engine. On Wednesday, 18th, one flight of 50 mins. at 4,500 ft., with passenger; also passenger carrying in the afternoon, while the next day a good flight was made with Lieut. Blatherwick in the rain at 2,500 ft. Tests were also made with a Lang propeller. Some passenger flights—one at 2,300 ft. through the clouds—were made on Friday and Saturday last.

The Sopwith in Australia.

ATTRACTED by the announcement that Mr. H. G. Hawker was to fly the Sopwith machine which he had brought from England, a crowd of about 15,000 people visited the Randwick Racecourse, Sydney, on Sunday. Among the passengers who were taken up were the Governor-General, Lord Denman; Miss Strickland, a daughter of the Governor of New South Wales, went up with Mr. Hawker on the previous day.

A 600 h.p. Canton-Unné Motor.

IT is interesting to note that the Dudbridge Iron Works, Ltd., who are now building the Canton-Unné engines over here, are engaged in the construction of a 600 b.h.p. engine. Incidentally it may be pointed out that, owing to a printer's error in the table of engines appearing in our last issue, the 90 h.p. Salmson (Canton-Unné) engine was credited with 17 cylinders instead of 7. The motor is similar to the 14-cyl. engine, except that it only has one ring of cylinders.

Good Business by the G.A.C.

IT is gratifying to learn that the General Aviation Contractors, Ltd., have just been favoured with contracts from the Grecian Government for a considerable quantity of their "Gnomol" castor oil, and a number of Roold and G.A.C. clothing equipments and accessories. During the past four weeks orders have been received from China, Australia, Canada, South Africa and the United States, thus showing the extensive reputation of the firm—like unto an octopus!—and, incidentally, the wide-spread channels into which FLIGHT circulates.

Good Work by the Isaacson Engine.

IT will be seen from the report of the doings at Brooklands on p. 215, that some very fine flying has been done recently by Mr. Dukinfield Jones, both with and without passengers, on the Flanders biplane, which, it may be recalled, is fitted with one of the new Isaacson engines.

FOREIGN AIRCRAFT NEWS.

Another German Height Record.

ON a Rumpler monoplane at Johannisthal on the 18th inst., Lennekogel beat the German record for pilot and one passenger by going up to 4,300 metres. The world's record for pilot and one passenger stands at 4,960 metres.

The Garros-Hamel Match.

IN spite of the wet and windy weather, a large crowd was attracted to the Juvisy aerodrome on Sunday to see the match between Hamel and Garros. Garros was fortunate, and secured the right to start first, one minute in advance of Hamel. Ten laps of the two kilom. course had to be covered, and Garros won the first heat in 12 mins. 6 secs., Hamel in the ninth lap, finding he could not win, rising and making a very fine loop. The two pilots then exchanged machines, but again Garros was the victor. This time he completed the 20 kiloms. in 11 mins $4\frac{4}{5}$ secs., while Hamel's time was 11 mins. $11\frac{1}{5}$ secs. Garros, having won two events, no further contest was necessary, and the two pilots then went on to give a very fine display of fancy flying, including looping the loop, &c. Both pilots used Morane-Saulnier machines of identical design, and fitted with Gnome engines and Integral propellers. Subsequently the winner was challenged by Audemars and Friedrich, and the challenges were accepted.

French Military Aeronautics.

IT was announced by the French military authorities last week that following on the formation of the new and separate department for Aeronautics with its own special Council, it has been decided to create two new posts: an Inspector of Aviation and an Inspector of Aerostation. The former will give his attention to aeroplanes while the latter will deal with dirigibles and balloons which have been somewhat neglected during the past year or so.

Fast Flying on a Ponnier.

ON Tuesday of last week, Emile Vedrines, on a new type of Ponnier monoplane, made a fine trip from Rheims to Paris. Starting from Rheims at a quarter past three, he flew at an altitude of about 2,500 metres until near Paris, when he came down to 200 metres and followed the course of the Seine, landing at Issy after flying for an hour and five minutes.

Two New Loopers.

THE number of pilots who have successfully looped the loop was increased to thirty-seven last week, Bill carrying out the manœuvre on a Henry Farman on Wednesday, while Legagneux did it on a Blériot on Saturday.

M. Farman Gives His Daughter a Flight.

AT Buc, on the 18th, Maurice Farman gave his daughter her *bapteme de l'air*, and took her for a little excursion to Rambouillet. He also made a long cross-country flight with Senoucque as passenger.

Testing an Aerial Torpedo.

SOME tests were made on the 18th inst. from the first platform of the Eiffel Tower with an aerial torpedo or bomb invented by M. Guerre. The device consists of a cylinder of petrol mounted on a steel arrow, the point of which is so arranged that, as soon as it comes in contact with anything, it liberates and ignites the spirit. To guide the bomb during its flight the rear end is provided with helicoidal fins. The bombs were dropped on to bales of straw, which were ignited and entirely destroyed in three minutes. At the request of the French military authorities, experiments are to be made in dropping the projectiles from an aeroplane in flight.

A Disaster at Lyon.

EXTRAORDINARY damage was done by a gale which swept across the district of Lyon on Sunday morning, and the military aerodrome, Bron, just by the town, suffered heavily. Ten hangars were blown down, and among the machines which were damaged more or less severely were thirteen Farman machines, most of them practically new machines.

Herr Bruno Langer and his Roland-Pfeil biplane on which his big record was accomplished recently.

Further Tests with the Bonnet Parachute.

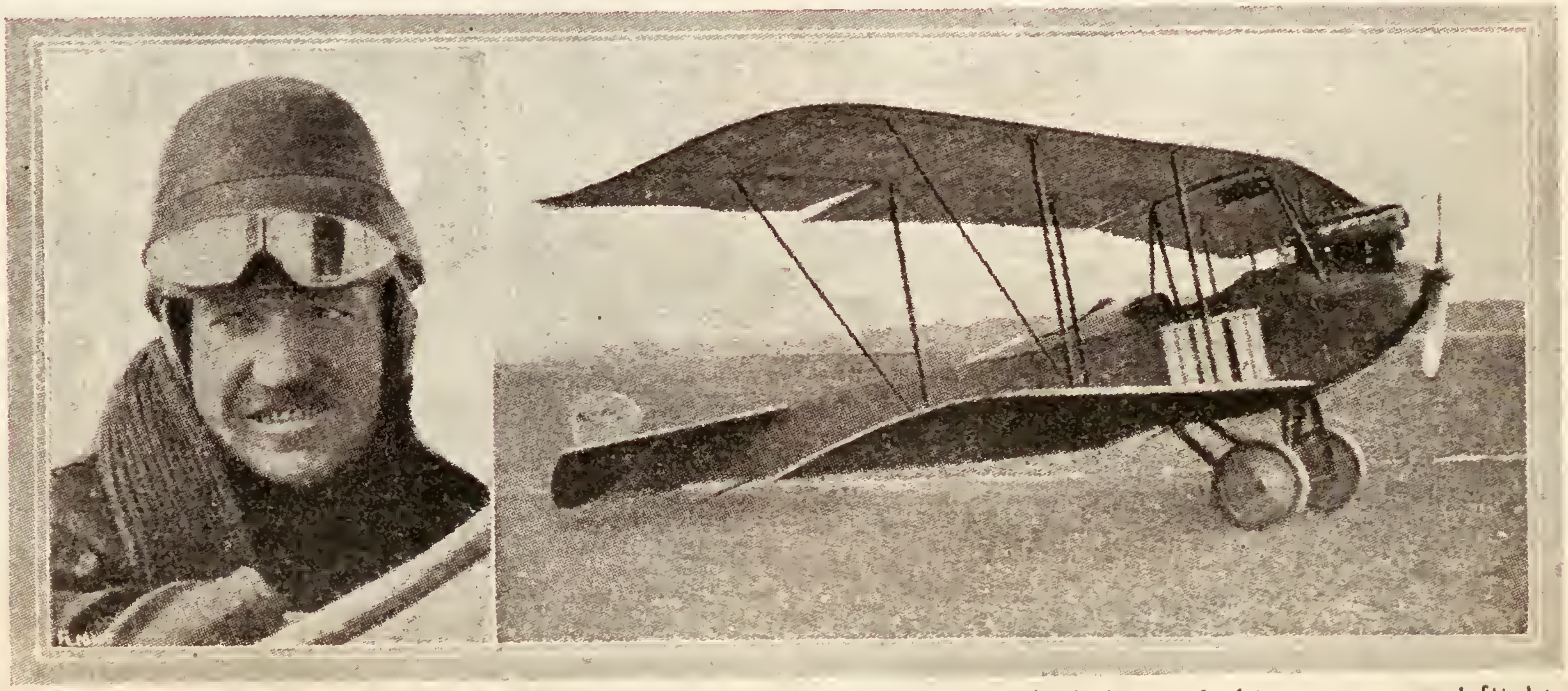
ON Saturday last another extraordinary demonstration was given at Juvisy with the Bonnet parachute. The aviator Lemoine took up on his Deperdussin machine another pilot named Le Bournis, and when at a height of about 400 metres, the latter threw himself from the machine during a *vol piqué*. Opening quickly, the Bonnet parachute was carried by the strong wind for a distance of about two kilometres before depositing its burden in the river Seine. Le Bournis was rescued none the worse for his immersion.

Long Flight in Germany.

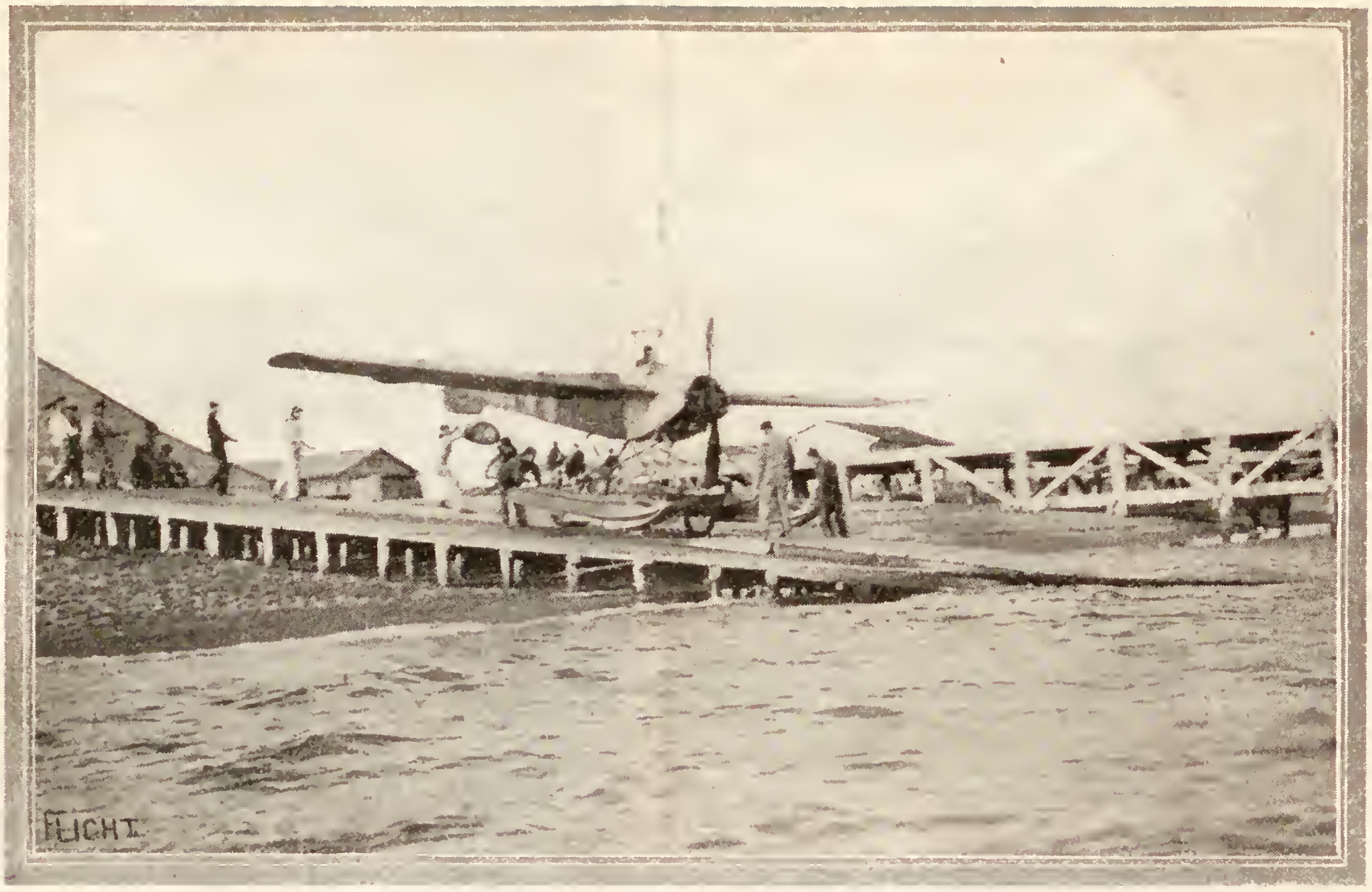
LEAVING Johannisthal at 7.30 a.m. on a Rumpler-Taube on the 18th inst., Basser eventually landed after flying for 10 hrs. 7 mins. at Wanne. His route was by way of Magdeburg, Cassel, Frankfort, Bingen, Coblentz, Bonn, Cologne, and Dusseldorf.

German Military Pilots at Johannisthal.

THE special military order prohibiting military pilots from flying at the Johannisthal aerodrome was withdrawn on the 18th inst. New regulations, defining certain areas for starting and other places for landing, are now in force at Johannisthal.



Herr Karl Ingold and his 100 h.p. Mercedes Aviatik-Pfeil biplane on which he made his recent record flight.



Photograph by Capt. J. C. Halahan.

AT THE FREJUS NAVAL AIR STATION.—Launching a Nieuport waterplane. The method adopted is to warp it out to an anchored buoy about 100 yards from the shore; the cradle on which it travels on land is then unlashed and sinks, to be drawn in shore later, the pilot starting the engine himself from the seat.

The South German Circuit.

ARRANGEMENTS are now being completed for the South German Circuit, which will be held from October 10th to 15th. Starting from Nuremburg, the first day's flight will end at Munich, while the second day's stage will be to Stuttgart, where there will be one day's rest. The next stage will be to Thuringen, where an exhibition of the competing machines will be held, after which the return to Nuremburg will be made *via* Hof and Bamberg. The competition will only be open to civilian pilots.

A Pekin to Paris Attempt.

IT is reported from St. Petersburg that the Russian Government has decided to assist Janoir, who is now in their service, in an attempt to fly from Pekin to Paris, which he proposes to make during the coming spring.

Medals for Russian Aviators.

THE Aero Club of Russia has decided to give medals to: Lieut. Nesterow for looping the loop; Alekhnowitch for his Russian height record; Mikhailow for his non-stop flight from St. Petersburg to Tver; and to A. Wassiliew for his flight from St. Petersburg to Moscow and back within 50 hours.

The Heliopolis Meeting.

THE four days' meeting which opened at the Heliopolis aerodrome on the 19th inst., mainly consisted of displays of looping the loop by Chevilliard on his Farman, and Guillaux on a Blériot, while Olivier carried passengers on his Farman. On the 20th, Guillaux is said to have looped the loop nine times in succession during one flight.

The Turkish Flight to Alexandria.

LAST week a little further progress was made by the two Turkish officers who are flying, with passengers, from Constantinople to Alexandria. Capt. Fethi had a mishap while flying between Beirut and Damascus which entailed delay until a new propeller could be obtained, while Lieut. Nouri succeeded in crossing the Taurus mountains.

Good Flights in California.

AT Los Angeles, on the 17th inst., Christofferson on a biplane flew, at a height of 6,500 ft., across the mountains, and covered 170 miles in 3 hours 45 minutes. On the 9th inst. Christofferson flew from San Francisco to Bakersfield, Cal., taking six hours for the 306 miles. He went on to San Diego the next day.

Two Bedouin watchmen, known locally as Gafirs, on guard over Mr. W. Oswald Watts' Blériot at Heliopolis.

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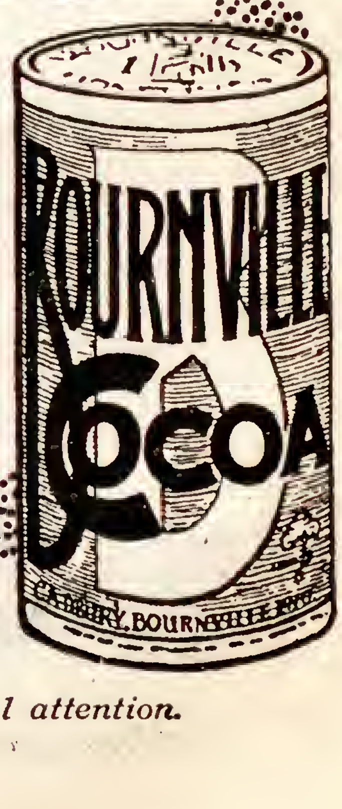

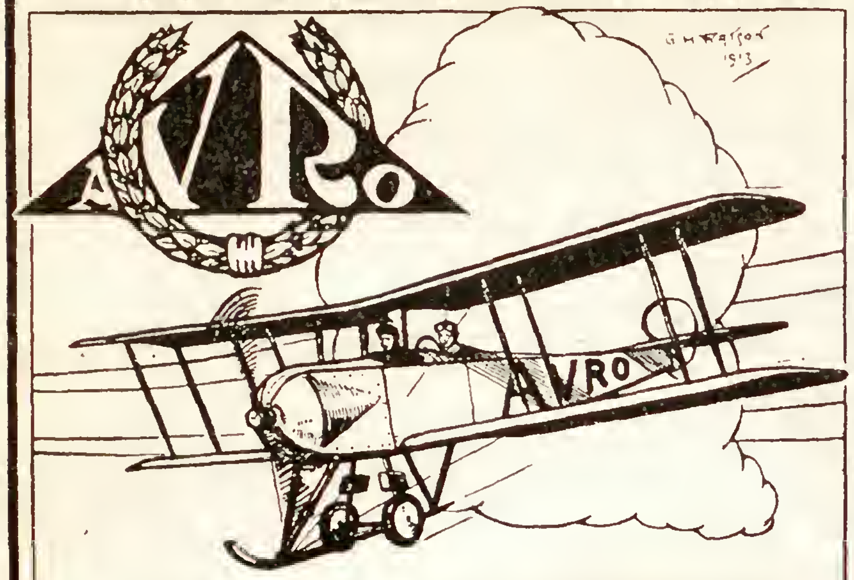

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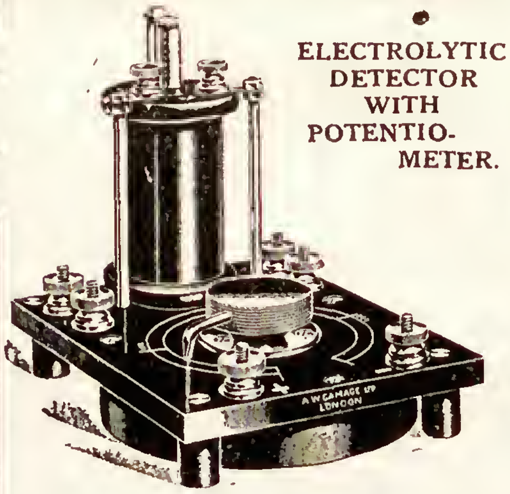

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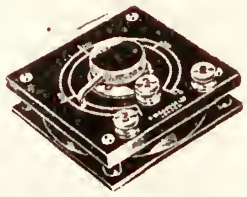

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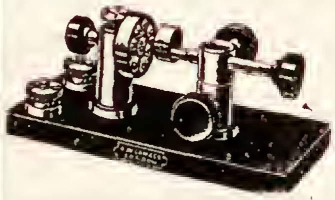

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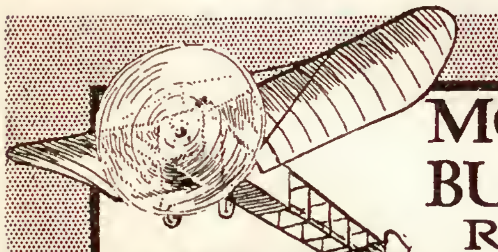

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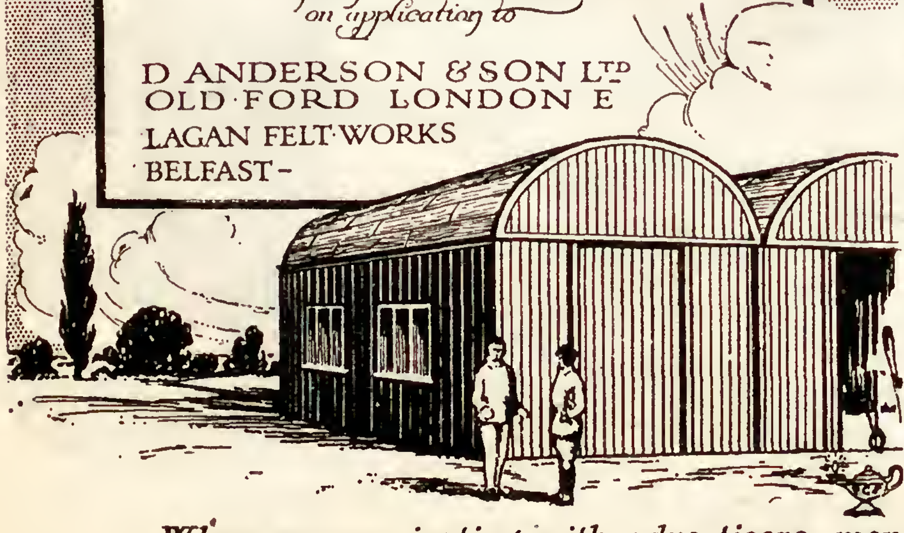

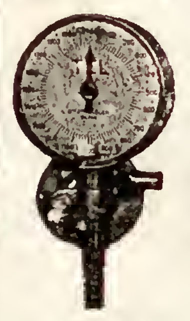

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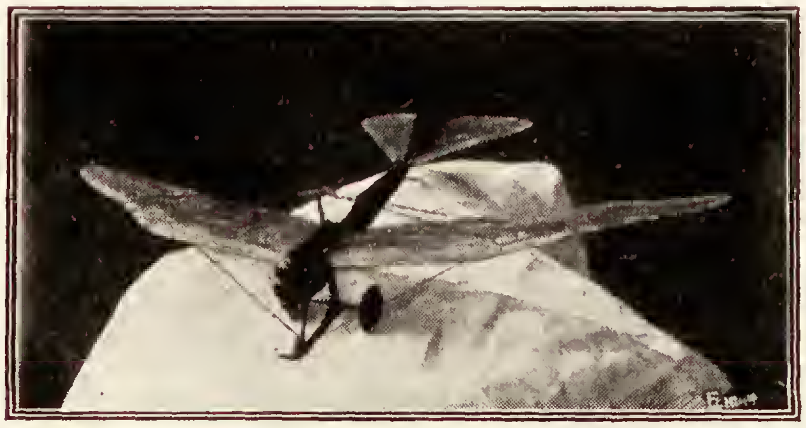
Edited by V. E. JOHNSON, M.A.

An Interesting Type of Paper Glider.

"I HAVE read with great interest the articles appearing in FLIGHT referring to paper gliders," writes Mr. Thomas Key, "and I am sending you a specimen of my type of glider, which is a result of four years' experiments. These machines have a good gliding angle, and are very spectacular in flight. The fitting of a landing chassis is highly instructive, as it shows the great strains imposed on this part of the machine, besides adding to the interest. I have found that after the 'cables' have loosened themselves a little, thus allowing the machine a certain amount of give, the models fly better. They will fly very well in strong winds, and have shown themselves to be very stable, and on several occasions I have induced them to loop the loop, which feat they have performed quite successfully. My friend, Mr. W. Beasley, who has helped me in my experiments for the last two years, has kept one of these machines for six months, using it very often, which I do not think is bad for a paper glider."

The little glider which our correspondent has been good enough to send us, is one of the most interesting of this type of model that we have seen for some time. The addition of a chassis, skid, and little paper disc wheels, that run quite freely in a little paper tube (a piece of drinking straw could have been used) greatly adds to the interest of the little machine. Its weight, we find, is exactly 4·5 grammes, it has a span of some 9·5 ins., the wing breadth tapers from about 1·75 ins. to 5/8 of an in. Overall length 6 ins. Tail triangular; length of base, 1·75 ins.; height or altitude, 1 7/8 ins. Distance of apex of tail from trailing edge of wings, 1·5 ins. Fin (above tail plane), a right-angled triangle; altitude (along tail plane), 1·75 ins.; hypotenuse, 2 ins., base 7/8 in. All sharp corners rounded off, and both trailing edge of wings and tail next to the *fuselage* cut away. Planes rather deeply cambered at the centre, washed out towards the tips. Diameter of wheels, 5/8 in. Distance apart, slightly over 1 in. The wings are braced both on the upper and lower sides with black thread, 4 cables above and 4 below.

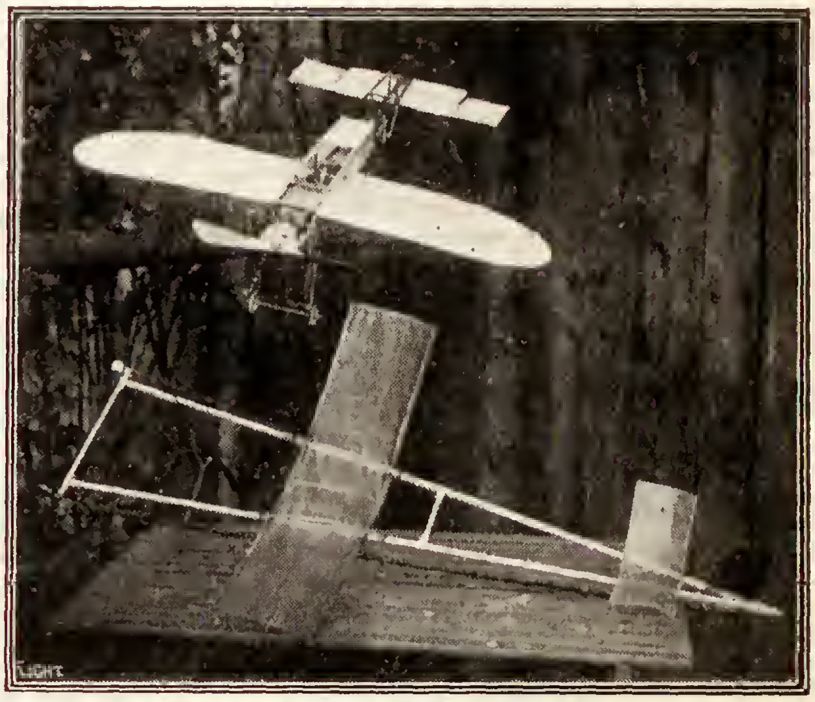

A novel paper glider designed by Mr. Thomas Key.

The threads are joined to the wings by means of tiny paper discs stuck on. They are placed near the leading edge and about two-thirds from the leading to trailing edge in pairs, both above and below. The centre of gravity is about half way across the wings from front edge to rear. The wheels are slightly in front of this. The model is weighted with three brass paper fasteners, fixed in the nose of the *fuselage*. There is a small skid under the apex of the tail, pointing to the rear at an angle of some 30°. The entire model is varnished, and this has dried so irregularly as to render the model somewhat difficult to photograph. We can quite understand that such a model should last six months with reasonable care, and we quite agree with all that Mr. Key says, save one remark, viz., that the machine will glide well in *strong* winds. It will do so in a light breeze, and loop the loop most gracefully, but in a strong gusty wind, such a light model is blown all over the place. It is most interesting to watch, because it shows you quite clearly what could happen in the case of a full-sized machine if the pilot lost control of his machine in a really big gale.

Mr. J. F. S. Corkett's Models.

"Enclosed is a photograph which may be of interest to readers of FLIGHT. It represents two of my aero models—a scale Blériot XI and a hand-launched twin-propeller model.

"The Blériot was built entirely by the aid of drawings and diagrams that have previously appeared in FLIGHT. Its imitation 3-cylinder Anzani engine, bell control, and built-up *fuselage* and planes are of special constructional interest. The construction of this machine was undertaken in the winter months, when it formed a most interesting hobby. Later it was shown at a local exhibition, where it secured second prize. The flying model is the result of last spring's experiments, and was completed in August, 1913. A few days before Christmas, after it had been in constant use for five months, it was sent to America, where it has been flown regularly ever since. Many people are of the opinion that such models last but a short time; this, however, was not the case with the model just referred to."


Two models by Mr. J. F. S. Corkett.

A Note on Egg-Beater Winders. By M. J. DUDLEY.

"I have seen in FLIGHT lately two or three drawings of egg-beater winders; when using such, it is a good plan to put a small fretworker's table clamp in your pocket, when you go flying; then instead of someone else holding the machine or the winder, the latter can be clamped to a form, post, fence, &c., and held much firmer in consequence. The ordinary 6*d.* egg-beater is in general use, but it is very much better to buy the one costing 1*s.* 3*d.*; anyone doing so will soon appreciate the difference. Both are made by the same firm. May I ask your readers what is the record for a light and small hydro-aeroplane? I have just completed a Ding-Sayer model 18 ins. frame, weight 2 ozs. exactly, inclusive of everything. It will rise from the surface of the water in 6 yards, and in 18 yards cleared a fence 6 ft. in height, afterwards flying in one large circle. Might I also express my thanks for the help that your model section has been to me in the past?"

Projected Areas and the Loading Question.

There is nothing very terrible or difficult to understand about this matter. Practically speaking, all surfaces save vertical ones are to count. Now obviously where surfaces are not horizontal but inclined at an angle to it, if such were reckoned up with respect to their full area, *i.e.*, the number of square inches or square units contained in the product of their total length and breadth, it would not be fair because such surfaces are not exerting their full lift, in some cases nothing like it. In the case of a monoplane with upturned tips for lateral stability such, save when the model is banked, exert practically no lift at all.

Now what is the "projected area" of such a plane? Place the model in a horizontal position on a table, on, say, a sheet of cardboard or white paper. Next drop (in imagination or in reality), *perpendicular* lines from the outer edges of the plane all round it, on to the sheet of paper, the area enclosed on the sheet of paper by such perpendiculars is the projected area. Perpendiculars are, of course, vertical or plummet lines.

If the machine be a biplane, then both planes, whether equal or unequal, must be treated in the same way. If the lower plane has the same chord and span as the upper, then, whether straight, curved, or dihedral, its projected area is the same as the upper. Some of the areas may possibly require a little calculation. Rectangles and triangles are easy enough, but when one has to deal with arrow-headed and swept back wings of varying chord, rounded-off tips, &c., &c., then you may begin to grow a little warm. The best way is to consult any decent book on mensuration. But, generally speaking, the matter can be dealt with on the straight line principle, making due allowance for little pieces, balancing "outside pieces against" inside ones.

The question of camber does not, of course, come into the question at all.

Is the Canard Type any Good?

In reply to Mr. H. H. Groves' query, "What was the real cause of failure in full-sized Canard type machines?" Mr. Handley Page replied, if we remember correctly, "Too much surface in front of the centre of pressure." After the lecture the writer had a few minutes' conversation with Mr. Groves, and understood that he had been endeavouring to design a power-driven Canard-type model—*fitted with a covered-in fuselage*—and that he had given it up as a bad job. We wonder how many others have tried it, with like result. The problem of a covered-in *fuselage* for a Canard-type machine seems like the *exact* squaring of the circle, unsolvable. I have a dozen such designs before me as I write, not one is satisfactory. In some cases it is no fault of the *designer* that such is the case, but of the design. In the first place, apart altogether from the matter as replied to by Mr. Handley Page, the *fuselage* is the wrong way about for a proper streamline form, or the correct streamline form is the wrong way about for the type of machine, it does not matter in the least which way you regard it.

It is no use trying to shirk the question, as aeromodellists have done with their single stick or triangular frames. You cannot use such constructions as these in full-sized work. Then of what use are they? It is no longer necessary that aeromodellists should build such machines for experimental purposes, to test planes, propellers, &c. Because other types to which *fuselages* of correct streamline form *can* be attached can now fly quite long enough for such purposes.

So far as full-sized work is concerned, covered-in *fuselages* are *essential*, both for military and naval purposes, and for cross-country passenger traffic. People will not go for journeys of any length where they are exposed to the full force of the elements. In war machines the machine must be protected (armour plated), *i.e.*, its vital parts and the pilot, &c., as well. Another point, of what use is a machine for military purposes where you cannot fire a gun without shooting off some part of your machine? Some of the most absurd designs have been put forward in this respect; with an elevator in front of you and a propeller, &c., behind you, and struts, stays, &c., on either side, where does the firing angle come in? Again, if the Canard-type machine becomes "stalled," what is there to prevent it slipping backwards, and if it does so what is going to save it? There is also the question of landing, and in the case of hydro-aeroplanes of alighting on the surface of the water. The least dig of the front float and the back of your machine is at once broken.

It is claimed that such machines have a greater degree of inherent or automatic stability. Model experiments certainly seem to show that in the form which such models usually take such is the case, but it has not, so far as I know, been shown that such is the case when the design is such as could be applied successfully to *future* full-sized work. If the full-sized Canard-type machine is any good, why is it not more in evidence, why has it been tried by some of the best designers and given up? Some aeromodellists contend that the designs were not such as would be likely to lead to success, basing their conclusions apparently on model experiments, but the question which arises is, are their models of such a design as to justify such conclusions? We are afraid not. There exists, I believe, in certain quarters, an idea that the writer is prejudiced against the Canard-type machine. Nothing could be more erroneous; if there has been any prejudice it has been the other way about; and it is with a feeling of the greatest reluctance that the writer has come to the above conclusions. But it is impossible to shut one's eyes to the drawbacks of such a type of machine from a full-sized point of view, or, even for that matter, from a model point of view, using the word in its best sense. No one would be more pleased than the writer could the views which he has expressed above be shown to be really erroneous, and the conclusion he has come to, that the Canard-type machine is for practical purposes useless, be shown to be altogether wrong.

I shall be pleased to hear what any of my readers have to say on the above points, either for or against.

To Ascertain the H.P. of a Rubber Motor.

A correspondent writes, asking: How can I find out the h.p. of my rubber motor? but gives no particulars.

Let us suppose the motor, when wound up to 500 turns, to run down in half a minute, *i.e.*, at a mean speed of 1,000 revs. per min. Suppose the mean thrust of the propeller to be 2 ozs., and the pitch 1 ft. Then the number of foot-lbs. of energy developed $= \frac{2 \times 1{,}000 \times 1 \text{ ft. (pitch)}}{16 \text{ ozs.}} = 125$ ft.-lbs. per min. But the rubber motor runs down in 30 secs. $\therefore$ energy really developed = 62·5 ft.-lbs. The motor, therefore, develops power *at the rate of* $\frac{125}{33{,}000} = 0{\cdot}00379$ h.p. for 30 secs. only.

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver	85 secs.
Twin screw, do.	Distance	R. Lucas	590 yards.
	Duration	G. Hayden	137 secs.
Single screw, rise off ground	Distance	W. E. Evans	290 yards.
	Duration	W. E. Evans	64 secs.
Twin screw, do.	Distance	L. H. Slatter	365 yards.
	Duration	J. E. Louch	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance	C. C. Dutton	266 yards.
	Duration	J. E. Louch	91 secs.
Do., off-ground	Distance	C. C. Dutton	190 yards.
	Duration	J. E. Louch	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter	60 secs.

Aero Show.—All club entries should reach the hon. sec. by first post on Monday, March 2nd. Individual entries must reach the hon. sec. by Wednesday, March 4th, to ensure insertion in the official catalogue, after which date no entries will be accepted.

Affiliation.—It is with pleasure that the Council announces the affiliation of the first foreign club, viz., the Rotterdamsche Model Aero Club, with a view to the promotion of an international meeting. It is hoped shortly to be able to announce that further foreign clubs have affiliated, so that if possible a good entry will be assured for the proposed international meeting. The above club, it will be remembered, sent over a representative to compete in the Gamage Cup contest in 1912, and he (Mr. R. C. Noordwyn) was successful in taking back the trophy. He, being in this country, has been elected by his club to represent them on committee.

Trophies.—All holders of challenge trophies are asked to forward same at once to the hon. sec. for the purpose of exhibiting same at the forthcoming show.

Trials in Connection with the Aero Show.—At the last meeting of the Secretaries' Guild it was suggested that the trials should be held either during the Easter Holidays or on April 3rd and 4th, but at present no exact date can be given until the judges have decided, but in any case the best dates will be selected in order to please, if possible, the majority of competitors, and will be decided at the secretaries' meeting on Wednesday, March 18th, which will be held at the Show.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (N. Branch) (27A, SEDGEMERE AVENUE, EAST FINCHLEY, N.)

FEB. 28TH, flying at Finchley, 3 p.m.; March 1st, 10 a.m.; also indoor meeting at Commercial Rooms, 383, Archway Road, March 5th, 8 p.m., sharp, interesting evening being arranged. Indoor meetings and lectures at new clubroom every fortnight, commencing Feb. 18th.

Monthly Report.—Flying during past month rather slow. Members busy on Olympia machines, at which we hope to make a record exhibition. Up to time of report 12 machines will be exhibited. Machines out this month being Mr. Partridge, 1-1-0-P_1; Mr. N. Colman, 1-1-0-P_2; Mr. Hindsley, tractor; Mr. Root, 1-1-0-P_1. Successful indoor meeting held at new clubroom. During evening Mr. Pickley gave an address on "The Relation of the Model to Full Size Machines." Discussion followed. Mr. Griffith, a new honorary member, who is doing good work in rousing the people's interest on aviation in East Finchley, was present.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

MARCH 1ST, flying, Wanstead Flats, 10 a.m. If wet meet at clubroom.

Monthly Report.—Feb. 1st, four h.l. models were in evidence, one hydro. and one r.o.g. Mr. Bedford obtained best flights of the morning. Feb. 8th and 15th, rain prevented all flying, and the members met at the clubroom. Feb. 22nd, Mr. Bond arrived with a r.o.g. and Mr. Bedford with a hydro, but for the third time this month rain put a stop to flying practically before any started. The committee have arranged that members of this club may enter models at Olympia for a fee of 2*s*. each model.

N.E. London Model Ae.C. (47, JENNER RD. STOKE NEWINGTON, N.)

Monthly Report.—Flying curtailed by inclement weather. Our competition programme is now under contemplation, and the sec. would be pleased to receive suggestions from members with respect to same.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

SATURDAY, Feb. 28th, Flying at Sudbury.

Monthly Report.—The past month being mostly wet, particularly on Saturdays, very little flying has been done. Jan. 31st was very windy. G. Rasmussen flying tail monoplane, which showed excellent stability. F. Lang tuning up twin propeller monoplane. C. C. Dutton flying 4-ft. hollow spar twin propeller monoplane, and instructing new members. M. Levy, tuning up 4-ft. A frame monoplane, smashed *fuselage*. W. E. Evans testing 3 ft. 6 in.

tubular *fuselage* monoplane, which, first time of launching, flew out of ground into a tree. Feb. 14th, rain commenced at 4 o'clock up to which time only a little flying was done. M. Levy with 8 oz. single propeller monoplane did 30 secs. D. Driver was obtaining excellent flights. Other members present were R. Bird, G. and A. Rasmussen, T. Carter, F. W. Johnson, and C. C. Dutton. Feb. 21st was like Feb. 7th, very wet, and no flying was done. Four new members have been elected, one each week, these being Messrs. A. Rusmussen, E. Eades, J. H. Barrett, and H. H. Warwick. Members who intend exhibiting models at Olympia will please note that they must fill in their red forms at once, if not already done, and hand same to the hon. sec., W. E. Evans, to-day, Feb. 28th, after which date no entries can be received.

Reigate, Redhill and District (The Cottage, Woodlands Avenue, Redhill).

Feb. 28th, flying, Earlswood Common.

Monthly Report.—Very little flying has been done owing to members being busy on Olympia machines. Messrs. Wilson have had out a floating tail mono. r.o.g., getting up to 54 secs. and 415 yds., also 8-oz. r.o.g. Canard, getting 36 secs. Mr. Young has had out a 7-oz. r.o.g. Canard mono., which he afterwards converted into a floating tail, getting better results with same power.

Sheffield Ae.C. (41, Coniston Road, Abbeydale, Sheffield).

Monthly Report.—Feb. 7th, general meeting at Mr. O. H. Broomhead's. It was decided that a general meeting be held on the first Saturday afternoon, 3 p.m., in every month at the above address. Mr. W. H. Bagshaw was elected vice-president, Mr. C. F. W. Cudworth secretary and treasurer combined, and Mr. E. W. Colver president. In view of encouraging more enthusiasm in aviation in Sheffield the entrance fee and subscriptions were lowered. The club has a very big programme to get through during the year, for the following prizes and competitions are to take place :—The Colver Cup, for r.o.g. machines ; the President's Challenge Cup for hydro-aeroplanes ; Mr. M. D. Manton's medal for tractor biplanes. Also two medals offered by Mr. Cudworth as follows :—Silver aviation medal to be awarded to the member making the longest duration record from March 28th to Dec. 25th, with r.o.g. machines, to be capable of carrying 4 ozs. dead weight, machine to weigh 4 ozs. and 2 ozs. of rubber ; bronze aviation medal, for novices only, to be awarded to the member making the longest duration flight with h.l. machine, any weight or size, from March 28th to Dec. 25th. All the above competitions are for club members only. Further particulars can be obtained from the secretary. All interested are invited to attend the general meeting on March 7th, 3 p.m., at Mr. Broomhead's, Leopold Street.

Stony Stratford and District Kite and Model Ae.C. (Old Stratford).

Stony Stratford : March 4th, meeting Wolverton. Subject, Mr. Handley Page's lecture to the K. and M.A.A. Building evening, March 18th, at clubroom. March 21st, members' visit to Olympia ; 28th, competition at Stony Stratford (duration). April 1st, meeting, Wolverton ; subject to be announced later. Buckingham : March 13th, ordinary meeting ; subject not decided upon. March 27th, Building evening, March 19th, members' visit to Olympia. Flying every Saturday at both grounds to commence 2–2.30 p.m.

Monthly Report.—Stony Stratford : A meeting was held in S. and A. Institute, Wolverton, Feb. 4th. Topic for the evening, "The Bragg Smith" Model paper read by Mr. R. Elmes. Feb. 14th, Elmes, in a rough wind, getting flights of 200 yds., Brown flying single propeller machine, too lightly loaded for wind. O. Hamilton, jun., was successful in obtaining flight of 81 yds. 2 ft. with his single propeller r.o.g. A business and building meeting held at clubroom on the 18th, when Mr. O. Hamilton, jun.'s flight of 81 yds. 2 ft. was passed as a record in Class No. 4a and 5a. Arranged for a lantern lecture to be held. Buckingham : Usual fortnightly meetings and flying each week end. The item of interest has been Mr. Palmer flying a new plane patented under the name of the "vibratory wing" for a Buckingham gentleman. The club joined in a competition for distance on Feb. 21st, in a drenching rain. It was decided to fly one trial only, with the following result :—W. Palmer, 1st, 150 yds. ; 2nd, E. Brown, 117 yds. 2 ft. ; 3rd, R. Elmes, 111 yds.

Wimbledon and District (165, Holland Road, W.).

Feb. 28th and March 1st flying as usual.

Monthly Report.—Very little flying during past month, as the weather has been very unfavourable, and members have been busy on their Olympia models. Mr. Hayden has had out a small biplane, type 0–2–1–P2, getting very good results. The machine is very stable and flies well in all winds, although the duration is only about 40 secs. Mr. Tucker has had out his Martinsyde monoplane on several occasions, getting very long straight flights at a good altitude. Mr. Laing brought out his Olympia twin-screw, but had the misfortune to catch in the branches of a tree, breaking one of the screws. Mr. Easdale's Dunne tractor has been flying well, and shows great stability. The best flights so far being 45 r.o.g. and 48 h.l. Mr. Smith has flown his small twin-screw machine in all weather, getting distances up to ½ mile, and durations up to 50. All members who have not yet sent in their entry forms for Olympia are requested to do so at once, as they must all be in before March 4th.

UNAFFILIATED CLUBS.

Burton and District Aero Club. (156, Shobnall Road.)

Monthly Report.—This club, although only started in January, has already a large membership, and the quality of the work turned out has greatly improved also, which shows the advantage of joining a club where the members are able to see one another's work and each try their best to turn out something better. The club record for single-screw monoplanes is at present 40 secs., held by H. Robinson. Messrs. Fearn and Metcalf tie with 27 secs. The consistent flying of Mr. N. L. Fearn's 3 ft. 6 ins. mono. being a feature of the weekly meetings. Mr. J. Makin has made a very fine hydroplane mono. Feb. 16th a lecture was given by Mr. C. G. Robinson on "Model Aeroplane Propellers," at the Y.M.C.A. Hall. Practical demonstrations were given of the thrust of different propellers on an apparatus showing the thrust in ounces, and diagrams relating to the subject were shown on a large screen, the lantern being lent and operated by Mr. F. Metcalf. Other lectures are to be arranged in the near future, and as the subscription is low—viz. : 2s. 6d. yearly for juniors under 16, and 5s. yearly for seniors—a much larger membership should be obtained. A competition is to be held on Good Friday, and a stand is being reserved for the club at the annual flower show.

Dundee Aero Club.

Monthly Report.—Annual General Meeting held in Clubrooms, Y.M.C.A., on Feb. 19th. New office-bearers were elected as follows :—Chairman, Mr. I. M. Luis ; Secretary and Treasurer, W. Powrie. Committee : Messrs. Luis, Powrie, Robertson, Maxwell and Hall. As the new Session commences on March 2nd, all intended members are invited to communicate with the secretary, or to call at the clubrooms any evening between 7.30–10. First flying meeting for the year March 28th. Place later. Thanks to a Cake and Candy Sale which the Club held on Jan. 20th, and which realised the sum of £12, we will be able to start our new season with a clean sheet. With the advent of the hydro-aeroplanes to the Naval Base, and the presence of the aeroplanes at Montrose, interest seems to be awakening in Dundee, and we hope ere long to secure several new members. The club is sustaining a great loss owing to our late secretary, Mr. Jas. Farningham, having to leave us to take up an important position out of town. During his year of office, Mr. Farningham has helped the club in no small way, and we all owe him a debt of gratitude for the efficient way in which he carried out his duties. Working the club in a new system, we hope to do something to lift it from the lowly position it has occupied of late. The annual subscription has been changed to monthly payments of 6*d.*, or 5*s.* per annum.

Finsbury and District (52, Lambton Road, Stroud Green, N.).

Feb. 28th, competition, commencing 3.30 p.m. Two silver medals and other prizes offered.

Monthly Report.—During month flying by Mr. B. H. Barnard (Deperdussin type tractor), Mr. Richards (tractor biplane), S. Gibbs, and S. Barnard (Caudron).

Ilford Model Ae.C. (83, Endsleigh Gardens, Ilford).

Feb. 28th, March 1st, 7th, 8th, 14th, 15th, 21st, 22nd, 28th and 29th, flying as usual at Newbury Park at 10 a.m. (weather permitting). The first annual social and dance will be held at the Kensington Hall on Wednesday, March 4th, at 7.30 p.m. sharp. Tickets, singles 1*s.* 6*d.*, doubles 2*s.* 6*d.*, can be obtained from the secretary at the above address.

Monthly Report.—Very little flying this month on account of the boisterous weather. Tractors are more in evidence now. All machines in the club are r.o.gs. Feb. 1st, wind exceedingly boisterous, flying almost impossible. Best duration, put up by Mr. B. Seabright, was only 27 secs. Mr. R. C. Nicholls had the misfortune to smash two monoplanes and one biplane. Good flights were put up by Messrs. R. C. Nicholls, J. L. Hartnoll, B. Seabright, J. P. Leggett and A. Tupper. These flights, other than Mr. B. Seabright's, were not officially timed. Feb. 14th, gale, Mr. R. C. Nicholls, however, obtained 480 yds. with his r.o.g. monoplane (not officially measured). Feb. 15th, very gusty. Some very fine flights were put up by Messrs. R. C. Nicholls, B. Seabright, G. Warren, J. L. Hartnoll, A. Tupper, H. Triggs and F. Rappey.

Liverpool Aero Research Club (62, Cedar Grove, Liverpool).

Monthly Report.—Chief interest is centred on the club exhibition, May 2nd. Particulars of open flying competitions in conjunction with same next month. B. Lear takes all honours this month for outdoor flying, making some really splendid flights with 1–1–0–P2 machines.

Scottish Ae.S. Model Ae.C. (5, Doune Quadrant, Glasgow).

March 7th, 14th and 21st, Paisley Racecourse, h.l. and r.o.g's.

Monthly Report.—At a Committee meeting on Jan. 26th, the resignation of the Secretary, Mr. W. Foster, was received with much regret. Mr. Jas. C. Balden and Mr. W. G. Langlands were appointed hon. joint secretaries. All correspondence in future to be addressed to Jas. C. Balden, 5, Doune Quadrant, Glasgow. On Jan. 28th, Dr. J. G. Gray delivered an excellent practical lecture on "Gyroscopes and their Applications." Dr. Gray showed that the mono-rail system now in use was unsuitable for application to aeroplanes or airships. Acrobatic figures animated by gyroscopes were shown performing on trapezes, walking hand over hand along wires, balancing on tight and slack wires by means of poles, riding bicycles and stabilizing, and steering two and four-wheeled motor cars. A system of applying gyroscopes to an airship was also shown. Owing to rain and wind there has been no flying done during the past month, but work has been going on steadily in the workshop, and several new models are now ready for testing. On March 4th Lieut. Arthur M. Langmore, R.N., will lecture on "Hydro-aeroplanes." A paper by Mr. V. E. Johnson, M.A., entitled, "The Use of Models in the Development of the Aeroplane," will be read on 18th March. Both lectures will be given in the Engineers' and Shipbuilders' Institute, Elmbank Crescent, at 8 p.m. The second half of the session has now commenced, and intending members can now be enrolled. Subscription for half session ending 10th Sept., 4*s.* Full particulars from the Hon. Joint Sec., Mr. Jas. C. Balden, 5, Doune Quadrant, Glasgow.

S. Eastern Model Ae.C. (1, Railway Approach, Brockley).

Feb. 28th flying demonstration on Woolwich Common from 3 o'clock until dusk ; March 1st at Blackheath, from 7 to 10 a.m.

Monthly Report.—As regular readers of Flight are no doubt well aware the past month has been one of exceptional industry for the S.E.M.A.C., as the following report will show. On Jan. 29th, the club held its first exhibition at Peckham, and the number of models on show was easily a record for a local exhibition. Marked originality was evidenced by the majority of members and the large number of visitors commented very favourably on this. Prominent among the models was a large steam-driven monoplane constructed by Mr. H. H. Groves, whose machine has made several excellent flights on Blackheath and was the winner of last season's "Olympia" prize offered by the Royal Aero Club. Another large monoplane, named the "Gnat" was shown by Mr. J. H. Dollittle, and was of the tractor type, engine being driven by compressed air instead of steam. Considerable interest was created when Mr. Dollittle demonstrated the capabilities of his five-cylinder engine, which is built on the Gnome principle. A model greatly appreciated by many visitors was a scale copy of the well-known Morane-Saulnier monoplane, constructed by Mr. F. Plummer who was congratulated on the fine workmanship displayed, both on this machine and on a large 20-oz. r.o.g. tractor monoplane, a splendid biplane fitted with a four-bladed tractor-screw and a twin-prop. duration mono. Mr. G. H. Westwood made a good show with three tractor monoplanes, and Mr. R. W. Prance had on view a nicely constructed "Morane" as well as a cleverly designed and beautifully built single-cylinder engine suitable for either steam or compressed air. Mr. A. D. Nicholls exhibited a whole series of models, consisting of his "Martinsyde" mono., which should prove a fine spectacular flyer, a neat little duration biplane, a hollow-spar weight-lifting machine and an r.o.g. hydroplane. Mr. L. B. Morris showed a new r.o.g. tractor of clean design, and Mr. G. Brown a partially built scale "Avro" biplane and several propeller-driven monos. Mr. A. F. Chinnery and Mr. E. W. Brunton each presented for inspection two capital models, and those indefatigable brothers, Messrs. C. and A. Beere displayed a comprehensive show of "tractor" models. Mr. F. W. Evans and Mr. F. Dixon showed their respective rise-off-ground monoplanes, and Mr. F. Edwards a neat hollow-spar biplane and a geared-motor tractor mono. Altogether nearly 50 models, as well as numerous parts of historical aeroplanes—including pieces of the propeller and fabric used by the late Mr. S. F. Cody in his flight round Great Britain—were shown. On Feb. 5th, the club's second indoor exhibition was held at Plumstead, and a splendid collection of models was exhibited. There was a large number of visitors, many of whom were thoroughly acquainted with the various technical points of the machines, and some were quickly involved in arguments on the various ideas embodied in the models, the resulting discussion should prove of considerable value. The largest model was Mr. G. H. Westwood's very original tractor monoplane, which has made many very fine flights on Blackheath. Other large tractors were shown by Messrs. A. D. Nicholls, C. Beere and A. F. Chinnery. Mr. E. W. Brunton exhibited a whole stud of monoplanes, including a "Meteor" hydro-aeroplane, which is also capable of rising off land, a very neat r.o.g. twin-prop. model and a small single-screw tractor. Mr. W. Jones showed a new r.o.g. mono., and Mr. Arthur Beere two monoplanes and a biplane of the tractor type. A very smart single stick model and a fair-sized tractor were shown by Mr. R. W. Prance, as well as his single-cylinder engine. Other interesting models made by Messrs. Plummer, Brown, Norris, Cox, Greenhill, and H. Clements were on view and Mr. A. B. Clark exhibited his scale Blériot which came in for a good deal of attention owing to the complete set of controls and intricate spring-suspended landing-gear appealing to many people, who were, apparently, endeavouring to qualify for their pilot's certificate. On Feb. 18th, 19th and 20th, a three-day exhibition (in conjunction with the 1st Sydenham Troop B.P. Scouts) was held at Sydenham, where demonstrations of flying with small models were given, to the huge delight of an appreciative audience. Branches are now being organised at Woolwich and Sydenham, and the Hon. Sec. (Mr. A. B. Clark) would be pleased to hear from aero-modellists residing in either of these districts. Despite the inclement weather the club's various flying meetings—which are now practically local fixtures—have been well attended, some of the best flights having been made by L. B. Norris with a twin propeller all-metal mono., and a very neat tractor. A. D. Nicholls and A. F. Chinnery with twin-prop. hollow-spar monoplanes and F. Plummer with his large 4 ft. 3 in. hollow-spar model have also done their share towards arousing local enthusiasm. F. Beere's small tractor has been giving excellent exhibitions of "looping" also Mr. McLaughlin whose 4-ft. single propeller model makes six complete successive loops as regularly as clockwork. This model also performs Mr. Hamel's speciality, commonly known as the "apple turnover." Other looping machines are Mr. Bennett's "A" frame and A. B. Clark's veteran all-metal monoplane. Messrs. C. and A. Beere's usual stud of tractors have been very busy and G. H. Westwood has had excellent flights from his numerous collection, while F. Dixson has been experimenting with a Dunne-type glider. G. Brown and A. B. Clark's single propeller models and F. Edwards' hollow-spar duration biplane have also put up noteworthy performances.

Twickenham Model Ae.C. (74, CLIFDEN ROAD, TWICKENHAM).

FLYING as usual at the Chudleigh Estate on Feb. 28th and March 1st.

Monthly Report.—Not much flying during the past month owing to the shocking weather, but a great deal of work has been done at the indoor meetings, among which the tests for the first and second class *brevets* and the design of badge have been decided on and a committee appointed. On the 31st ult. and 1st inst. Messrs. Franklyn, Stagg, Hill, Clayton, Whyte, Maynard, and Rice-Skinner out with tractors, Mr. Stagg being conspicuous for the trick flying of his little Dep. S. Messrs. White, Ord and Franklyn obtaining such flights with flying sticks as to have shown more than ever the necessity for obtaining a larger flying ground. Feb. 14th and 15th, flyable days, although squally. Flying stick competition, for duration only, won by Messrs. Stagg and Rice-Skinner, who collaborated. The tractor competition was postponed indefinitely as the weather has been impossible for flying tractors. On Feb. 22nd, Messrs. Whyte, Ord and Golding out with flying sticks, and Messrs. Williams, Stagg, Maynard, Franklyn and White flying tractors. Mr. Franklyn passed his second class *brevet* test with a tractor, and Messrs. Ord, Stagg and Maynard finished half the tests. The club is improving vastly in the workmanship of the models, some approaching Olympia style in finish. This month's new members include Messrs. Golding, Knowles, Barnes and Clarke.

* * * *

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

1. **Meeting**—The eighth meeting of the present session will be held on Wednesday, March 4th, at 8.30 p.m., when Mr. Mervyn O'Gorman, C.B., M.I.M.E., A.F.Ae.S., will preside. Mr. Archibald R. Low, M.A., A.F.Ae.S., will read a paper on "The Rational Design of Aeroplanes," followed by a discussion.

2. **Annual General Meeting.**—The annual general meeting of the Society will be held on Wednesday, March 18th, at 8 p.m., at the Royal United Service Institution, Whitehall, S.W. (Rule 39).

The last day for the receipt by the Secretary of notice in writing from any voter wishing to propose any subject for discussion at the annual general meeting is March 3rd.

B. G. COOPER, Secretary.

* * * *

Birmingham Aero Club.

Monthly Report.—Some very fine sport during the past month has been had with land yacht. During the early part of the month when there were some high winds during the week-ends, very fine runs were made with two members on board, and when only one member was steering, speeds approaching 35 miles per hour were attained, although at this speed it was very difficult to keep in the seat over the bumpy grassfield.

On February the 7th and 8th, Mr. W. R. Beaumont had his biplane glider out for its initial trials, and owing to his trying to manage the glider on Sunday morning without any assistance, a smash resulted, and by the time the members arrived it was in a hopeless state, being battered and blown across the aerodrome. His power-driven monoplane is nearing completion, and will be ready about Autumn.

Mr. N. Stamps' glider is now completed, with the exception of the covering, and we hope to see this soon at the club's aerodrome at Billesley. He is shortly starting on the construction of a power monoplane of original design, and which it is expected will be ready in about three months.

Messrs. Löwy and Swingler have experienced some bad luck with the Anzani engine on their monoplane, but it is expected to be got going at any time now.

Some very fine flying has been executed by Mr. E. Prosser on his Caudron biplane at the club aerodrome, his spirals being very excellent. He experienced a narrow escape a fortnight back through a valve breaking when banking rather steeply near the ground, but managed to land with very little to spare, and, had his altitude been a few feet lower, it is fairly certain that he would not have got out of the difficulty so well and without accident.

The next monthly meeting at the Colonnade Hotel, New Street, takes place on Monday, March 2nd, at 8 p.m.

* * * *

CORRESPONDENCE.

The R.A.F. and the Industry.

[1841] I fail to see the least why a careful reading of Octopus's letter should have prevented my writing mine. He objected, and still objects, to a Government department acting as "designer, buyer, and seller" at the same time. Well, he is perfectly at liberty to do so, but I fail to see why I should not also be at liberty to point out that it is the practice of all important Government departments in all countries of first-rate standing, except in details of subsidiary importance, and that the same practice applies to large private firms. In Naval matters, for instance, some ships are built in the dockyards, some by contract to Admiralty design. Further, cartridges, powder, shot, guns, rifles, &c., are bought all to Government design. Octopus says that what suits a private firm may not necessarily suit a Government department; but in this particular case, if it is found that the best result for the money is got by specifying accurately what one wants in private life, I do not myself quite see why it should not be the best for a Government department.

I do not quite see the drift of the last sentence of his letter. The fact that the Admiralty both designs and buys ships has certainly not killed the industry of building war-ships in this country.

F. STRICKLAND.

Possibility of Crossing Atlantic.

[1842] With reference to the article in your current issue, and the query as to whether an engine could be made to stand up for (say) 18 hours, have you thought of the phenomenal performance of the little 15 h.p. Argyll sleeve-valve engine at Brooklands last summer? The two runs of 14 hours each by no means represented a limit! the engine came back here in perfect order.

It may interest you to know that the aeroplane engine built on the same lines has displayed the same outstanding feature in its initial tests, viz., a regularity which is almost monotonous.

For ARGYLLS, LTD.,
J. S. MATTHEW, Managing Director.
Alexandria, Dumbartonshire, Feb. 24th, 1914.

* * * *

PUBLICATION RECEIVED.

Taschenbuch der Luftflotten I, 1914. By F. Rasch and W. Hormel. Munich: J. F. Lehmann, Paul Heyse-Str. 26. Price 5 marks.

* * * *

Aeronautical Patents Published.

Applied for in 1913.

Published February 26th, 1914.

3,928.	W. H. NOSWORTHY AND S. J. PRESCOTT. Aerial machines.
8,034.	O. I. KOSSTOVITCH. Airships.
15,920.	G. F. HEUBES. Automatic stabilising apparatus.
17,434.	E. CARRET AND A. SCHMITT. Aeroplanes.

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Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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CONTENTS.

Editorial Comment:

	PAGE
The Monaco Aerial Rally	353
A Practical Suggestion	353
Men of Moment in the World of Flight:	355
Flying at Hendon	356
The 100 h.p. Albatros Biplane (with scale drawings)	358
Armchair Reflections. By "The Dreamer"	363
From the British Flying Grounds	365
Eddies. By "Will o' the Wisp"	368
Bomb-Sighting Device	369
Acetylene and Aviation	370
British Notes of the Week	372
Correspondence...	373
Foreign Aircraft News	374
Models. Edited by V. E. Johnson, M.A.	375
Model Clubs Diary and Reports	376

EDITORIAL COMMENT.

The Monaco Aerial Rally.

Last week we were able to publish the full details of the Monaco Aerial Rally, one of the most important events that has ever been attempted in connection with aviation. As will have been gathered from the details given, seven routes have been fixed, with their starting places at important European centres, and competitors will be required to cover distances of roughly 800 miles across sea and country. There is no need to repeat all the details, but there is one aspect that appeals to us and that is that, generally speaking, the Press of this country has hardly deigned to notice that such an affair is in contemplation. One or two of the most important newspapers, notably those whose interest in aviation is proverbial, have mentioned that it is toward, but further than that there seems to be total lack of interest in it. We are not making any complaint about this. Indeed, when one comes to think of it, there is no necessity for complaint, because the prevailing attitude seems to indicate that such events as these have become akin to the commonplace. It is a text from which we have often preached, and we have no desire to labour the point, but aviation is still young enough to cause us to marvel at its progress day by day. Therefore, we cannot but read into the apathy—or comparative apathy—we have noted evidences of that progress which has in so few short years brought the science to a point where its possibilities are accepted as of no more than a passing news interest.

In the matter under review, we have been watching our daily papers for information of what has been done or what is going to be done by the seven and twenty entrants who intend to take part in this most interesting "rally," but apparently the foreign correspondents no longer regard these things as important enough to cable. Think of it! The preparations for a competition such as this, involving cross-flights by every competitor of nigh upon a thousand miles, hardly worth the expenditure of two-pence-halfpenny a word to record! And when we think that it is but four or five years ago the same journals kept a special staff of correspondents waiting and watching for days to see the first conquest of the Channel by a heavier-than-air machine! Can anything more significant, more eloquent of progress be imagined? We think not.

Looking down the columns of the *Daily Mail* the other day, we noticed that the fact that it is now possible to travel from London to Margate by motor 'bus was thought worthy of the best part of half a column of space, while not even a paragraph was devoted to the Monaco Rally. As we have said, we are not complaining, but simply endeavouring to point the moral, that flying now has become very much like using a taxi or a motor omnibus. Yesterday it was very wonderful. To-day it is no more so—and that is all there is about it.

◆ ◆ ◆

A Practical Suggestion.

We read in a communication from the American Aeronautical Society that that body has proposed to the Panama-Pacific Exposition authorities that in place of the round-the-world air race projected in connection with the opening of the Canal there should be substituted one from the East coast of America to the West, *viâ* the Panama Canal. The reasons given for the Society's recommendation are that such a contest would arouse great enthusiasm, be of lasting benefit to the industry in America, and would probably attract a fair field of entries.

We must say that we are fully in accord with the Society in its views. Ultimately, there is no manner of doubt that the earth will be circled by aeroplane, but large as is our faith in flight, we do not think the time is yet. While we have done what we could to encourage the idea, we have always tempered our encouragement with the caution born of the belief that the Exposition authorities were, to say the least, somewhat premature and ambitious in their plans. To speak quite frankly, we do not think there was ever the remotest chance of this round-the-world race materialising this year or next.

We know that, especially in connection with flight, it is utterly unsafe to prophesy unless with exact knowledge in hand, but this first plan savours too much of trying to run before we have learned to walk properly. With regard to the now suggested race round the Northern American continent, there are not the same objections to be urged. It is ambitious enough in all conscience, but not unduly so. Indeed, we see no reason whatever why the journey should not be safely and securely accomplished, given that organisation and arrangements are made reasonably perfect, and that the time schedules are not too severely drawn.

Accompanying the official communique from the American Society are many expressions of opinion from leaders of the industry and prominent flying men, practically unanimous in condemnation of the original round-the-world race, and favouring the revision of the affair in accordance with the Society's suggestion. We may therefore take it as being practically certain that the first plan will not be persisted in. If it is, then we see nothing but failure in front of it. It has nothing to commend it, while the latest idea certainly carries with it the stamp of practicality and usefulness.

⊗ ⊗ ⊗ ⊗

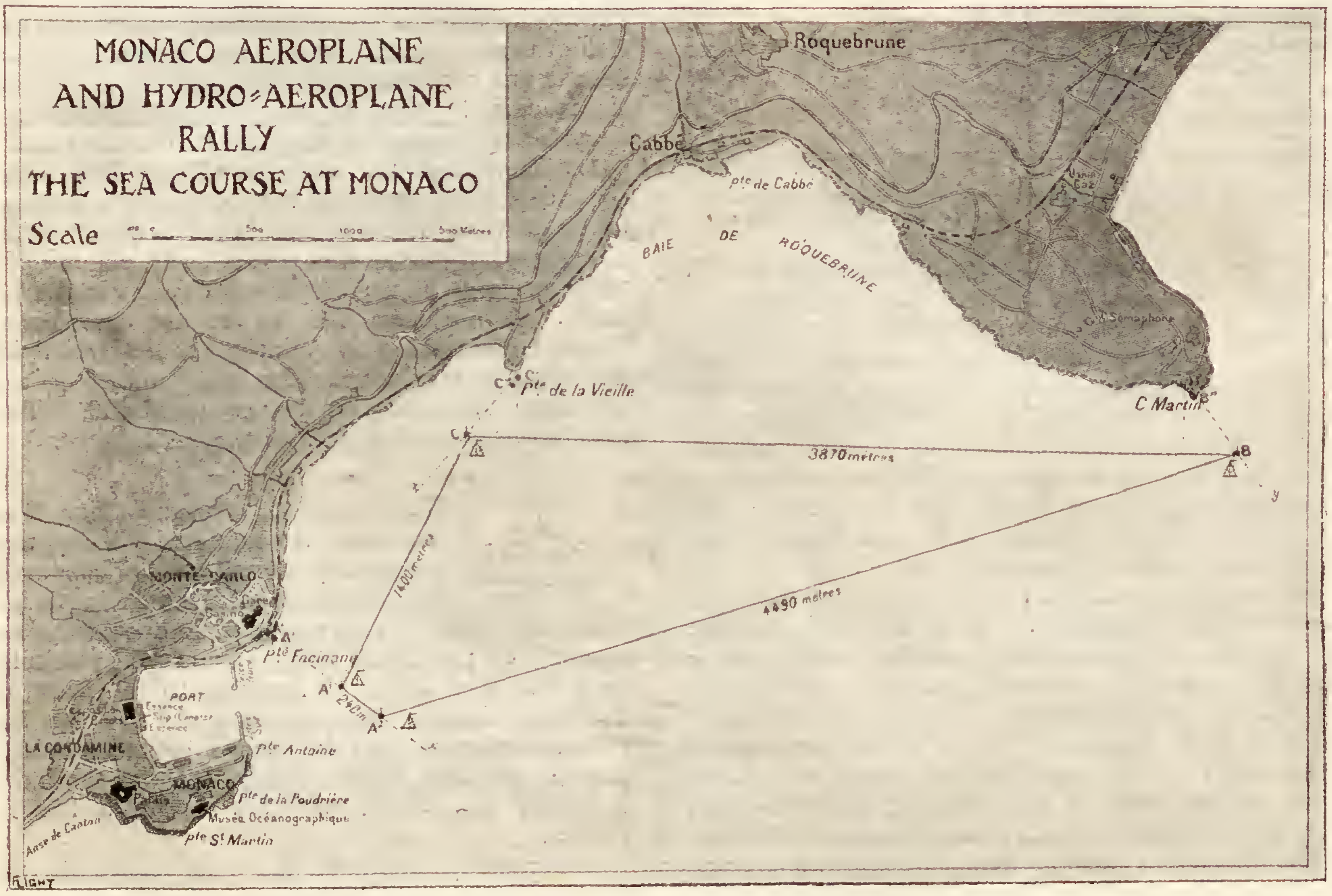
Easter at Hendon.

THE five days' meeting which has been arranged to take place at Hendon during the Easter Holidays will inaugurate the summer season at Hendon, and holiday makers may look forward to a wonderful display of flying. Thursday afternoon's programme will be devoted to exhibition and passenger flights. In addition to demonstrations of "looping the loop" and upside-down flying, the twelve-mile speed contest for the "Shell" Trophy will be flown on Good Friday, the programme commencing at 3 p.m. Saturday's contests will include a twenty-mile cross-country race and a quick-starting competition, and on Sunday afternoon special flying displays will be given by Mr. Gustav Hamel and other well-known Hendon aviators. The Bank Holiday events include special exhibition flights commencing at 12 noon, the grand speed handicap for the Barclay Walker Trophy at 3.30 p.m., and "looping" displays by Mr. Gustav Hamel.

"Animal Flight."

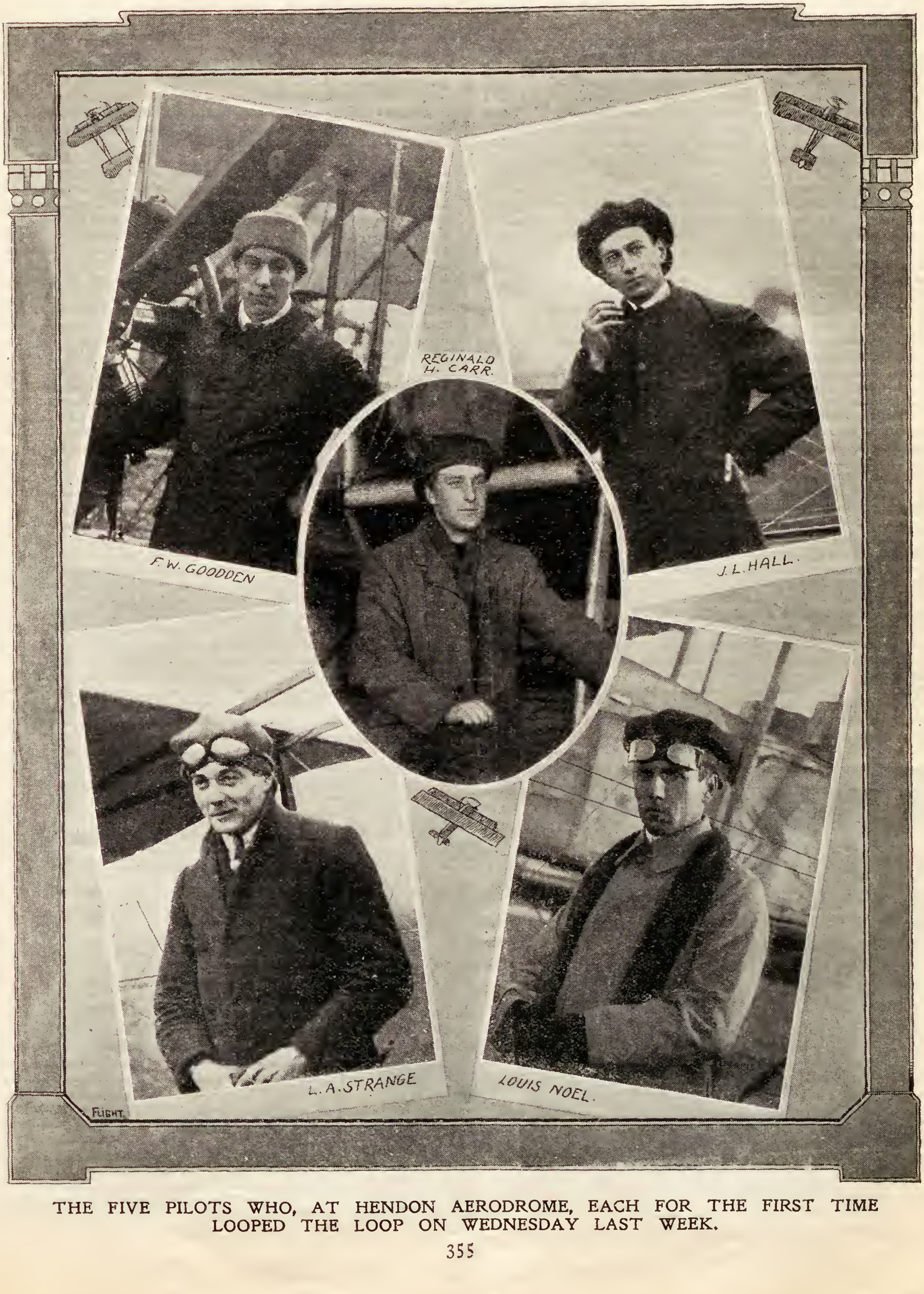
READERS of FLIGHT are, of course, well aware of the extraordinary amount of time and labour which Dr. E. H. Hankin has given to the study of bird flight—and of soaring flight in particular—and the book which he has recently published under the above title is certain of a warm welcome at the hands of all who are interested in the theory of aeronautics. Since the publication of his "Study in Bird Flight," which appeared in these columns during the last four months of the year 1911, Dr. Hankin has made further observations, not only of large birds in India but also of flies, bats, flying fish, &c., and the results of these observations are included in this book.

As Dr. Hankin points out in the preface, the book is a record of observations, and in India the author had exceptional opportunities of observing great soaring birds having a wing span of from 7 ft. to 11 ft., while he went to great lengths to see that his observations were accurate in all details. Not only has Dr. Hankin recorded what happens to the wings in flight, but he has gone to considerable trouble in endeavouring to find out and explain how it happens and why. The book is written mostly in non-technical language, and the few technical terms employed are fully explained both in a glossary and in footnotes. What is even more satisfactory is that there is a very complete index, while the illustrations number 98. The book is published by Messrs. Iliffe and Sons, Ltd., at the price of 12*s.* 6*d.*



The sea course in Monaco bay which has to be covered by the competitors in the aeroplane rally, particulars of which were given in last week's issue.

MEN OF MOMENT IN THE WORLD OF FLIGHT


F. W. GOODDEN
REGINALD H. CARR.
J. L. HALL.
L. A. STRANGE
LOUIS NOEL.
FLIGHT

THE FIVE PILOTS WHO, AT HENDON AERODROME, EACH FOR THE FIRST TIME LOOPED THE LOOP ON WEDNESDAY LAST WEEK.

FLYING AT HENDON.

A SERIOUS epidemic of *aeroloopitis* broke out at Hendon on Thursday afternoon of last week, which affected five well known Hendon pilots in a very pronounced manner, and it is expected that others will also succumb. A good attendance of visitors turned up to witness the usual exhibition and passenger flights, and with a light north-easterly wind blowing the weather kept fine. At 3 o'clock, R. H. Carr came out on the G.-W. tractor biplane "Lizzie" and climbing to a height of 800 feet executed, much to everyone's surprise, a perfect loop, following it up with another one shortly after. These loops were well formed, Lizzie turning over in excellent style and, as we were informed later, very easily. About an hour afterwards, Carr went up again, and at the same altitude made three more loops, making a total of five. At about the same time, F. W. Goodden ascended on the two-year old 45 h p. (Anzani) Caudron, and climbing to a height of 1,500 feet, he also executed two loops in equally fine style. He repeated his performance about half an hour afterwards, bringing his total of loops to four. This was not the end of the looping, however, for during the afternoon three more pilots were stricken with the ailment. These were J. L. Hall, Louis Noel, and L. A. Strange; Hall ascended to a height of 1,000 feet on his 50 h.p. Avro, and made one complete loop, whilst Noel and Strange put up two loops each, piloting Lizzie, with the greatest possible ease. The total number of loops, therefore, made by the five stricken ones was 14. In addition to the above looping displays several exhibition and passenger flights were made by the various pilots, including Philippe Marty on the 80 h.p. Blériot, W. Birchenough, and Strange on G.-W. 'buses, and Noel on the Maurice Farman.

The first Spring meeting last Saturday was held under Spring conditions indeed, and although still somewhat wet under foot the fine weather brought up a large number of visitors. The first to ascend was L. A. Strange on the 50 h.p. G.-W. 'bus No. 109, Philippe Marty with a passenger following shortly after on the 80 h.p. Blériot, whilst Louis Noel on the Maurice Farman and W. Birchenough on the other G.-W. 'bus also took the air. Two loopers, F. W. Goodden on the 45 h.p. Caudron, and R. H. Carr, on Lizzie, then ascended almost simultaneously. Goodden made the first loop at a height of about 1,000 ft., Carr making the next at a similar height, and a second one shortly after. Goodden made his second loop at about 800 ft., and then executed some fine spirals before landing. Carr put up a third loop at 700 ft., and also made some steeply banked spirals before landing. In the meanwhile J. L. Hall was up on his Avro, but did not join in the looping. A start was then made for the cross-country handicap to Bittacy Hill and back four times, the competitors being as follows: L. A. Strange, on the G.-W. 'bus 109 (6 mins. 7 secs.); W. Birchenough, on the other G.-W. 'bus (5 mins. 37 secs.); Louis Noel, on the Maurice Farman (3 mins.); R. H. Carr, on Lizzie (34 secs.); and Philippe Marty, with a passenger on the 80 h.p. Blériot (scratch). Marty came home an easy first, with Noel, who flew very low on entering the aerodrome, 35 secs. behind. Strange went out of his course on his second lap and retired, whilst Birchenough also flew a wrong course and was not placed, so third place went to Carr, who was 19 secs. behind Noel. Immediately after the race, E. F. Norris went up on the G.-W. 'bus 109, and Goodden ascended once more and executed two more loops at 1,000 ft., whilst Marty and Noel took up a passenger each on the Blériot and Maurice Farman respectively. All interest was then centred round two new comers—Herr Thelen, the well-known German pilot, and the fine Albatros biplane. The latter is a magnificent piece of work, but as we deal with this machine in detail elsewhere in this issue, we will confine our remarks to its first public performances in the air at Hendon. After a preliminary run of the engine Thelen took the machine up for a test flight, rising in splendid style after a run of some 20 yds. or so, and rapidly climbing to an altitude of over 1,000 ft. After remaining up for about 5 mins., during which he executed some very fine banked turns, he descended, making an excellent landing, and pulling the machine up in a remarkable manner by means of the "plough" brake. He then made another flight with a passenger, climbing rapidly to a height of 1,500 feet and putting the machine through several evolutions; this particular biplane appears to have a very good speed range, and flies in a particularly steady manner. After this flight the machine was returned to the hangar. The rest of the evening was devoted to further exhibition and passenger flights, put up by the following:—Hall on the Avro with passengers, R. J. Lillywhite, M. Osipenko, and Birchenough (with passengers) on G.-W. 'buses, Noel with passengers on the Maurice Farman, and Marty with passengers on the Blériot. Carr gave another demonstration of looping on Lizzie, making three complete loops at heights varying from 1,000 to 800 feet. Later, Strange took over the same machine and made two well-formed loops at 600 and 500 feet respectively, Noel doing a *vol pancake* on the Maurice Farman near by during the last loop. On descending, Strange handed over Lizzie to Noel who made two very fine loops each at a height of 600 feet and almost over the same part of the aerodrome each time; in all therefore, 14 loops were made during this afternoon. Just as the various machines were being returned to the hangars, at 6.10 p.m., a Blériot was seen approaching the aerodrome from the west. This proved to be Henri Salmet, who had been expected earlier in the afternoon, on the *Daily Mail* Blériot which he had flown over from Paris. He was accompanied by T. Elder Hearn, who obtained his pilot's certificate in France some little time back, and both reported an exceedingly pleasant journey. They left Paris at 10 a.m. that morning, arriving at Folkestone at 2.30 p.m., where they stayed until 4 o'clock when they resumed their journey. Great difficulty, however, was experienced in keeping a correct course to Hendon owing to the mist that enveloped various parts of the country, and their arrival at the aerodrome was thus considerably delayed. As it was too late in the evening to fly on to Manchester as had been originally intended, the machine was put up for the night, and as this was being done A. L. Barrs, who just recently obtained his ticket at the Grahame-White School, made the last flight of the evening on a 35 h.p. Deperdussin monoplane.

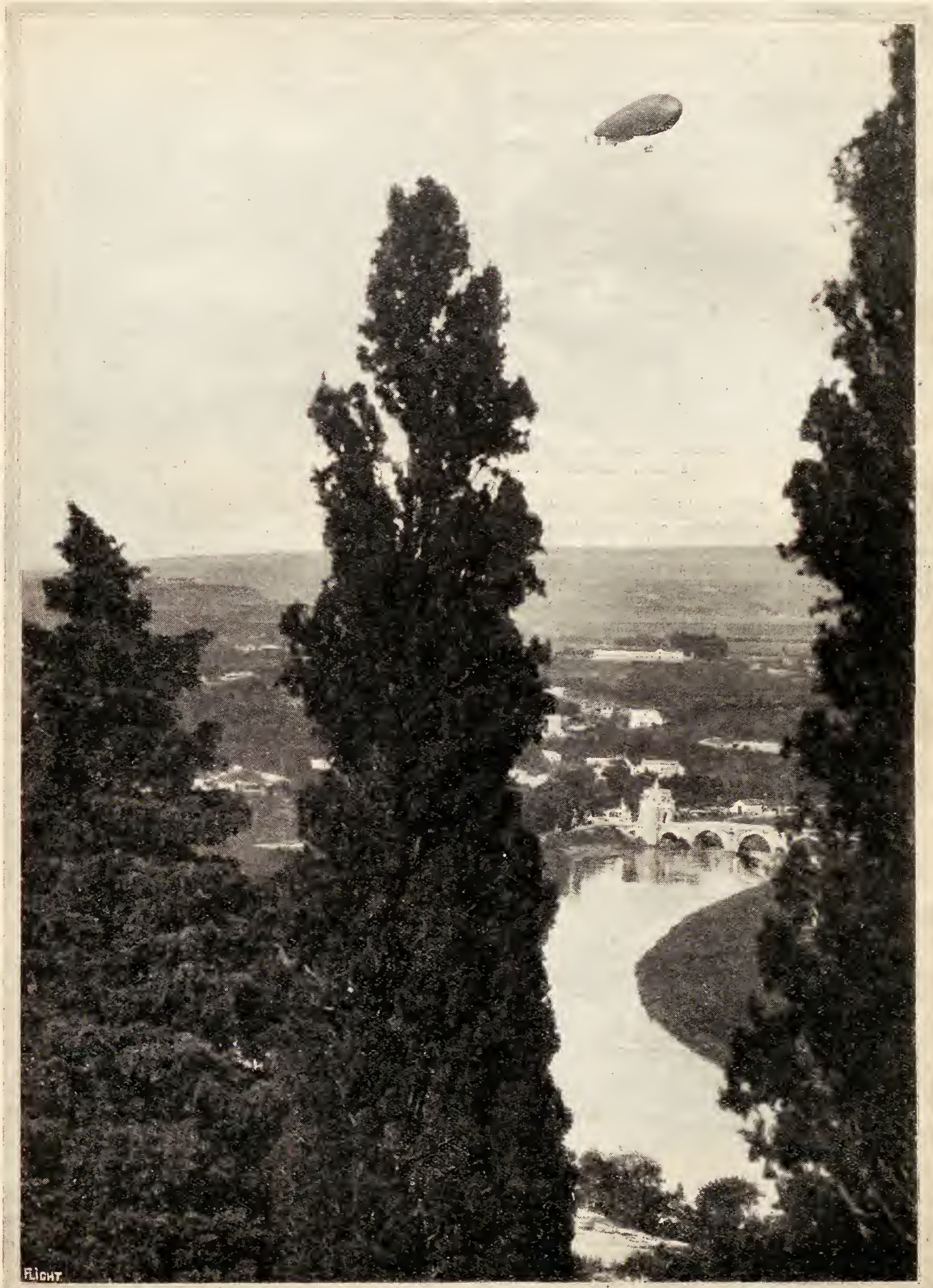
	Cross-Country Handicap. (16 miles.)	Handicap. m. s.	Handicap Time. m. s.
1.	Philippe Marty (80 h.p. Blériot monoplane) ...	scratch	23 36
2.	Louis Noel (70 h.p. M. Farman biplane) ...	3 0	24 11
3.	R. H. Carr (50 h.p. G.-W. tractor biplane)	0 34	24 30
	W. Birchenough (50 h.p. G.-W. biplane)	5 37	
	L. A. Strange (50 h.p. G.-W. biplane)	6 7	

Dull, rainy weather made matters very unpleasant for both visitors and pilots on Sunday afternoon, but despite the unfavourable conditions there was no lack either of visitors or flying. Philippe Marty made several flights with passengers on the Blériot, R. H. Carr put up some more looping on "Lizzie," Louis Noel took up several passengers (mostly of the fair sex) on the Maurice Farman, and executed *vols pancakes*, and L. A. Strange was busy on the G.-W. 'bus. It will be seen, therefore, that even rain will not damp the proceedings at Hendon.

A 9-mile speed handicap will be the principal event for this (Saturday) afternoon's April meeting, which opens at 3.30 p.m.

"Flight" Copyright.

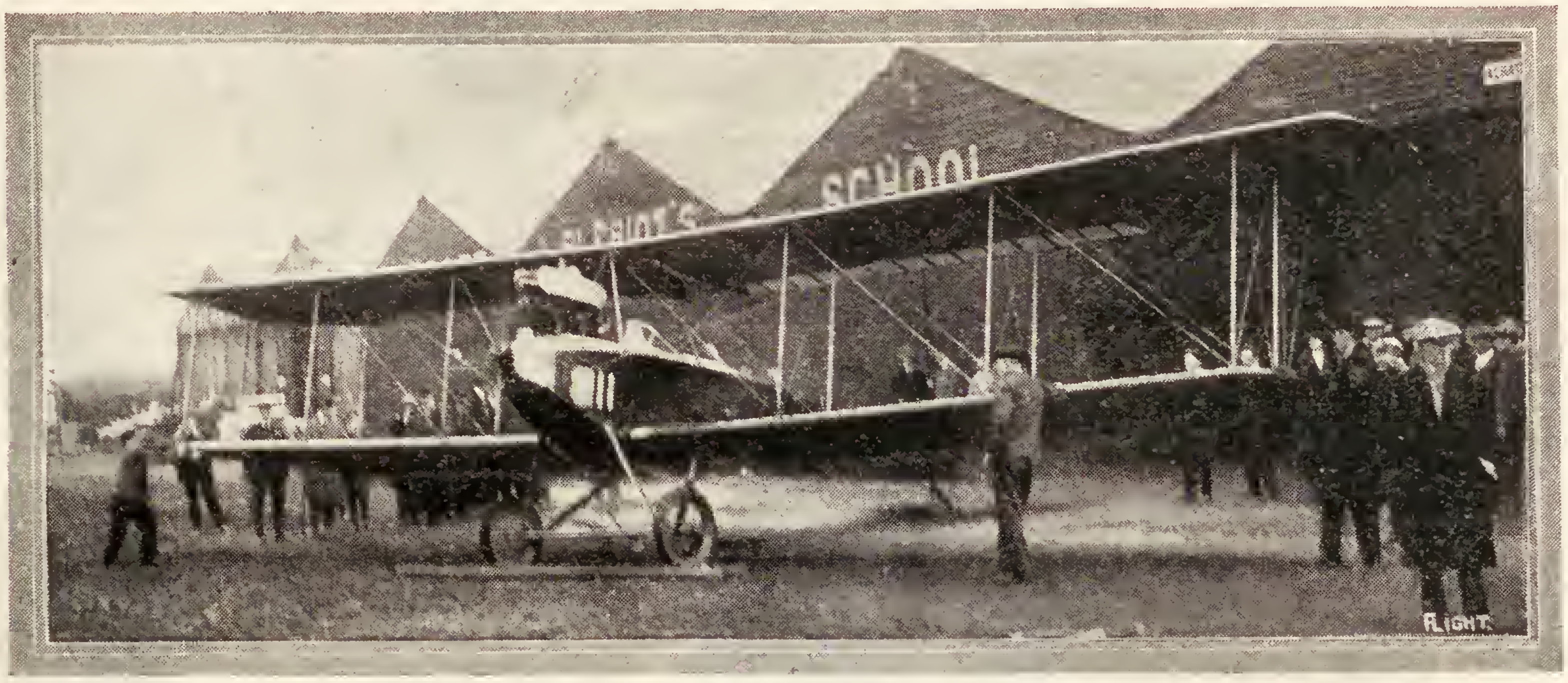
Herr Thelen in the cockpit of the Albatros.



The Forlanini airship as seen cruising near Rome.

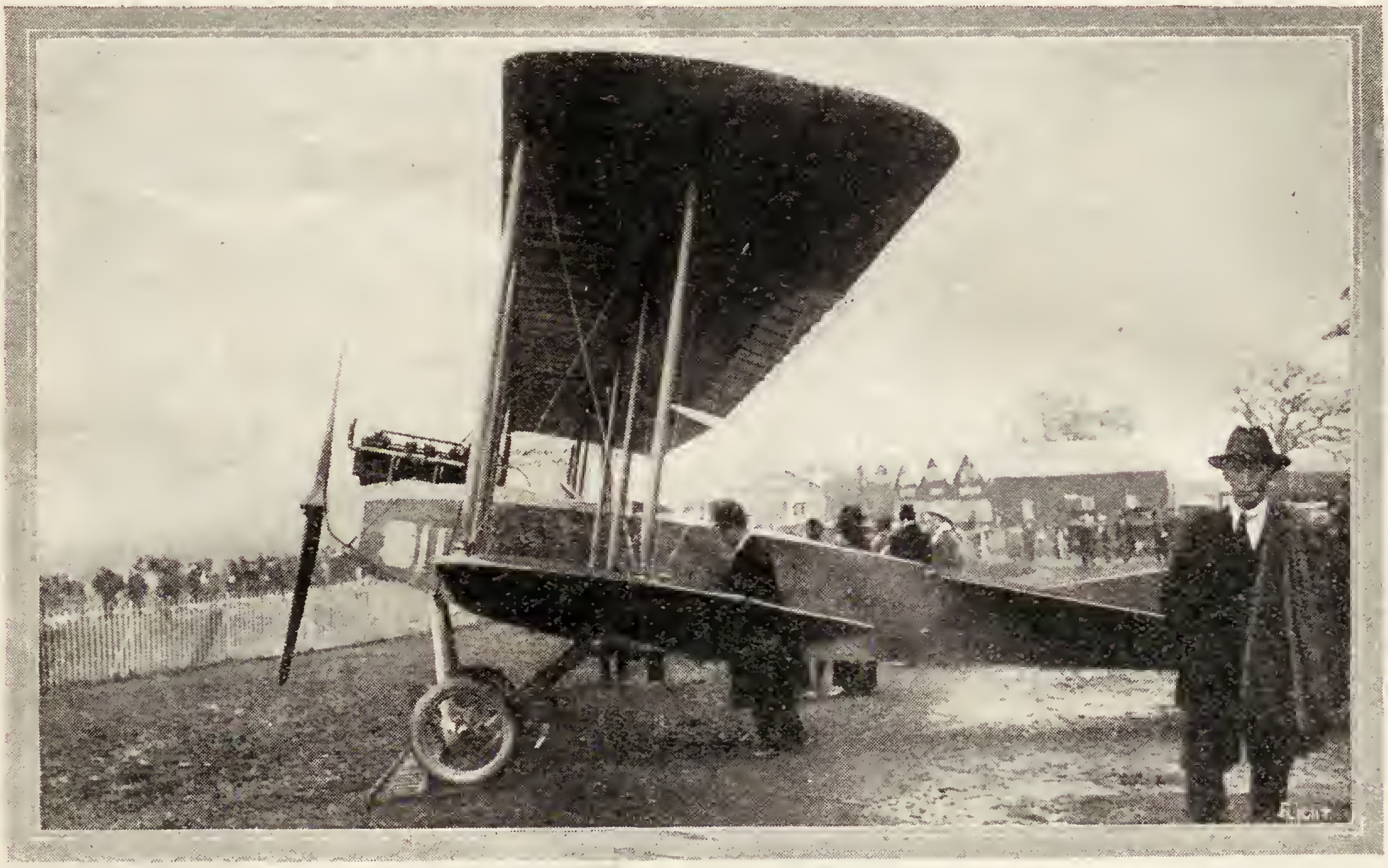
THE 100 H.P. ALBATROS BIPLANE.

Evidently the German constructors have confidence in the ability of their products to compete against machines of British manufacture, for again a German machine—this time a 100 h.p. Albatros biplane—has arrived in this country with a view to being submitted to tests at Farnborough. As regards workmanship and soundness of construction, this latest arrival to these shores must be admitted to be equal to the best of British machines, and judging by the amount of flying done on these machines in Germany and the popularity that they have attained in that country, there is every reason to believe that they are as efficient aerodynamically as they are robust constructionally. The machine, of which we publish scale drawings and illustrations this week, arrived at Hendon on the morning of Friday last on its lorry, and was in the air the same afternoon.



THE ALBATROS BIPLANE.—View from in front. "Flight" Copyright

After giving the engine—a 100 h.p. Mercedes—a preliminary run, the pilot, Herr Robert Thelen, had the machine wheeled up on the pier in front of the Grahame-White offices, and, when warned against the soft ground at the end of the pier, he laughingly replied that he would be off by the time he got to the soft ground. As the wheels reached the end of the pier the nose of the machine shot upwards, the tail skid touched the ground and the great biplane climbed upwards at an angle reminiscent of the little Sopwith flown by Mr. Hawker.



THE ALBATROS BIPLANE.—Side view. "Flight" Copyright.

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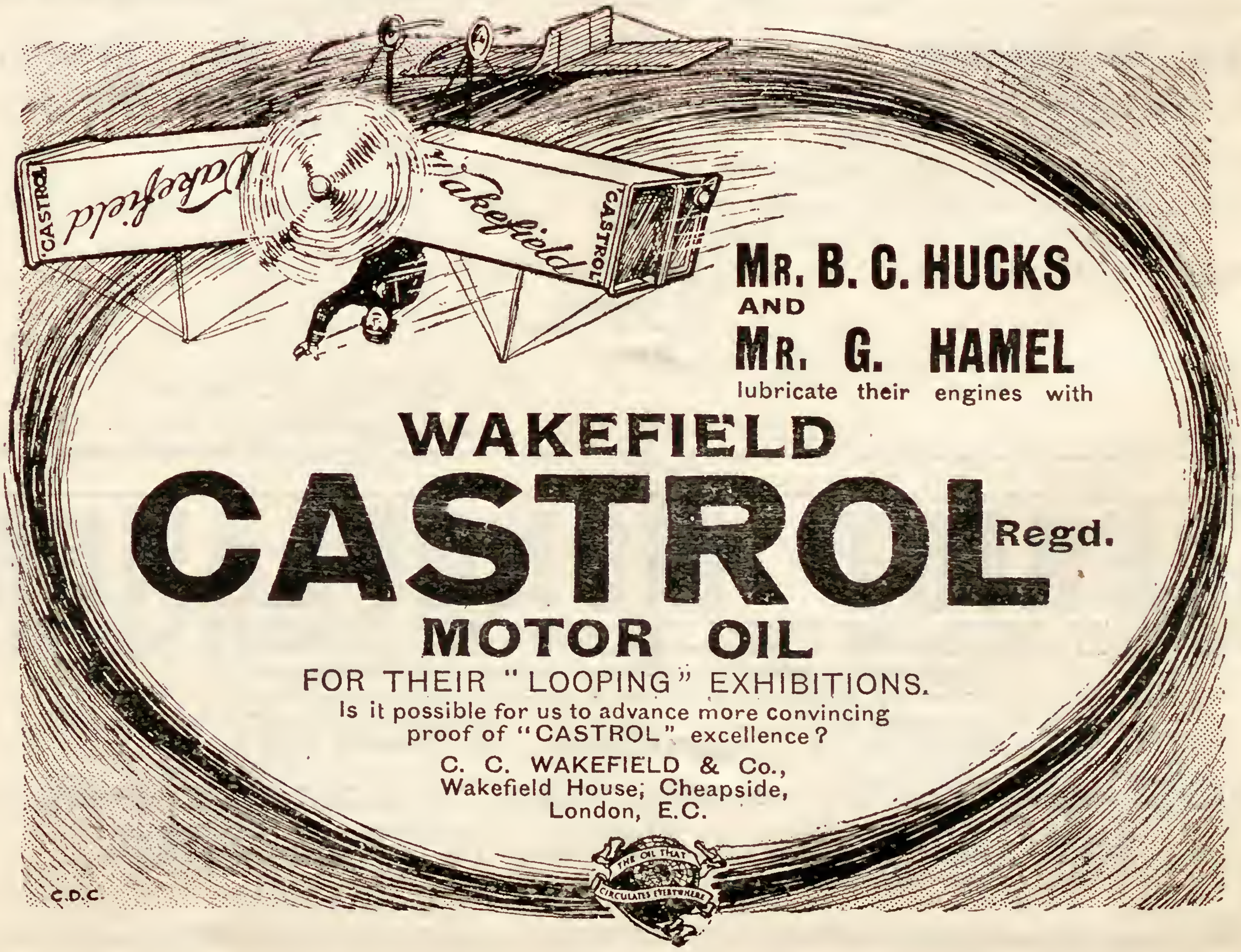

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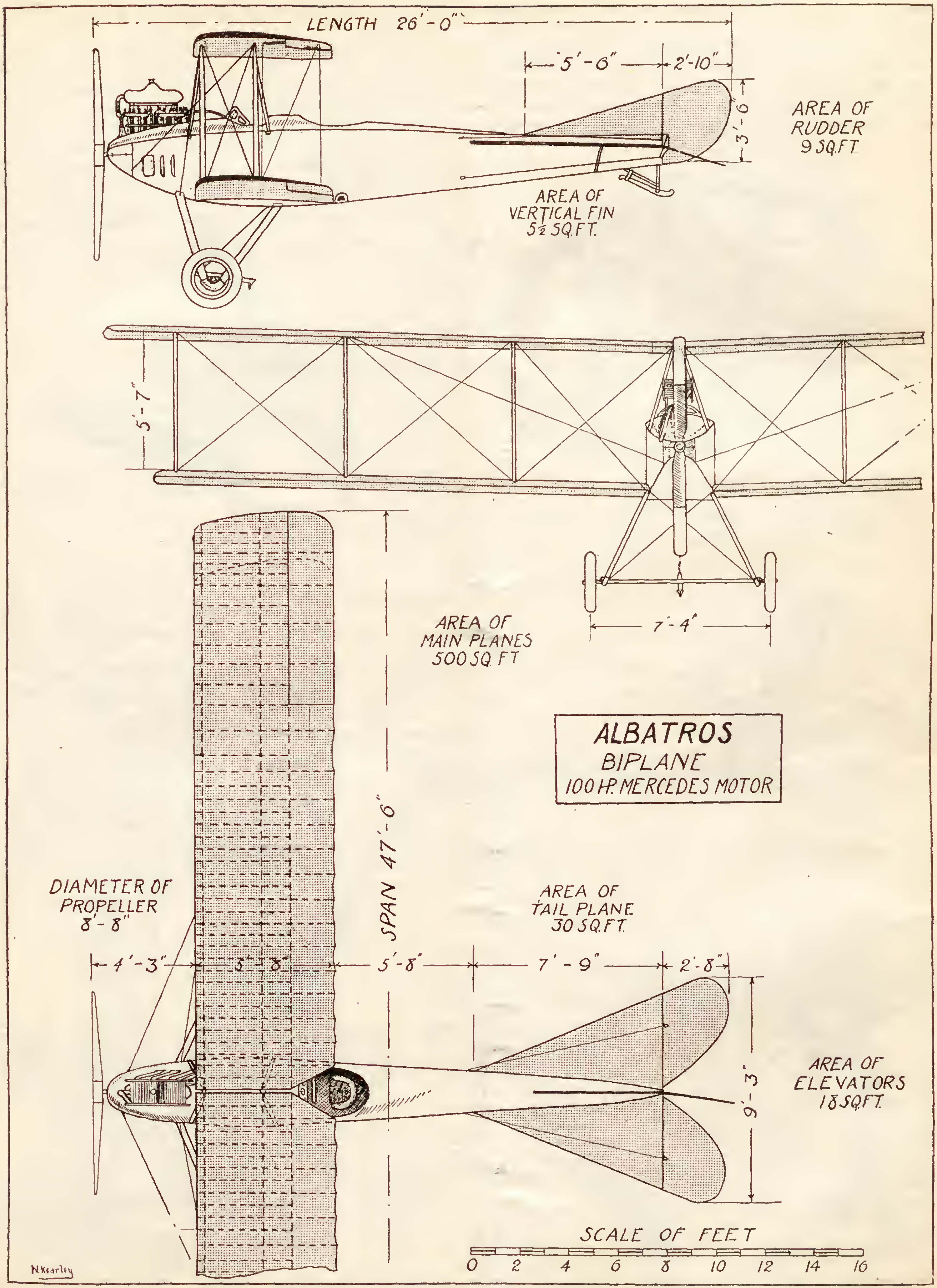
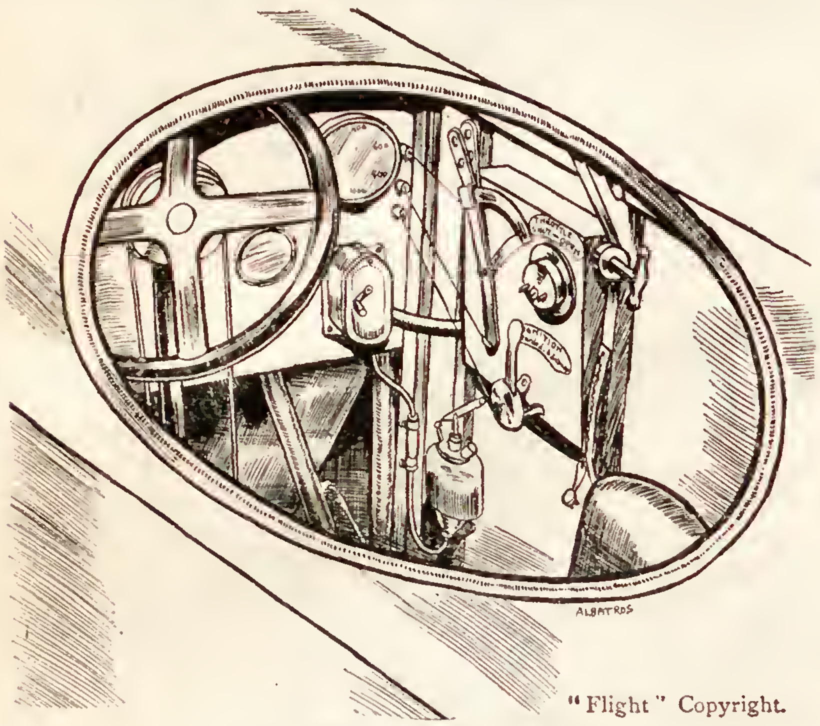


THE ALBATROS BIPLANE.—Plan, side and front elevations to scale.

Like the majority of German machines, the Albatros biplane is of the tractor type, but the wings are straight, as seen in plan view, instead of being swept backwards as in several other machines hailing from that country. Among the many interesting features the construction of the *fuselage* is worthy of notice, for it is built up without the use of the ordinary diagonal cross bracing, the necessary rigidity being obtained by the covering, which is of three-ply-wood.

According to calculations carried out by the Albatroswerke and corrected by *Deutsche Versuchsanstalt für luftfahrt*, the factor of safety of the *fuselage* of the Albatros biplane is about 60, and the bending resistance of this type of *fuselage* is 2·5 times greater than that of a diagonally wired *fuselage* of the same outside dimensions and having members of the size usually employed in structures of this type. The *Versuchsanstalt* also states that the Albatros-werke are justified in concluding that the bending resistance of the veneer type of *fuselage* is greater than that of a cross wired *fuselage* of the same weight.



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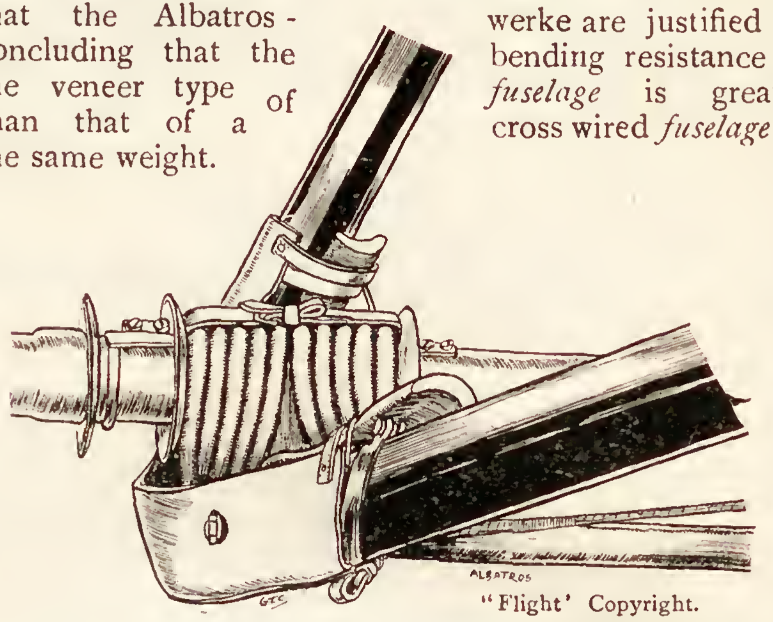
Pilot's cockpit on Albatros.



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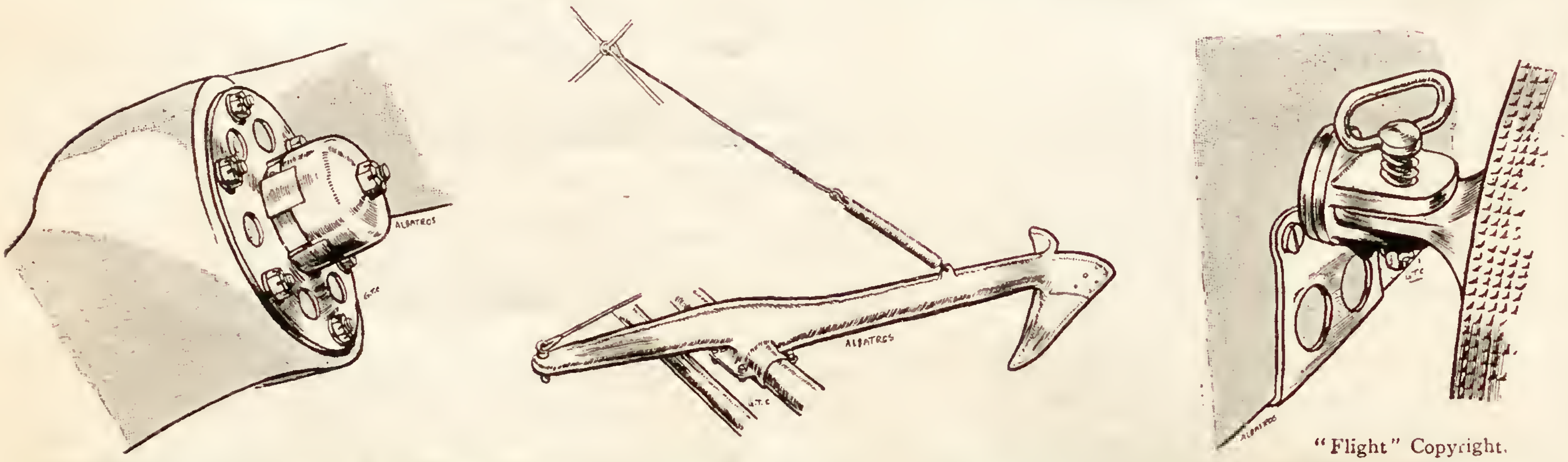
Detail of shock absorbing arrangement on Albatros.



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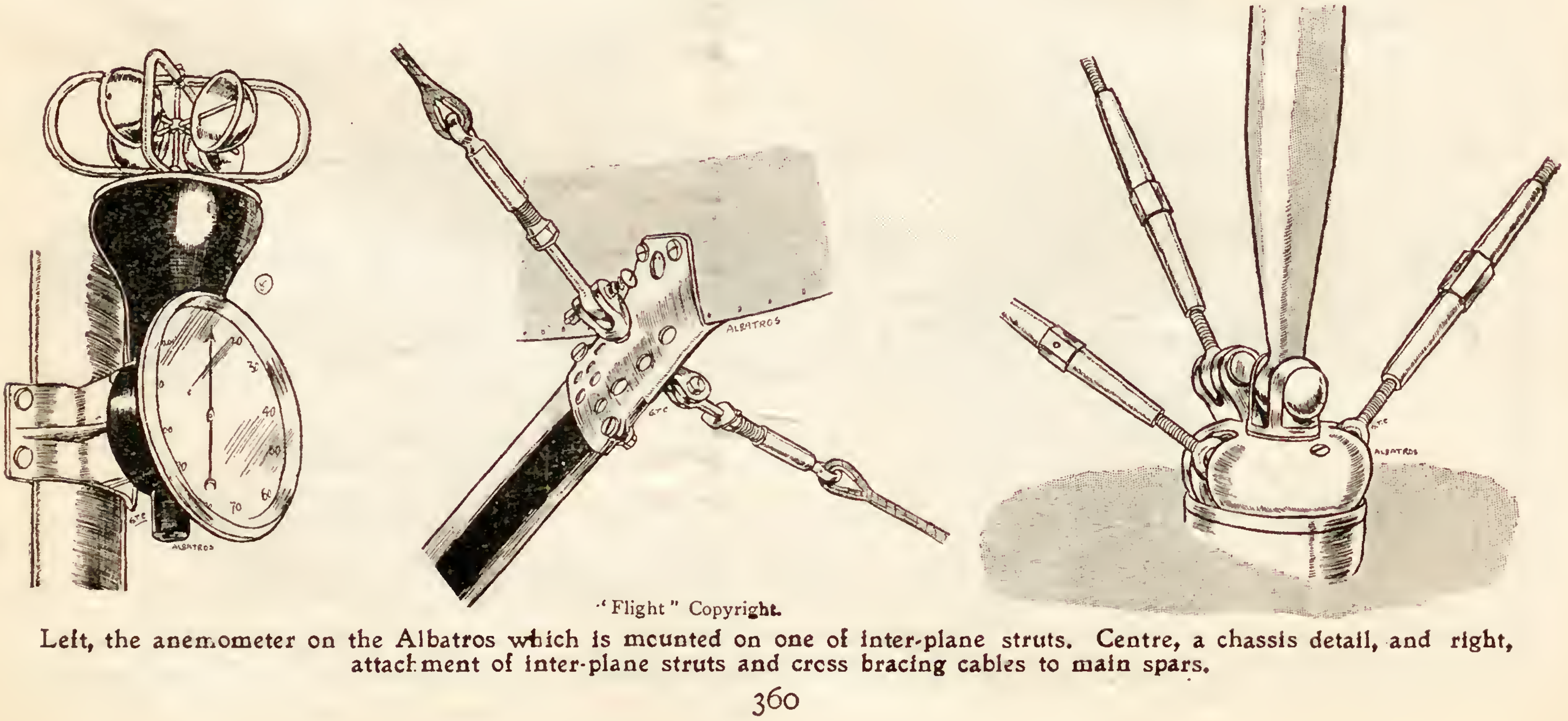
Left, method on Albatros of locking propeller on engine shaft; centre, the hand operated brake; and right, attachment of lower plane to *fuselage*.



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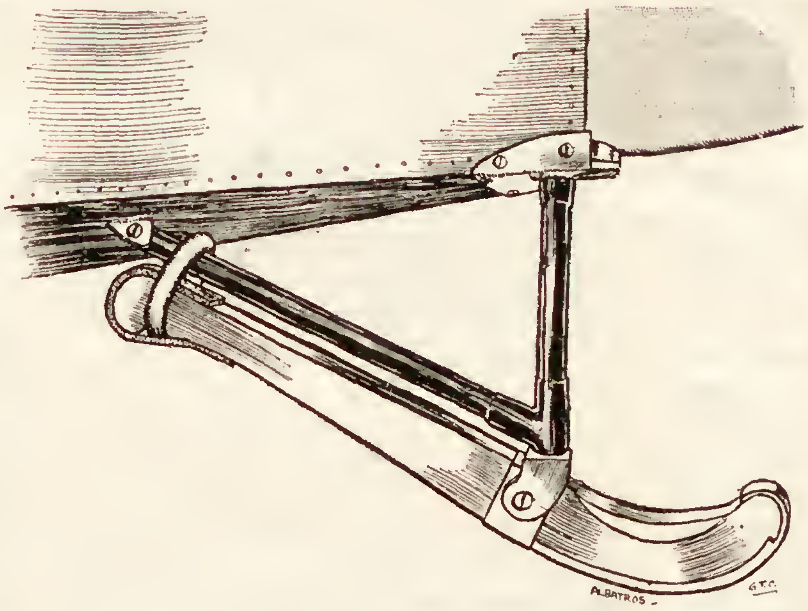
Left, the anemometer on the Albatros which is mounted on one of inter-plane struts. Centre, a chassis detail, and right, attachment of inter-plane struts and cross bracing cables to main spars.

There are six *longerons* of ash, one in each corner of the rectangular section *fuselage* and one about half-way up each side. The struts are also of ash, and occur at frequent intervals along the whole length of the *fuselage*. The three-ply covering is tacked to struts and *longerons*. From the nose up to a point in front of the tail fin the deck of the *fuselage* is given a streamline form by means of a curved turtleback, whilst the under surface is flat.

The 100 h.p. Mercedes engine is mounted on strong ash bearers in the nose of the *fuselage*, and the radiator, as will be seen from the accompanying illustrations, is supported on brackets immediately above the engine. The pilot's and passenger's seats are arranged tandem fashion inside the roomiest portion of the *fuselage*, the pilot occupying the rear seat. Between the passenger's seat and the engine are the petrol and oil tanks, which have a capacity sufficient for a flight of 4½ hours' duration. The seats are unusually comfortable, being well upholstered. A neat instrument board, carrying a variety of instruments, is situated in front of the pilot's seat, as shown in one of the sketches, whilst in front of the passenger or observer is a small folding table.



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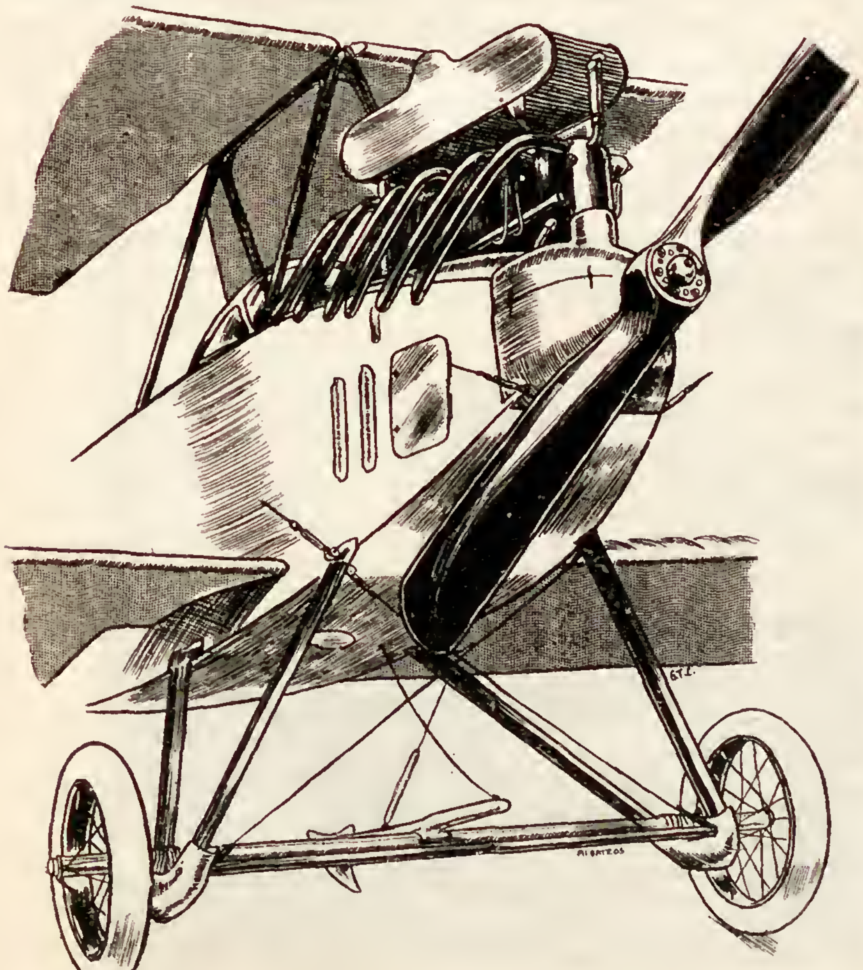
The tail skid of Albatros.



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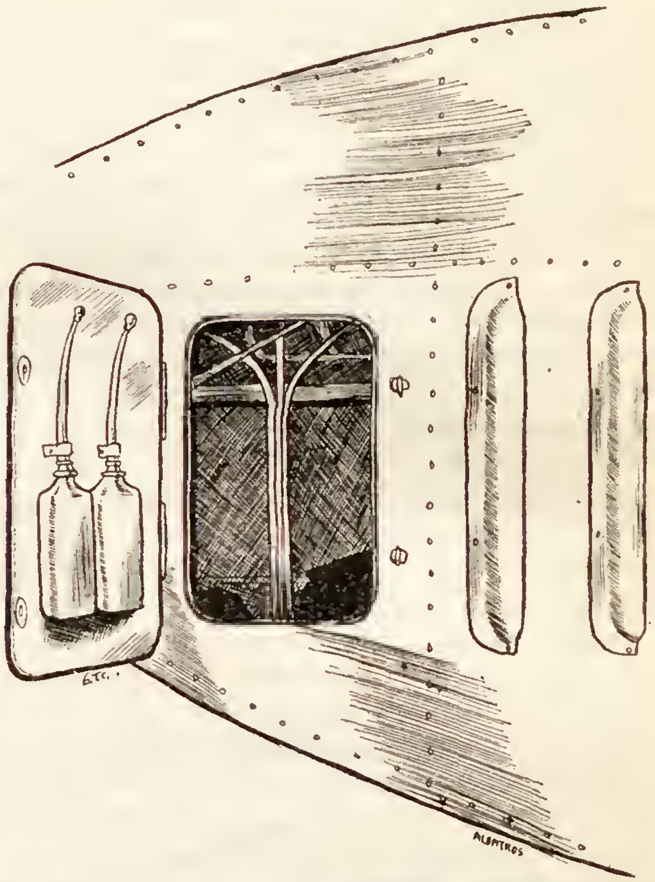
Chassis and engine of Albatros.

The chassis is of a very simple type, and consists of two pairs of V tubes of steel carrying the large diameter tubular axle, which is sprung from the chassis by means of rubber cord. Leather guards protect these cords against contact with the ground in a heavy landing and prevent them from being splashed with mud. Pivoted around the wheel axle, and operated by means of a cable from the pilot's seat, is a very effective brake, which pulls the machine up very quickly on landing; it may also be used to prevent the machine from going forward while the



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Oil and petrol cans mounted on engine inspection door of Albatros.

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View from below of the Albatros in flight.

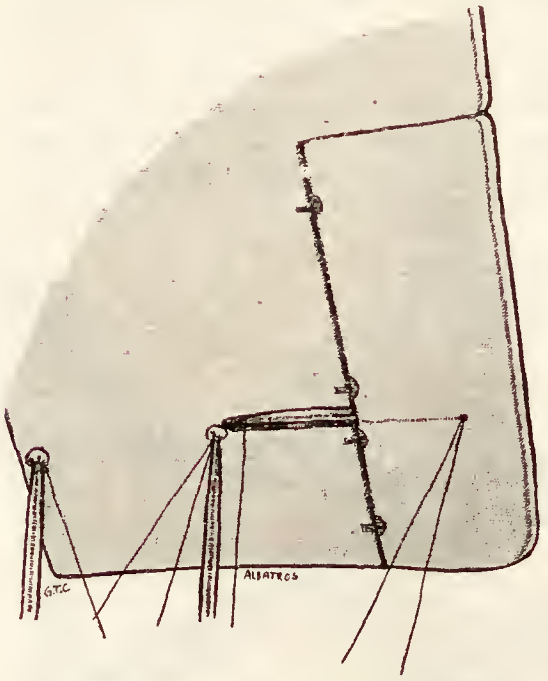
pilot is testing his engine before a flight. By means of this brake and the hand-operated starter, the pilot is able to start the machine without any outside assistance, a very desirable feature in a machine for military purposes.

The main planes, as will be seen from the accompanying scale drawings, have the two main spars comparatively close together, the rear spar occurring about half way along the chord. The rear portion of the wing therefore possesses a considerable amount of flexibility, further increased by having the extreme rear part of the wing single surfaced for a distance of about a foot from the trailing edge. This, it will be seen, provides a form of progressive springing of the trailing edge, to which the machine no doubt owes a considerable amount of its lateral stability. *Ailerons* are fitted to both upper and lower planes, and the crank levers for operating these are not set at right angles to the planes, as it is usually done, but lie parallel to the planes and work in slots cut in the upper plane. From the end of these crank-levers cables pass round pulleys in the lower plane, and thence to the control wheel. The *ailerons* on the lower plane are set at a slightly negative angle of incidence, thus probably further enhancing the lateral stability.

Streamline steel tube struts connect the planes, and the attachment of these struts to the spars is highly original. A steel shell of the shape shown in the accompanying sketch rests on a paper fibre pad shaped to fit the curvature of the plane. Inside the shell is carried a steel ring, to which are anchored the cross-bracing cables, or, more correctly speaking, the turnbuckles for the cables. A bolt passes through the shell and the spar, and is locked on the other side of the plane by means of a nut.

The wings are attached to the *fuselage* by vertical bolts, as shown in the sketch, whilst the upper planes are secured at the centre to a *cabane* consisting of four streamline steel tubes bolted to the upper *longerons* of the *fuselage*, and carrying at their upper extremities a horizontal tube which is provided with flanges for the attachment bolts. By undoing half a dozen bolts, the planes can be detached from the *fuselage*, and folded flat against one another without removing the inter-plane struts. We understand that three sets of main planes of different size can be used for the same *fuselage* according to whether the machine is wanted to be speedy, for scouting work, or slower but with a greater weight-carrying capacity. Some of these machines, we learn, can even be converted into monoplanes by fitting a single pair of wings in the usual place. The *cabane* mentioned above then serves as a support for the upper bracing cables. Also the machine may be turned into a seaplane by substituting floats for the wheels.

The tail planes are of the usual type, consisting of a fixed stabilizing plane, to the trailing edge of which is hinged the divided elevator. A triangular vertical fin is mounted on top of the *fuselage* and secured to the stern-post, which also carries the rudder. A strong tail skid, sprung by rubber bands, protects the tail planes against contact with the ground.



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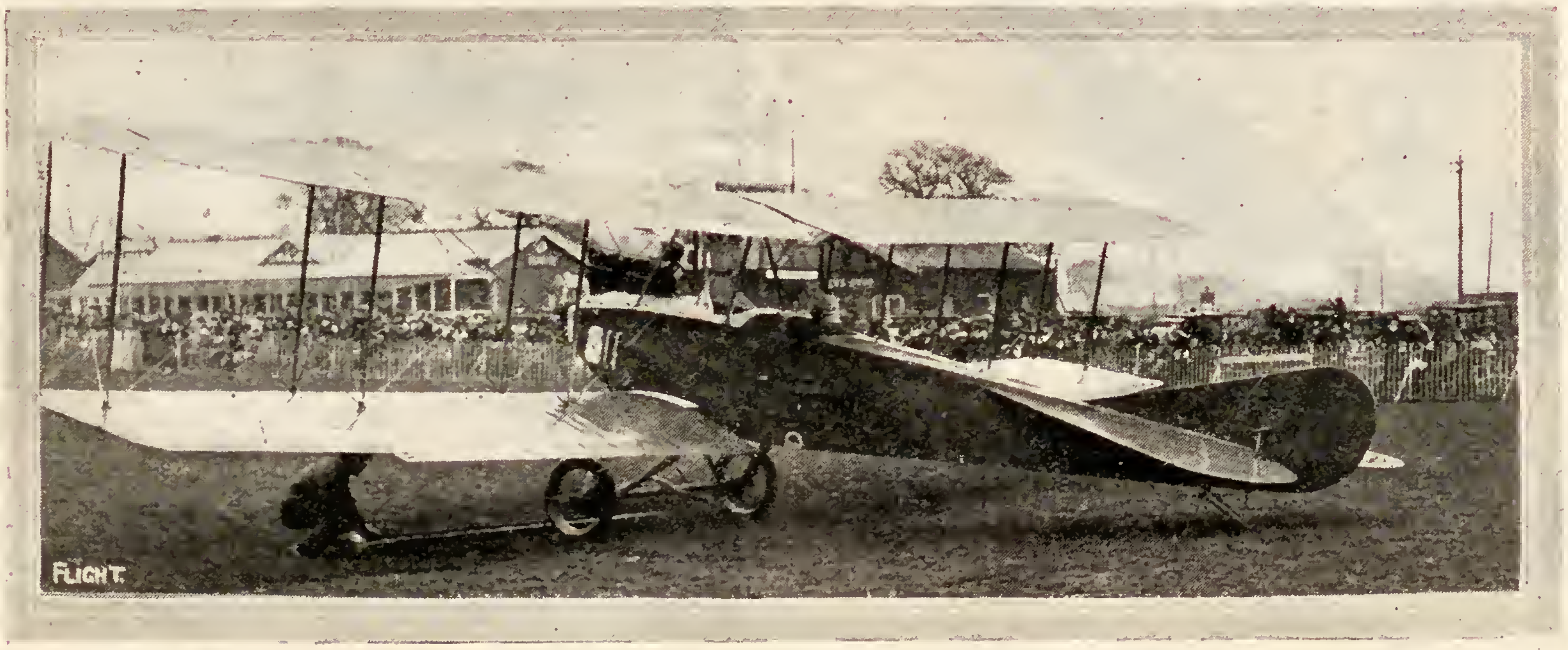
Aileron **crank lever on Albatros.**

With the medium-sized wings fitted at present, the machine has a speed of about 70 m.p.h. and weighs about 1,500 lbs. empty. The workmanship and finish are excellent, and the behaviour of the machine in the air, as far as it was possible to judge from a flight with Herr Thelen, appears to be very good. When struck by gusts or running into *remous* the machine rose and sank on an even keel, the *ailerons* rarely being called into play. The climbing capabilities are extremely good for a machine of this size, and the speed range, without knowing the actual figures, seems to be considerable. With the engine throttled right down the machine glided very flat, but even when flying absolutely *cabré* we did not notice any tendency whatever to side-slip, nor did the pilot appear to experience any difficulty in getting her nose down again. On steeply banked turns, the bank being increased by using the *ailerons*, the considerable side area of the *fuselage* appeared to prevent side-slipping.

We understand that if the machine passes her tests, and there are reasonable prospects of repeat orders, it is the intention of the Albatros firm to establish a factory in this country.



THE ALBATROS BIPLANE.—Three-quarter rear view. "Flight" Copyright.

ARMCHAIR REFLECTIONS.

By THE DREAMER.

Came I but of the stock of Buzfuz, I, be-wigged and be-gowned, would conduct the case for the prosecution. Rely me, I would, not on such slender evidence as chops and tomato sauce, in however unsavoury condition I might, garnished by forensic eloquence, be able to serve it. Counselistic subtlety should not wheedle from Bardells of tender years damning, though ambiguous evidence in favour of my side.

Dobson and Fogg should never have undertaken a case "on spec" with more certainty of winning than I. Forcible, with all the vigour born of the certainty of conviction, would I quote Vics. and Caps.; respectfully would I refer his Lordship to Barber *v.* Penley, to the Pelican Club, to R. V. Moore. Hinde *v.* Evans should furnish me with precedent, and Article IV (2) of the Motor Cars Order should be my trump card, and clear for me a way whereby I would strike terror to the very souls of the transgressors.

I was not born to "Silk," yet shall some gentleman of the Inns take up the cudgels on behalf of suffering humanity, and remove all loitering cars and pedestrian deadheads from the roads round and about Hendon, and suchlike centres of gathering. Understanding comes slowly to me why a man who can afford to run a car for his own and his friends' pleasure, should yet find it necessary when wishing to witness the flying to do so from a distance, and from the public highway, in order to save the small fee charged for admission. Should they be asked their interest in aviation, they would, I venture, reply almost to a man that it was the sport of the thing.

One who is interested in sport is generally proud to be thought a sportsman, because "Sportsman" carries with it an impression of genuine straightforward fairness, and the sportsmanship of the average Englishman is known throughout the world. Yet here we have men thinking themselves sportsmen, who, knowing, as they must know, the enormous expense attached to the running of such places as aerodromes, are mean enough to take advantage of the fact that it is impossible to build the aerodrome fence right up to the sky; to stay outside and place themselves on an equal footing with the small boy who crawls under the circus tent, and sees the show for nothing.

Yes! understanding comes slowly to me, but it is not with the nature of mankind that I have to deal; it is with that organisation which Mr. Samuel Weller was pleased to designate "A hass," but which appears likely to bray shortly, in a key which shall be heard a long way.

Hendon, by reason of the great and continuous amount of flying that takes place there is a great sufferer, but they are by no means alone. Throughout the entire country, wherever there is an established aerodrome or where temporary aerodromes are used for the purpose of exhibition flying, whether it be week-end meetings or as an addition to other shows such as flower-shows or agricultural exhibitions, comes the same complaint, that many members of the general public stay outside the gates and see all or nearly all that there is to be seen free of charge.

The general public seem to have an idea that on the King's highway they can stand, and leave their cars to their heart's content, but a little thought on the subject will show that they are amenable to law. A highway primarily exists for the use of those wishing to establish communication between distant places. The word "highway" embraces all three of the roads general in England—the carriage road, the footpath, and the bridle path; and the rights of the public consist only in the right to use these roads to pass and repass in their desire to proceed from one place to another. Stopping for a reasonable time to load or unload goods, or to take up or set down passengers, is a right, but they have no right whatever to congregate or stand about, forming units of

The Albatros in flight. "Flight" Copyright.

a crowd liable to bring discomfort or trouble to other users of the road.

Complaints have been made to the Press with special reference to the roads round about Hendon, which on some days are all but impassable to ordinary users of the road owing to the number of waiting cars.

The question arises, whether this practice can be stopped by law; it undoubtedly can! So far as Hendon is concerned, there is no question, as the roads come under the authority of the Hendon Urban District Council, and are also within the Metropolitan Police Area.

It has been proved, by many verdicts in our courts of law, that those responsible for the exhibition which causes the crowd to assemble are also responsible to the authorities, but in the case of Hendon, as the crowd generally assembles at a good distance from the actual scene, it is more than doubtful that any action could hold against them, and should the authorities or others choose to take action against the culprits, I am sure nobody would be more pleased than the London Aerodrome people themselves, for it must be annoying to them in the extreme.

So far as foot-passengers are concerned, it would seem that the only course for the police to adopt is to order them to move on, and then prosecute them for obstruction should they refuse to do so.

The only question seems to be whether what is done represents a reasonable usage of the road or not, and it is a well-established principle of our common law that persons are not entitled to use the highway as a vantage ground for sighting seeing.

The case of motor cars is different, for they not only come under the general law applicable to all carriages, but there is special legislation concerning them.

A driver of any carriage whatsoever is prohibited from leaving such a carriage on the highway so as to obstruct the passage thereof, and this holds good, notwithstanding that the carriage is not unattended, the whole question being whether the highway is obstructed, and it seems that in the case of Hendon, the distribution of carriages in groups along the carriage way does not leave sufficient room for the safe passage of other vehicles in both directions along the road.

It is an offence against both the Metropolitan Police Act and the Towns Police Clauses Act, to leave any carriage standing on a highway longer than is strictly necessary, and it is provided that a person shall not, when driving or in charge of a motor vehicle, allow the car to stand on a highway so as to cause any unnecessary obstruction. The police could order all cars stationed on the roads round Hendon to be removed, and could take proceedings against the persons in charge of them, and thus put an end to proceedings which are not creditable to our boasted sportsmanship.

These reflections and relations of matters of legal guidance are inspired and begotten from an article of much merit by one Charles Rudkin, which has, within the last two weeks gone by, appeared in the *Local Government Chronicle*, and the London Aerodrome, as well as all other places of similar gathering, have much for which to thank this advocate, should a result of his teaching be a mitigation of this mean evil.

Lieut. Spencer Grey flying the new Sopwith biplane at Hendon. From an original drawing by Roderic Hill.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Monday last week was good flying day, Henry Farman, Caudron, 3 Shorts, 100 Avro, Sopwith and 80 Le Rhone-Blériot at work.

Tuesday, showery towards evening. Caudron, Henry Farman, 3 Shorts out.

Wednesday, Henry Farman, Maurice Farman, 70 Reno, 80 Short gun machine, and three other Shorts (250 h.p. and 180 h.p.). 80 Sopwith, No. 149, sociable from Hendon, Lieut. Spencer Grey, Pilot, and Eng.-Lieut. Aldwell, passenger. On starting back for Hendon in the afternoon they had rather a bad accident just outside the aerodrome. The machine seemed to drop suddenly, striking the ground, and carrying away the landing gear and buckling the planes and back. Lieut. Spencer Grey was found to be suffering from severe shock and injuries to his shoulders and back, and Lieut. Aldwell from injuries to his face and thigh. They were removed to the Royal Naval Hospital, Chatham, and are reported to be progressing favourably. A few minutes after the above occurred, Lieut. Ireland, with passenger, made a hurried descent on a Maurice Farman (owing to engine trouble) in a garden in Eastchurch Village, carrying away the telephone wires. Luckily he escaped without injury, the passenger, an E.R.A., also escaped unhurt.

Mr. A. E. Barrs, who has just passed for his certificate at the Grahame-White School, Hendon.

Thursday windy, new Bristol tractor was out, and successfully passed the test.

Friday fine, 80 Sopwith, 50 B.E., Bristol tractor, Avros and 3 Shorts.

Saturday, fine, 80 Deperdussin monoplane, 80 Sopwith, Caudron, 3 Shorts and Bristol tractor. Sunday, very windy morning, calm evening.

Civilian Flying.—Tuesday Hon. M. Egerton on 50 Short biplane, one flight. Thursday, Hon. M. Egerton two flights. Friday, Hon. M. Egerton three flights. Saturday, Hon. M. Egerton, three flights, Prof. Huntington one flight. Sunday, Hon. M. Egerton one flight.

Brooklands Aerodrome.

Monday last week, owing to wind, up to over 30 m.p.h., and rain, there was no school work done. Mr. Lan-Davies was out on his 50 h.p. Avro biplane, and Mr. Waterfall started for Farnborough on the new Martinsyde monoplane, but had to return owing to rain.

Before breakfast Tuesday, the conditions were well nigh perfect for flying, and both Vickers and Bristol Schools were in full swing. Mr. Barnwell flew to Staines and back at 3,000 ft. on the 50 h.p. Vickers-Blériot, Mr. Elsdon afterwards making a flight on the same machine. Mr. Lan-Davies passed his *brevet* test on his Avro biplane in good style, the first landing being on the mark, the second 50 ft. from it, and an altitude of 400 ft. being reached in the altitude test, a good *vol plané* descent being made from that height. Herr Roempler took up Lieut. Collett, R.N., to officially test the new D.F.W. all-steel biplane ordered by the Admiralty, the machine passing its tests well. Mr. Barnwell was out on the 70 h.p. Vickers biplane. The wind varied between zero and 24 m.p.h.

On Wednesday Lieut. Mansergh on a Vickers biplane passed his *brevet* tests, rising to 500 ft. in the altitude one. Lieut. Collett, R.N., took up the new D.F.W. biplane for a flight by himself, and gave a fine exhibition with good banked turns and spiral landing, the machine answering its controls in a wonderful manner. Mr. Waterfall was out on the new Martinsyde monoplane. In the afternoon Mr. Barnwell was testing the Vickers gun-carrying biplane, and Mr. Raynham the 100 A.B.C. engined Avro biplane. The wind was about the same as the previous day.

Mr. Merriam made a good flight on Thursday on the Bristol biplane and Mr. Waterfall one on the new Martinsyde monoplane. In the afternoon Mr. Barnwell was out on the Vickers gun 'bus, and Mr. Merriam on the Bristol biplane with and without pupils. The Vickers pupils were also at work. Lieut. Collet, R.N., was again flying well on the D.F.W. biplane. Mr. Alcock made several trips on the Maurice Farman biplane. The wind was blowing up to 25 m.p.h.

On Friday both the Bristol and Vickers Schools were busy. Mr. Alcock went to Staines and back at 4,000 ft. In the afternoon Mr. Barnwell flew to Farnborough on the Vickers gun 'bus. Mr. Merriam made several flights on the Bristol biplane. Mr. Waterfall was out on the new Martinsyde monoplane. The Bristol and Vickers pupils were again busy. Mr. Elsdon was on the 50 h.p. Vickers-Blériot monoplane, on which Mr. Hinshelwood, one of the Vickers pupils had his first trip, showing considerable aptitude in handling the machine. The wind varied between zero and 15 m.p.h.

Mr. Barnwell was testing the new Vickers gun-carrying biplane on Saturday afternoon which flew extremely well. Mr. Lan-Davies made a number of flights on his 50 h.p. Avro biplane. Mr. Merriam was out several times on the Bristol biplane, as was Mr. Alcock on the Maurice Farman biplane, on which he flew across country. Mr. Mahl was taxying on the Sopwith biplane.

On Sunday, notwithstanding the weather, a fair number of spectators put in an appearance. Mr. Waterfall made a fine flight on the new Martinsyde monoplane. Mr. Alcock was out several times on the Maurice Farman biplane. Mr. Barnwell was further testing the new Vickers gun-carrying biplane. And Mr. Merriam made one or two good trips on the Bristol biplane, on which he took up the winner of the ballot for the free passenger flight—Mr. E. Elms of Chertsey Road, Byfleet, who has now won four times!

Mr. W. J. Stutt, another Australian pilot who has taken his certificate at the Bristol School, Salisbury Plain.

Bristol School.—Monday, last week, Merriam for test, then with Sergeant Deane as passenger, this pupil then making several straights. Mr. Racine Jacques followed with a short solo, but the rising wind stopped tuition for the rest of the day.

Merriam with Sergeant Deane on landing practice, Tuesday, Deane afterwards doing some solo flying, as also did Mr. Racine Jacques. Too windy for further tuition.

Wednesday, high flight by Merriam for test; Sergeant Deane on solos, making excellent landings. Merriam for another test in the afternoon, but weather too bad for pupils.

Several tests by Merriam, Thursday, but weather unsuitable for tuition.

Sergeant Deane made his first circuits and landings, Friday, afterwards going up 500 ft. and landing with engine off. Merriam with Mr. Racine Jacques to over 2,000 ft. for cross-country flight, this pupil then following with three solos. Sergeant Deane flying figures of eight and practising landings.

FLIGHT

Mr. J. E. B. Thornely, the very able seventeen-year-old pilot who last week looped the loop at Eastbourne.

Saturday, too windy for solo flying by pupils.

Vickers School.—Monday, last week, Barnwell, Knight, and Elsdon on biplanes with Capt. Phillips. Comte FitzJames, and Lieut. Acland. Lieut. Mansergh solo.

Tuesday, Barnwell, Knight, and Elsdon on biplanes with Capt. Phillips, Lieut. Acland, Lieut. Mansergh, Comte FitzJames, and Mr. Wilberforce; Comte FitzJames and Mr. Wilberforce solos. Barnwell and Elsdon on Blériot mono.

Wednesday, in morning, Lieut. Mansergh solo on biplane (figures of 8) then for *brevet*, getting through in excellent style. Knight and Elsdon with Capt. Phillips, Comte FitzJames and Lieut. Acland, two last named for solos also.

Thursday, in afternoon, Barnwell, Knight, and Elsdon on biplanes with Lieuts. Leighton and Underhill (new pupil), and Comte FitzJames. Messrs. Hurst and Wilberforce and Comte FitzJames solos.

Friday, Barnwell, Knight and Elsdon on biplanes with Comte FitzJames, Lieut. Underhill and Mr. Wilberforce. Comte FitzJames and Mr. Wilberforce solos. Knight and Elsdon with Lieut. Leighton. Elsdon, Knight and Mr. Hinshelwood on Blériot mono.

Sunbeam Activities.—Mr. Jack Alcock on Thursday last week, made one flight with passenger on 100 h.p. Sunbeam-engined M. Farman across country to Windsor for over an hour at 3,000 ft.

Friday morning, one hour's flight with passenger in aerodrome, later across country for 40 mins. with Mr. Brewster at 4,000 ft. Afternoon, cross-country flight round Staines and Hampton Court with Miss C. Pullin as passenger at 4,000 ft.; also 20 mins. flight in aerodrome with Mr. Brewster. Fine cross-country flight, Saturday, with Mr. W. Douglas round Hurst Park, Staines, and Woking at 3,000 ft.; also passenger carrying all the afternoon.

Sunday one flight in the rain with passenger at 2,000 ft. Also Mr. Raynham made a flight in the rain; was very pleased with the engine.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Mr. Robinson rolling with Instructor Howarth, Monday last week, and afterwards alone. Messrs. Norris, Lillywhite, and Bjorkland circuits, &c., alone. Mr. Smiles rolling with Instructor Strange, afterwards flying straights with Instructor Howarth. Lieut. Lindopp solo circuits, figures of 8, &c.; Prince Sapieha straights and circuits, with Instructor Howarth in passenger seat; Mr. Edridge Green circuits, figures of 8, &c., afterwards going in for and gaining his pilot's certificate.

Tuesday, Messrs. Bjorkland, Grahame and Lieut. Lindopp solo circuits, &c.; Mr. Lowe circuits with Instructor Howarth. Later, Mr. Grahame and Lieut. Lindopp going in for their *brevet* tests, and each gaining his pilot aviator's certificate, Lieut. Lindopp making especially good landings.

Mr. Robinson rolling alone, Wednesday; Messrs. Kershaw, Lowe, Parker, and Prince Sapieha straights, with Instructor Howarth in passenger seat; Mr. Smiles straights with Mr. Strange; Mr. Bjorkland circuits, &c.

Friday, Mr. Parker straights with Instructor Strange, afterwards doing solo straights. Messrs Smiles, Kershaw, Robinson, and Moore straights with Instructors Strange, Howarth, and Lillywhite; Mr. Norris circuits, &c.

Mr. Weber solo straights, Saturday, on Blériot; Major Piercy straights with Instructor Strange; Messrs. Clarke, Kershaw, and Dunn solo circuits, &c., Mr. Norris solo straights.

W. H. Ewen School.—On Monday, last week, the school was out at 6.30 a.m. After test flight by Mr. F. W. Goodden, Mr. Bankes-Price did circuits, and Mr. Curtiss straights.

At 8.45 a.m. on Tuesday, Mr. Goodden was out with pupils. Mr. Bankes-Price did circuits, and Mr. Curtis half circuits on *brevet* machine. On 35 h.p. Caudron No. 1 Mr. Garvin straights, and Mr. Verney straights.

On Thursday afternoon, Mr. F. W. Goodden made a splendid exhibition flight and looped the loop four times on the 45 h.p. Caudron biplane.

Hall School.—Monday, last week, L. E. Palmer one straight flight at 30 ft. followed by a good circuit at 100 ft. A. L. Brookes three half circuits at 30 ft. Virgilio three straights at 20 ft. A. F. Arcier three straights at 40 ft. Miss d'Elsa three straights. Owing to heavy mist practice was greatly hampered and made circuits and figure eights almost impracticable. In evening H. C. G. Allen out on his 35 h.p. Blériot, doing numerous straights.

FLIGHT

2nd Lieut. J. Lee Jackson, who has recently taken his Royal Aero Club *brevet* at the Vickers Flying School, Brooklands.

Several pupils put in an appearance Tuesday, at 6 a.m. Messrs. Palmer and Brookes excellent figure eights at good altitude. Arcier and Gearing half circuits. Virgilio straights at 20 ft. J. H. Rose showing aptitude in rolling. J. L. Hall out on Avro. H. C. G. Allen straights on his Anzani-Blériot.

Wednesday, E. Palmer good circuits at 100 ft. Brooks unfortunately, on completing a figure eight after an excellent circuit, seemed to lose control, and made a forced landing, putting No. 2 Caudron out of practice for some time. H. C. G. Allen made six well judged straights on Blériot, afterwards going for passenger ride with Hall on Avro. Later J. L. Hall took out Mr. Alastair Miller's Deperdussin monoplane and made a short flight.

Thursday J. L. Hall successfully looped the loop on Avro at 2,000 ft., and on Friday he was flying Mr. Allen's Blériot and adjusting machine.

Saturday, J. L. Hall exhibition and passenger carrying, amongst passengers being Sir Francis Popham, N. Bosanquet, and L. Aines.

Salisbury Plain.

Bristol School.—Voigt and Stutt made passenger flights, Monday last week, with Lieut. Bonham-Carter (4 flights), Lieut. Bolitho, Lieut. George (2), Mr. Hay (2), Mr. Chambers (3), Lieut. Myburgh, solo flights being made by Lieut. Harman (2), Lieut. George (2), Lieut. Bolitho (3), Lieut. Barratt (3) and Capt. Fell (3)

Tuesday, after testing, with Lieut. Bonham-Carter as passenger tuition was given to Mr. Hay, Mr. Chambers, Lieut. Myburgh, Lieut. Rabagliati and Capt. Walcot. Lieut. Harman and Capt. Fell were out solo flying, but wind and rain prevented further tuition.

Passenger tuition was given Wednesday to Mr. Hay, Mr Chambers, Lieut. Rabagliati, Lieut. Bonham-Carter, Lieut Myburgh and Capt. Walcot. Capt. Fell, Lieut. Barratt, Lieut Bolitho, Lieut. George and Lieut. Harman all made solo flights.

Thursday, Voigt with Lieut. Bonham-Carter (2), Capt. Walcot, and Mr. Hay as passengers. Lieut. Barratt made a solo and then flew for his certificate, which he obtained in splendid style. Capt. Fell also made a solo flight and passed part of the tests for his *brevet*. Voigt finished the day's work by giving tuition to Capt. Walcot, Lieut. Myburgh, Lieut. Bolitho, and Mr. Chambers.

Friday, passenger tuition by Voigt to Capt. Walcot (3 flights), Lieut. Bolitho (5), Lieut. Bonham-Carter (2), Lieut. Harman (3), Lieut. Myburgh (4), Mr. Chambers (3), Mr. Hay (2), Air-Mechanic Locker (1). Capt. Fell went out for a solo and then completed the tests for his certificate excellently.

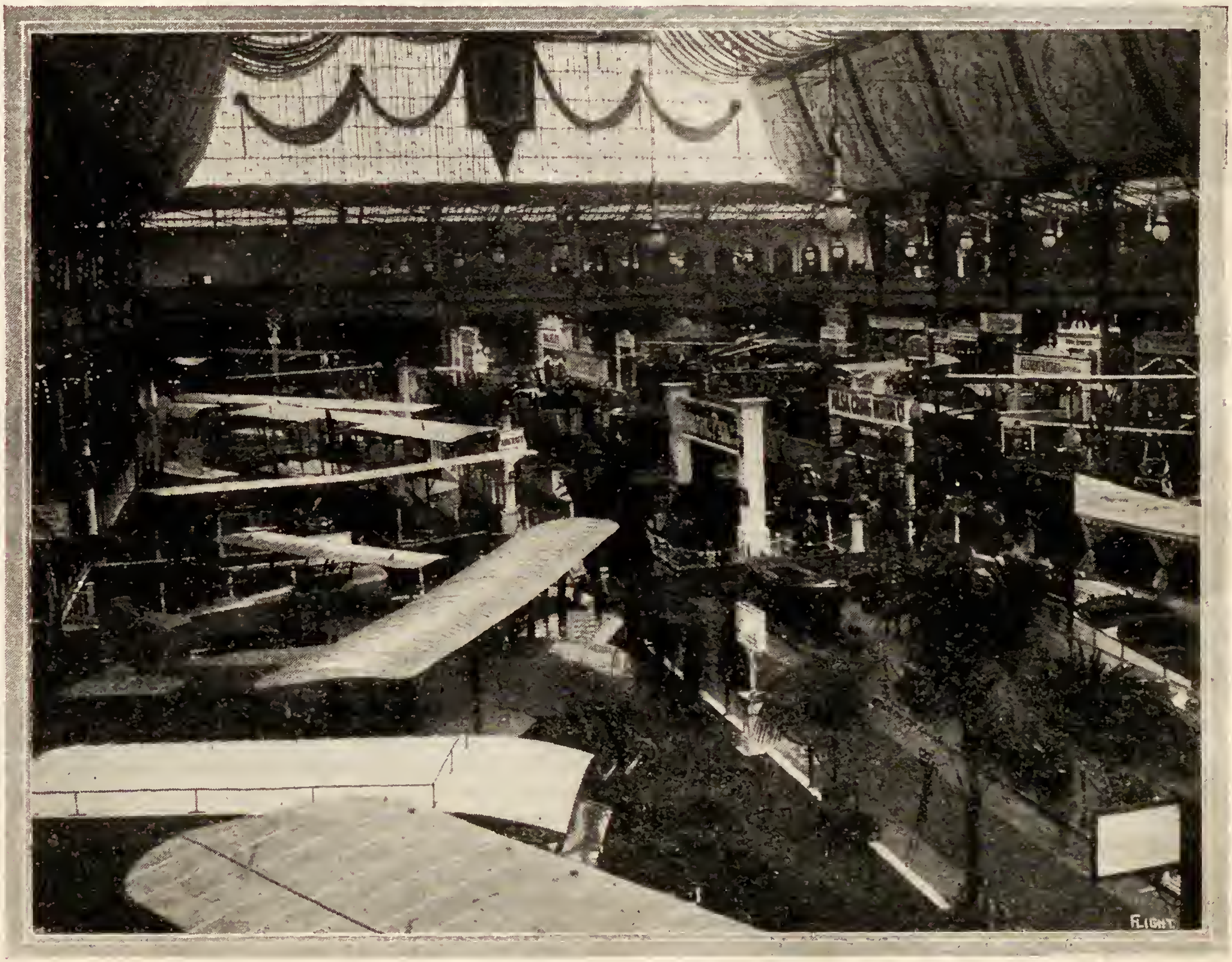
Voigt made a test, Saturday, and then gave tuition to Lieut. Bonham-Carter (4 flights), Mr. Chambers (3) and Mr. Hay (3), but further tuition was prevented owing to wind and rain.

Shoreham Aerodrome.

Pashley School.—Monday and Tuesday very windy, but advantage was taken of an improvement in the weather on Wednesday and Messrs. Mortimer, Gray, Hale and Willett were taken for flights behind the instructor. Similar work was done on Thursday and Friday; Messrs. Hale and Gray were also doing solo straights.

Capt. A. Ross Hume, who last month obtained his *brevet* on a Vickers biplane at the Vickers Flying School, Brooklands.

On Sunday a visitor to the school, Mrs. Maas, was taken for a passenger flight although it rained hard all the time the machine was in the air.



"Flight" Copyright.

A general view of the recent Olympia Show as seen from the west end of the building.

EDDIES.

YOU saw the little paper gliders at Olympia, of course! I mean the Cellon loop-loopers. You were no doubt one of the number to the amount of over a thousand who bought one for three-pence, and so added your mite to the Desoutter fund. They were good value, were they not? They were beautifully made, and they looped the loop in true Hucks style, and you would have bought one for the price wherever you might have seen them, and consider you had your money's worth, apart from any help given to a deserving cause—so would most people. Here is a letter received by friend Barr:—

"Dear Sir,—For the enclosed piece of paper I was charged 3*d.* at the Olympia Exhibition by the persons in charge of your stall. If you are aware of the fact, well and good, but if not, I don't think it right the public ought to be done. I may mention I was not the only one who had to pay it.

"Yours sincerely."

Nearly £10 was added to the Desoutter fund by the sale of these little gliders, so, as the correspondent observes, he was not the only one who paid, thank goodness!

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Progress in aviation is reported from New Zealand, in a letter just to hand from J. W. H. Scotland who came to this country last May to learn flying, and was Mr. J. L. Hall's first pupil when he started his school at Hendon. He is now engaged by the New Zealand Aviation Co., Ltd., just formed to give flying exhibitions in that country. By the same post, strange to say, came a letter from J. J. Hammond, also from New Zealand, these two being the only two flyers at present there. Mr. Hammond is flying the Government I.C.S. Blériot and Mr. Scotland his own 45 h.p. Caudron, purchased from Mr. Ewen, and which he says is going fine. We are always sorry when pilots leave this country and go abroad, but with a company formed to give exhibitions, and only two pilots in the colony, there should be a good opening for skilled flyers.

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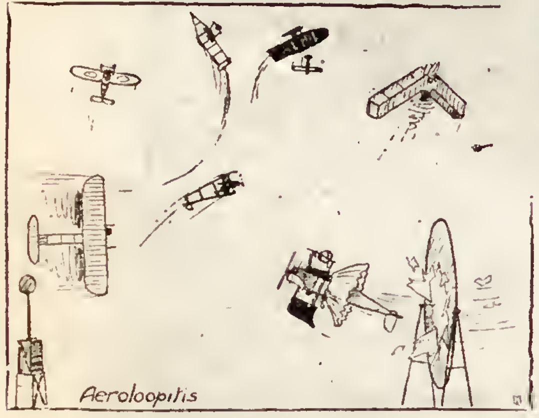

To loop or not to loop, it seems, is no longer a question—all pilots will loop. The microbe responsible for "aero-loopitis" must have been about in full force at Hendon last week, when no less than five usually sedate pilots went rolling about in the air on one afternoon, and all for the first time. Carr set the ball rolling, and the fever soon spread to Noel, Strange, Goodden and Hall, who one after the other went up and made their initial loops. On Saturday they were at it again, sometimes two or three at a time, in fact the air seemed full of machines turning over, so much so that one had a job to follow them in their evolutions. Looping now seems to have become part of the ordinary business of flying, and it is quite possible that before very long looping competitions will be seen, or perhaps on finishing a race every pilot will be required to loop on crossing the finishing line, as a sign that he has completed the course. They do it very low down, too. Pegoud set the altitude of safety at some three thousand feet, but it is no unusual thing now for machines to be turned over at altitudes of only two or three hundred feet, and there is no longer any difficulty in seeing exactly what takes place.

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A tube lift is not the usual place to interview celebrated pilots on their latest achievements, but the journalist is no respecter of places, so that he gets his copy. Consequently when Salmet stepped into the lift at Leicester Square with me this morning, I tackled him on his Paris-London trip straight away. He told me he had a good trip, but that after leaving Folkestone he was much bothered by the mist which, owing to the altitude at which he was flying, made it very hard to follow his route. The first place he really recognised with any degree of certainty was the Staines reservoirs, and then he had been flying about so long that he had run short of petrol, and had to come down to replenish. The amount of flood water all over the country also bothered him a good deal when looking for the Welsh Harp, and even when he had located it, he could not find the aerodrome for some time. Asked if he was going to stay at Hendon, he told me that he was then off to Paris again to bring over the waterplane—asked if he wanted a passenger, he treated me to one of the Salmet smiles, and disappeared Charing Cross way.

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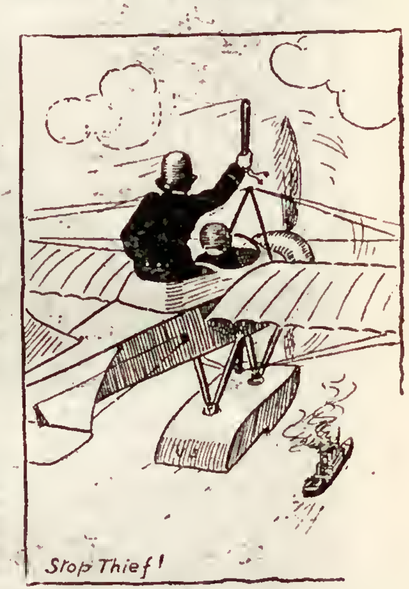

It reads quite like a film plot—that of a detective chasing in a waterplane a steamer that had left port with a wanted man on board, yet this is exactly what took place recently in America. A negro boy, it appears, had stolen a valuable diamond brooch from the hotel where he was employed, and was *en route* for Bermuda when the detective heard of the theft and the flight of the offender, and by wireless the captain of the steamer was made aware of what was happening, and the hydro overtook him twenty miles at sea, when the steamer lay too whilst the detective went on board and secured his prisoner, who was then strapped in the machine and treated to a flight back to land to be dealt with by law. Truly, what with wireless and aeroplanes, the lot of the transgressor is hard, and a free flight is but poor compensation.

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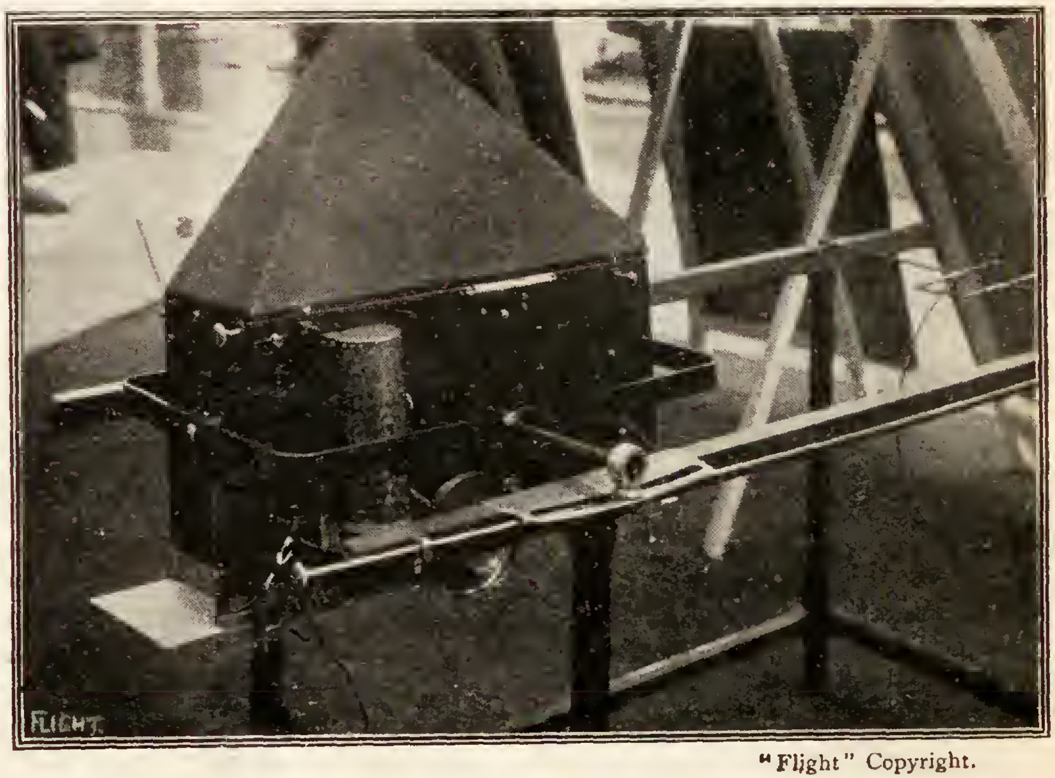
"The Mahdi is dead—It is not so difficult to get to Khartum as it once was"—and "if Mr. McClean is coming to England in his aeroplane, he will probably never get here at all." These mighty words of wisdom from Mr. Justice Darling in a case of Hare *v.* McClean. That the Mahdi is dead and that it is not so difficult to get to Khartum as it once was, is news of about equal importance. The gibe at the prospect of an aeroplane never reaching this country from Egypt, shows the inroads that a knowledge of aviation has made on the judicial understanding—or is it simply one of the supposedly huge jokes which emanate from the bench on occasion?

"WILL O' THE WISP."

A BOMB-SIGHTING DEVICE.

On the stand of the Aircraft Manufacturing Co. at Olympia, an extremely ingenious device was exhibited, the Coursin Bomb Sighting apparatus. Its greatest claim upon our attention does not rest upon its ingenuity, but upon the simplicity with which it can be employed, as the observer, after setting the mechanism for the height at which the aircraft may be above the ground and adjusting it for the speed relative to the earth, has only to wait until the object aimed at is in line with a pointer within the box and then to drop the bomb over the side of the *nacelle* or *fuselage*.

The general appearance of the apparatus is shown in the accompanying photograph; and will be seen to consist of a box, within which the controlling mechanism is placed, surmounted by a pyramidal shaped cover. On the outside of the box is a casing containing a small electric motor which is driven by current from an accumulator. This motor drives a vertical shaft within the box by means of gearing. To the right of the casing is seen a circular wheel having two diameters, which is connected by mechanism to a rubber-covered wheel mounted upon the vertical shaft driven by the motor so that the rotation of the hand-wheel causes the rubber-covered wheel to move radially over a circular disc, mounted on a horizontal axis, against which it presses. The larger diameter of the hand wheel is graduated to a suitable scale for the adjustment of the mechanism for height above the ground, hence, as the aeroplane rises, the observer sets the wheel to the corresponding height, and in so doing moves the rubber-covered wheel within the box nearer to the centre of the circular disc. The latter is connected to another and similar disc on the opposite side of the box against which a second rubber-covered wheel is pressed. This rubber-covered wheel drives a small drum, around which an endless thread, knotted at regular intervals, is wound, the thread being taken to the extreme ends of the box and, passing over fair-leads, is taken along the centre line near the upper edge of the box. The location of the second rubber-covered wheel on its disc is determined by mechanism operated by the small knob seen at the end of the box, as well as by the height-adjusting gear, which is inter-connected with it, and a steel band, carrying a pointer, is connected therewith, so that when the knob is rotated, the rubber wheel is caused to move radially inwards or outwards, and the pointer carried by the steel band to move along the length of the box.



"Flight" Copyright.

View of the Coursin bomb-dropping apparatus from the motor side, showing adjusting handles.

We therefore see that the endless thread is caused to move by the electric motor, its speed being determined by the radial position of the two rubber-covered wheels on their respective discs.

In the bottom of the box is a slide, carrying a lens which projects an image of the ground over which the aeroplane is passing upon a ground glass screen in the bottom of the tapered cover. Thus an observer looking through the eyepiece at the top sees a projected view of the country beneath upon which is also shown the shadow cast by the endless thread down the centre of the box and the pointer carried by the steel band. The position of the lens is varied by the rotation of the handwheel used for making the adjustment for height.

To sight the apparatus, the observer rotates the hand wheel until the graduation corresponding to the elevation at which the machine is flying is opposite the index pointer, and adjusts the speed correction knob, so that the speed of the thread over the ground glass screen is the same as the speed of movement of the earth projected on the same screen. The pointer inside the box and the line are now in certain positions, and the image of the former and of the earth is seen by the observer, and when the object and the pointer come into line, the bomb is dropped.

A spirit level is attached to the side of the box with a movable balance weight for keeping the apparatus horizontal, and means are provided for moving the apparatus so as to compensate for the angle of inclination of the machine with the direction of flight. This apparatus was used in the Michelin bomb-dropping competition, when the first and second prizes were won on Maurice Farman aeroplanes.

The bomb exhibited on this stand also calls for notice. It is torpedo shaped and provided with fins near the tail, so that as it passes through the air the bomb is caused to rotate. This rotation is necessary first of all for directive purposes, and secondly to render the bomb "live." In the nose of the shell there is a safety fuze, the detonator cap being incapable of moving forward against the striker until the spring-locking gear is disengaged by the action of centrifugal force. As the bomb falls through the air, these locking springs are thrown radially outwards, and on striking the ground the detonator cap is impelled upon the striker, thus firing the bomb.

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AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

1. **Election.**—Member: A. Klemin Schmidt.

2. **Meeting.**—The eleventh meeting of the present session will be held on Wednesday, April 15th, at 8.30 p.m., when Brigadier-General D. Henderson, C.B., D.S.O., will preside. Mr. Griffith Brewer, A.F.Ae.S., and Lieut. J. N. Fletcher, R.E., will read a paper, to be followed by a discussion, on "The Value of Ballooning as a Training for Flying."

Tickets for visitors, not introduced, may be obtained from the Secretary, 11, Adam Street, Adelphi, W.C.

B. G. COOPER, Secretary.

BIRMINGHAM AERO CLUB

The past month has been rather quiet partly owing to the bad weather, and Messrs. Löwy and Swingler have again experienced bad luck with their monoplane. First the engine shaft screwed out of the flywheel whilst the engine was being tested and a week later a wind damaged the tent in which the machine was sheltering and at the same time damaging the monoplane. However, the damages are now being put right and the aeroplane should be quite ready for the tests again in a fortnight's time. During this week-end Messrs. Trykle and Baker have completed their propeller which Mr. Prosser will be trying and testing on his Caudron biplane. On several occasions Mr. Prosser has started out alone from the club aerodrome. Taking the shutters of the hangar down, wheeling out the aeroplane, starting the engine and starting off have all been accomplished without a single person near at hand. The Anzani engine has now been running very beautifully, it being possible to throttle it down to less than 200 r.p.m., the propeller almost being seen as it is rotating.

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PUBLICATIONS RECEIVED.

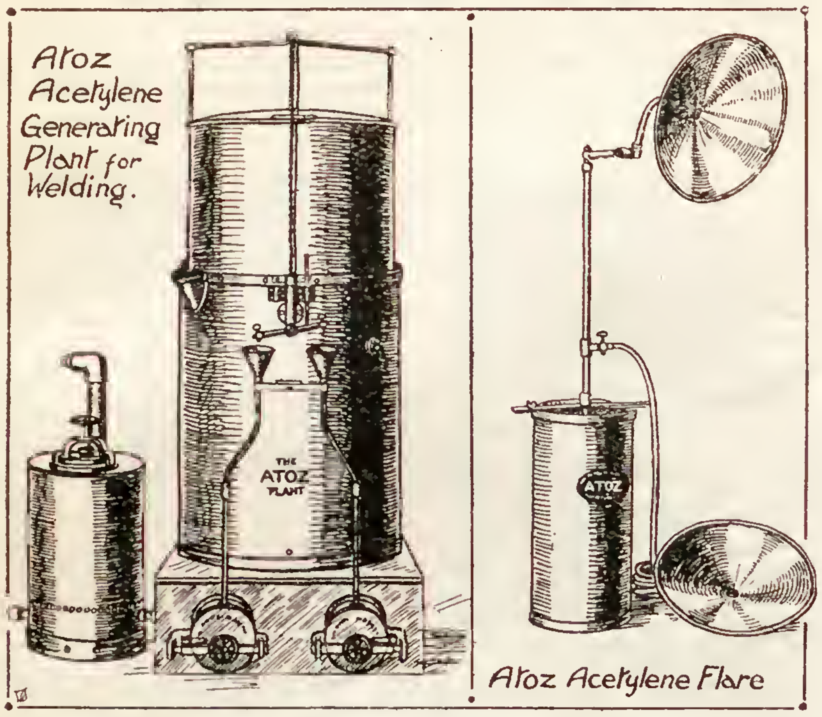
The Brooklands Year-Book, 1914. The Brooklands Automobile Racing Club, Carlton House, Regent Street, S.W.

"*The Age of Risks.*" Burroughs, Wellcome and Co., London, E.C.

Animal Flight: a Record of Observation. By Dr. E. H. Hankin. London: Iliffe and Sons, Ltd. Price 12*s.* 6*d.*

ACETYLENE AND AVIATION.

Steel is being more and more extensively used in the construction of the aircraft of to-day, largely owing to the possibilities opened up by welding. Not so long ago, welding was essentially a skilled art, and most of the jobs of this kind had to be done "out." To-day, however, there is hardly a large factory where welding obtains that has not its own welding plant, and workers who thoroughly know their work. In aeroplane construction there are innumerable cases in which welding can be utilised, such as for the tubular work in the *fuselage*, chassis, and planes, in addition to struts, sockets, &c. For such work, perhaps, the most successful form of welding is the Oxy-Acetylene system, in which the intense heat of acetylene gas in conjunction with oxygen is utilised to produce a concentrated and extremely hot flame that is easily controlled.


Atoz Acetylene Generating Plant for Welding.

Atoz Acetylene Flare

Acetylene generates over 1,500 B.T.U. of heat per cubic foot, and with the Oxy-Acetylene system about one volume of acetylene to 1½ volumes of oxygen are used, producing a flame having a temperature of about 6,000° F. The localisation of this intense and concentrated heat enables a weld to be done quickly and efficiently without burning the metal by oxidation or causing other injurious effects, whilst very little practice is required to make the workman proficient in the manipulation of the blow-pipe.

Messrs. The Acetylene Corporation, Ltd., of 49, Victoria Street, London, W., who have had many years' experience of acetylene and its uses, have designed several acetylene generators for use with welding plants, of which there are many in use in various large works, including some aeroplane factories. Two of these generators are the "Atoz" stationary plant, which has two generating chambers, and the "Atoz" portable plant. The latter can easily be moved about from place to place, the weight being only 112 lbs., and it will be found invaluable for general work on metal up to ¼ in. thick. The former model is shown in the accompanying sketch. They are made of mild steel and galvanized after construction. These and the other models are extremely simple to handle, and are quite automatic in action. The gas is slowly generated and stored in a gas bell, whilst a large volume of water surrounding the generating chambers prevents overheating.

An efficient system of purification is employed whereby a cool, thoroughly washed and purified supply of acetylene gas is produced. This is of the utmost importance, as it is essential that the acetylene employed for welding purposes should be absolutely pure. A complete welding outfit consists of the acetylene generator and the necessary calcium carbide, one or more blow-pipes, oxygen pressure regulator, hydraulic back pressure valve, flexible tubing, specially tinted spectacles for the protection of the operator's eyes, and, of course, the oxygen, all of which can be supplied by the Acetylene Corporation, Ltd. In addition to welding outfits, the above firm also supply various other specialities in connection with acetylene, one of which, being applicable in many ways to aviation, is the "Atoz" acetylene flare, also shown in the accompanying sketch. The uses to which these flares can be put are numerous, for in addition to supplying illumination in large hangars—for they are quite safe—they can be used out in the open for marking out aerodromes during night flying, or would greatly facilitate repairs being carried out to an aeroplane at night when a forced descent has been made away from the aerodrome. The light given is very powerful and steady, and ordinary commercial carbide is used. Other flares similar to the one just described, but much smaller so that they can be carried about in the hand, are also made, which should be equally useful in connection with night flying.

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"LESSONS ACCIDENTS HAVE TAUGHT."

(*Continued from page* 318.)

THE DISCUSSION.

In opening the discussion Mr. Mervyn O'Gorman remarked that he wished the public were made fully aware of the fact that the Accidents Investigation Committee required funds in order to carry on their work effectively. The object of the Committee was to secure safety; and in the exercise of their functions they had—(*a*) to interrogate witnesses in order to ascertain the facts concerning an accident as accurately as possible; (*b*) to express an opinion as to the probable cause of the accident, and (*c*) to formulate a statement giving their recommendations based on that opinion. This, he said, necessarily involved considerable expense, and it would be a great advantage to the Committee if they had sufficient money at their disposal as would allow them to maintain a trained staff to make and check calculations, pay for tests and experiments, and possess an independent expert to study and analyse these accidents. The Committee did not condemn flyers or constructors, but indicated weaknesses, errors and risks. He suggested that "wear and tear" might be included amongst the causes of accidents cited in the paper, as this was much greater than was generally supposed. He agreed with the author's remarks concerning the possibility of a pilot slipping forward on to his controls when diving steeply, thus causing the aircraft to dive still more; but thought it was probable that with the large machines which might come into existence in the near future, a servomotor would be used for operating the controls, in which event no harm would be likely to result. On the subject of hazardous flying, he said that very few pilots took the precaution to look round their machine before starting. Many did not insist on a new part, but permitted the re-adjustment, straightening, or patching up of an old part. As regards gusts and their effect upon the safety of the macnine, Mr. O'Gorman observed that in his opinion there was no warranty—in view of the knowledge they now possessed—for assuming that they were the actual cause of accidents, although they might be regarded as primarily responsible, and it was due to other factors that their effects were not corrected in time. He drew attention to the danger involved when pilots allowed their machines to attain extremely high speed before flattening out. No aeroplane, he said, should be permitted to dive at a greater speed than, say, 20 per cent. about the normal speed attained in horizontal flight, which figure was suggested as a basis for discussion, and he gave the following illustration as indicating the magnitude of the stresses induced in the various parts at excessive velocities. Supposing, from some cause, the loss of the sense of location, for example, that a pilot allowed his machine to dive for 10 seconds. In that time, it was possible for the speed to rise to as much as twice the normal speed, then assuming that the stresses varied as the square of the velocity, the stress induced by this increased velocity would be four times the normal. In flattening out, the machine would pass through all angles of lift, including that of maximum lift, at which point the loading might be three times the normal. Hence it was possible for the stress actually induced when flattening out under these conditions, to be as much as twelve times the normal stress and the limitations imposed by weight considerations precluded any possibility of allowing the high factor of safety that would be required to render the machine capable of withstanding such high stresses. Mr. O'Gorman also referred to the importance of keeping the aneroid in good order, as in flying from one district to another which might be immersed in fog, there was only the aneroid to tell the pilot that he was at a sufficiently low level to beware of high objects on the ground. He said that the aspirations of flyers to describe a loop were growing in intensity and an unduly rapid dive might prove fatal. It would appear that successful exponents of this form of flying do not increase the speed of preliminary descent as much as was supposed, and the exchange of information on these subjects would be of value to all concerned in flight while the application of a recording tautness meter to the wires of a machine used for this purpose would be so instructive that he would be glad of the opportunity of obtaining readings if one of our skilful exponents of the art would permit of it.

Dr. Leakey observed that he believed the attitude of pilots towards the use of safety belts was to a large extent influenced by the school in which they had received their training, and he thought they should leave the matter in the hands of the pilots themselves as to whether they would use them or not. As regards preventive measures, the results of accidents could be greatly minimised by the adequate use of padding, and he had noted at the exhibition at Olympia that the hard framing on one machine could be distinctly felt beneath the padding, whilst in another the padding was quite four feet above the pilot's seat and in that position was of no service whatever. He considered that much could be done to mitigate suffering and damage in the event of serious injury to the pilot or passenger by controlling the action of the crowd that always assembled after an accident and prevent them from endeavouring to extricate the man from the wreckage—unless fire or other immediate danger to human life appeared imminent—until some person or persons skilled in handling injured persons arrived, as he knew of cases where much harm had been done thereby. He did not believe that a medical examination of so severe a character as that required for the Army and the Navy was necessary in the case of pilots.

Dr. Thurston considered that non-fatal as well as fatal accidents should be investigated by the Accidents Committee, because, from the fact that the principal actor in the accident was alive, so much more could be learned as to its cause. Any alteration in the existing direction of operation of controls, he thought, would be undesirable, because the present method necessitated a movement of the lever in the direction indicated by nature. He mentioned that some years back he had developed a system in which it would be impossible to dive at a greater speed than 30 per cent. above the normal flying speed.

Mr. Griffith Brewer recalled an incident in the tour of Messrs. Ogilvie and McClean in Egypt, as illustrating the value of an air-speed indicator. On one occasion, when their engine was working badly, the only way in which they were able to proceed was by reducing their speed until they were on the point of stalling the machine, and this was rendered possible by the reliance they were able to place upon the air-speed indicator.

The author (Col. Holden), in the course of his reply, said that he agreed with Mr. O'Gorman's remarks concerning the need of funds, and the only source from whence these could be obtained was the pockets of the public. He thought that he had covered the suggestion as to the inclusion of wear and tear, but would make a note regarding it. He did not intend the medical examination of pilots to be similar in character to that which candidates for the Army and the Navy were subjected, but that such examination "should be a special and thorough one." As regards padding, they were now in possession of a substance that tests had shown to be in every way suitable for the purpose. In reply to Dr. Thurston, he mentioned that they had already investigated a number of non-fatal accidents.

The meeting concluded by a vote of thanks to the author, proposed by the Chairman (General Ruck), for his interesting paper.

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A New Zeppelin on Trial.

The new military Zeppelin "Z8" on Tuesday made a trial cruise of nearly five hours duration over Switzerland to the south of Lake Constance. To pass over Mont Sentis, in the Appenzell Alps, the airship rose to a height of 3,065 metres.

A Zeppelin Trans-Atlantic Flyer.

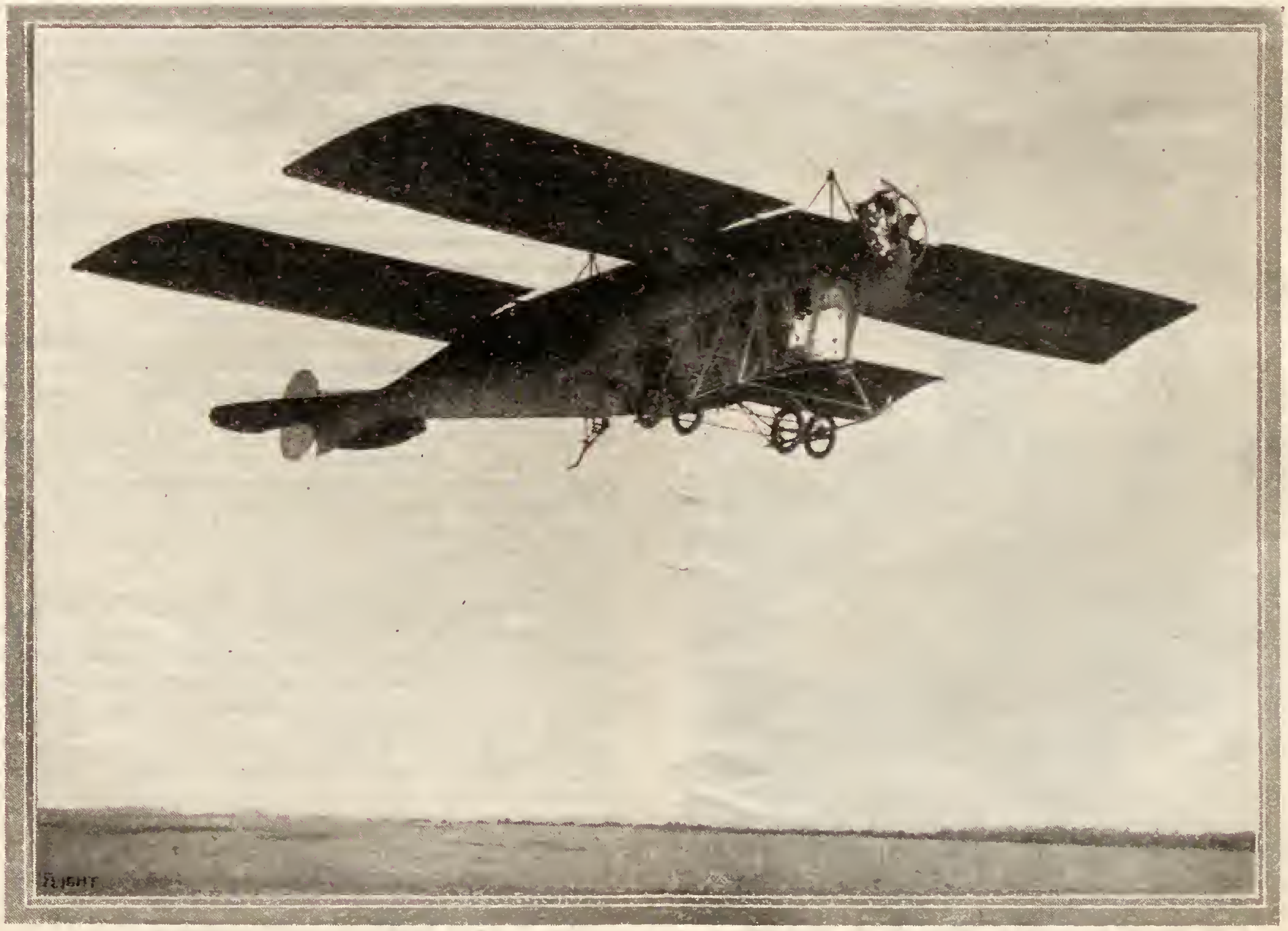
It is announced from Berlin that the Zeppelin Co. are busy at their Friedrichschafen works with the construction of a hydro-aeroplane, with which it is intended to make an attempt for the *Daily Mail* Trans-Atlantic Prize.

French Airship Adrift.

After a cruise lasting over four hours on the 27th ult., the French military dirigible "Eugene Montgolfier" returned to her station at Maubeuge, and signalled that owing to a mishap to the machinery a descent could not be made. Subsequently trouble was experienced with the starboard propeller, and the dirigible drifted along the Belgian frontier, her progress being followed by a party of 25 *aerostiers* in motor cars.

An Aerial Fleet for Russia.

It is announced from St. Petersburg that the Russian Government has drawn up a scheme which calls for the provision of no less than 330 aeroplanes and three airships, all to be delivered before the end of this year. Of the aeroplanes 10 are to be of the Sikorsky "Grand" type and 90 others, Sikorsky biplanes and monoplanes of ordinary size. The orders for the bulk of the remainder will be distributed among the Farman, Morane, Deperdussin and Voisin firms in France, but two Rumplers will be ordered in Germany and two Sopwiths in England. The airships will include one Clement-Bayard, one Astra, and one by the Igor works in Russia.



The Albessard monoplane, which was illustrated in FLIGHT the week before last, in the air.

BRITISH NOTES OF THE WEEK.

THE ROYAL FLYING CORPS.

THE following appointment was announced by the Admiralty on the 25th ult.:—Carpenter L. R. Staddon (acting) to "Pembroke," additional, for Felixstowe Naval Air Station, March 24th.

The following appointments were announced by the Admiralty on the 1st inst.:—Lieuts. J. W. O. Dalgleish, to the "Pembroke," additional, for course of instruction with Naval Air-ship Section; J. F. Williams and G. W. W. Hooper, to the "Pembroke," additional, for course of instruction at the Central Flying School. To date May 11. Sub-Lieut. L. Tomkinson, to the "Pembroke" additional, for course of instruction at the Central Flying School. To date May 11.

Assistant-Paymaster E. B. Parker, one of the Flying Officers attached to the Naval Flying School, Eastchurch, has retired through ill-health.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending March 28th:—

No. 2 Squadron. Montrose.—There was no flying during the early part of the week, but on the 27th 1,300 miles were flown on B.E. machines. The squadron is well settled in at the new aerodrome.

No. 3 Squadron. Netheravon.—The pilots of "B" and "C" flights were out most days throughout the week. Various experiments were successfully carried out.

No. 4 Squadron. Netheravon.—Flying took place daily after the 24th. Some new workshop plant has been erected and taken into use. Major Raleigh, the O.C. Squadron, returned to duty after his recent accident in Switzerland.

No. 5 Squadron. S. Farnborough.—All the officer and N.C.O. pilots were flying daily throughout the week over the country round Aldershot. Instructional work was continued.

No. 6 Squadron. S. Farnborough.—Flying was carried out daily, and satisfactory tests were made by the wireless flight.

Flying Depôt. S. Farnborough.—The workshops were fully occupied with repairing aircraft and M.T. Experimental and instructional work was also carried out.

The Mother Ship for Seaplanes.

IT will be recalled that the Navy Estimates include a sum of £80,000 for the provision of a ship for carrying seaplanes, and it is now stated that the Admiralty has acquired a vessel under construction by the Blyth Shipbuilding Co. This vessel, which is 385 ft. long, is to be converted, so as to give a clear run for the machines along the deck, and with this object in view the funnels and other super-structure will be placed right aft.

Mr. Vivian Hewitt and his lamb passenger.

Salmet's Paris-London Trip.

A FINE flight from Paris to London was made by Mr. H. Salmet, accompanied by T. Elder Hearn, on a Blériot monoplane, on Saturday last. Buc was left at 10 a.m., and a non-stop trip made to Folkestone, which was reached about half-past twelve. Resuming at 4 p.m., good progress was made until nearing the Metropolis when the machine ran into mists, and a descent had to be made at Staines in order to ask the way. Eventually Hendon was reached about ten minutes past six.

The Aerial Derby.

SATURDAY, May 23rd, has been selected as the date for the Aerial Derby, and, in addition to the *Daily Mail* gold cup, a cash prize of £400 and a valuable trophy has been presented by the distributors of "Shell" motor spirit.

A 50-Mile Circuit with Jack Alcock.

LAST Saturday, Jack Alcock, on the 100 h.p. Sunbeam-engined M. Farman, accompanied by Mr. Clarence Winchester, covered a circular route of about 50 miles in a trip of about an hour's duration. Leaving Brooklands, the machine proceeded in the direction of Windsor, afterwards bearing to the left and completing a wide circle, returning to the track from the south. A height of 5,000 ft. was maintained, and a neat spiral finished a most pleasant trip. The Sunbeam ran as sweetly as could be desired.

Mr. Hewitt at Rhyl.

ON Tuesday of last week Mr. Vivian Hewitt flew on his re-built Blériot for about an hour round about Rhyl, and went up the Vale of Clwyd as far as Rhuddlan and back. On Thursday he was up again over Rhyl for 1½ hrs., and also went over to Abergele, about five miles from Rhyl. The next day he was up again for one hour, and had as passenger a small black lamb, this being, no doubt, the first time that a lamb has been carried in an aeroplane. A descent was made on the shore at Rhyl, in order that the accompanying photo might be taken. The lamb seemed to take it quite as a matter of course, and trotted back to its mother after the flight as if nothing had happened.

Aviation Week for Scarborough.

NEGOTIATIONS are under way for the organisation of a combined aviation week and regatta at Scarborough at the beginning of July. It is hoped that a feature of the programme will be a series of displays of looping the loop, &c., over the sea by Mr. Hucks.

A Missing Olympia Model.

MRS. FRANCES M. HOLT writes to say that somebody, doubtless in error, took her model tractor monoplane, No. 204, from the recent Aero Show at Olympia. If this should catch the eye of the person who made the mistake, it is hoped that the model will be returned to its owner at 52, St. Mary's Grove, Sheen Road, Richmond.

Vickers Aeroplanes.

LIKE its predecessors the latest album issued by Messrs. Vickers, Ltd., in connection with their aviation department, is a most artistic production and beautifully printed. It contains full particulars of the fighting and scouting types of Vickers biplanes and the Vickers-Levasseur air screws, and is well illustrated by photographs, among which there are several views of the splendidly equipped works at Erith where the aeroplanes are built. A charming water-colour picture of H.M.S. "Emperor of India," built by Messrs. Vickers and launched last November, makes a very effective frontispiece to the album.

Integral Developments.

IN view of the continued expansion of their business so that the number of orders in hand has outgrown the capacity of the works, taken over this time last year, the Integral Propeller Co., Ltd., have had to remove to larger and more commodious premises. As a matter of fact they have secured the works lately occupied by the British Deperdussin Co., at 1B, Elthorne Road, Upper Holloway, N., and, as they entered into possession on Thursday last, that will be their address for the future. The telephone number is Hornsey 2345, while the telegraphic address is "Aviprop (Upholl) London."

Aeronautical Technical Terms.

THE need having become evident for an extension of the preliminary list of technical terms published by the Aeronautical Society in 1910, a committee has been appointed to take up the question.

CORRESPONDENCE.

Correspondents communicating with regard to letters which have appeared in FLIGHT, would much facilitate ready reference by quoting the number of each letter.

[1848] I would like to state some of my own observations and experiences in comparison with Mr. Maurice J. Dodd's, given in FLIGHT, February 7th, 1914, as our methods seem to have been similar.

The times of our observations nearly coincide, and our reception from manufacturers was similarly frigid, owing to their looking for automatic stability. Mr. Grahame-White rejected my inherent stability ideas in 1910, as he had several good patents in automatic stability which he was investigating. As nothing has been heard of these, I presume they were not successful.

Want of means to try my models full size prevented me giving proof, and similar circumstances militated against any further attempts to develop the matter on my part, but in the light of recent evidences from experimental results, both by practical machines such as the Dunne, &c., and results of scientific experiments by M. Eiffel and others, my own observations and deductions are confirmed, and as Mr. Dodd's seem something similar to mine, I can quite understand his letter.

I will compare and add my observations to each paragraph in Mr. Dodd's letter, using the same numbering. Paragraphs missed are those with which I agree.

9. "Where quick responsive control is of most importance horizontal and vertical rudders are less effective." They are least effective at a low speed, but this is not the only case where quick responsive controls are needed.

37. One could go further and say if c.g. is at same point as c.p. of planes, there is no tendency to spin round either vertical or horizontal axes.

38. If the propeller were mounted at c.g. the thrust line could still cut the curved path taken by the c.g., but it would cut it at this point, or in simple words, one could still side-slip, as thrust of propeller is at right angles to planes. For safety I should say—"The thrust line shall remain tangential to the curved path followed by the c.p. of planes," but as, for a stable bank, c.g. has to be on same vertical axis as c.p., it makes little difference.

47. In gliding flight the tail of a gull is always folded, not expanded; small birds having small wing area, supplement this area by expanding their tails, and if their tails are in constant oscillating motion it is due to bad balance of themselves. A swift or swallow with its long tail may manage to use it as a weathercock, but a gull's tail close to the rear edge of wide-spread wings would not give sufficient force to change their direction.

48. Fig. 2 (*d*). Shortening of lever arm would be very slight unless the wing turned through a big angle. Shortening of the lever arm a few inches, would only bank the machine through an angle depending on distance of c.g. from c.p., so machine having a low c.g. would require a big angular turn of wing, whereas a machine with c.g. on same horizontal line as c.p. would tip transversely till it fell or side-slipped.

Again, retiring the wing would move c.p. behind c.g., which would cause dive as already explained by Mr. Dodd. Angle of dive is again regulated by distance of c.g. from c.p., and if outside wing were advanced to counteract this, it would shorten the lever arm on that side, till both sides were equal before machine regained level horizontal keel.

49 (c) "Weight of machine acting through tiny arm of a few inches"—makes a great difference in the angle turned if c.g. is close below c.p., and little difference if c.g. is long way below c.p. In birds, this adjustment of c.p. in relation to c.g., for transverse and horizontal stability is most admirably done. Pigeons, which glide with wings at a big dihedral angle, give an example of low c.g., and yet they are by no means steady gliders. Small birds, such as starlings, when gliding have their c.g. practically at c.p., if not above, and cannot glide in anything like a strong gusty wind. Swifts can glide and tip transversely and horizontally with utmost speed and ease in any wind due to formation of wings and positions of c.p. in relation to the c.g. Gulls, my chief study, can and do adjust their c.p. when gliding either far above, at or below the c.g. of their bodies, also far in advance, at or far behind their c.g.

I believe the imaginary volume in which a gull, or sea-bird of that species, can place at will its resultant centre of pressure of its two wings is far greater than the volume at the disposal of a land-bird, and as far as I can judge, the c.g. of the bird comes at the c.g. of this imaginary volume.

58. I have seen gulls drop *vol piqué* and flatten out. I have also seen them glide down at a big angle, more like parachuting, dropping roughly 6 ft. in 1 ft., by increasing the angle of incidence of their wings, yet remaining on an even keel, if I may use the expression for having their bodies horizontal. In this position they come down very slowly and alight gently, seeming to use their wings and tail as a parachute, and also as brakes against their forward motion, long after they have lost momentum from any previous direction of motion, a drop of 30 ft. taking roughly one minute, and I see no reason why an aeroplane, with efficient planes capable of placing them in any desired position, using this principle should not land with a horizontal speed of half or less than that at which it is capable of travelling, and with but slight increase of vertical speed.

In conclusion, I may add that, as a result of my observations and experiments on models, in 1909 I applied for and was granted a patent for the stability, improved efficiency and control of aeroplanes, having very much the principles and formations of wings put forward by Mr. Dodd. Also that my ideas can be put on either mono- or bi-plane, and that any automatic stability device could be used if required.

Wishing you every success,

LEWIS RENATEAU.

Montreal, Canada, March 18th.

Spotting Talent.

[1849] Your leading article this week asks the question, "What is wrong with the Military Wing?" The answer to this is very simple—so simple that, when supplied, few people will think it worth considering. It is a similar question to that which was asked when the Great Eastern Railway Co. had to go to America for their manager. It is merely that we in this country appear to be short of that happy instinct which is capable of recognising talent.

A few weeks back there was some correspondence in your paper with reference to the aviation industry. This came to an end, as the War Office had at last recognised the position taken up by the reformers, and organised an Aeronautical Inspection Department.

When all is said and done, if you wipe away all the side issues, and get right to the bottom of many of these troubles which people do not appear to understand, you will find it is a case of our native talent not being recognised in one way or another. Recognise talent as something which should be encouraged, and the rest is plain sailing.

"OCTOPUS"

A Big Distance Record.

[1850] I read in this morning's paper an account of a law suit in the King's Bench Division, during which Mr. Gordon England, the airman, claims to have flown a distance of a hundred thousand miles (100,000 miles).

Surely he doesn't seriously mean this. I find by a rough calculation that in three years' hard flying—flying every day without a break, Sundays included—one would have to average more than 91 miles per day, which, as the Americans might say, would be "some" stunt; in fact quite good training for a round the world flight.

"A FLYER OF THREE YEARS' HARD EXPERIENCE."

Skegness.

OUR READERS ASK

WHY is pendulum stability in disrepute?

The argument against pendulum stability is based mainly on the natural tendency of any pendulum device to keep on swinging. So long as the inertia introduced by the pendulum principle is sufficient to prevent any disturbance in the attitude of the machine, the pendulum is, of course, as good as anything else. The more important point, however, is the question of how a machine recovers itself after it has been disturbed. No machine can hope to be so stable as to never be disturbed under widely varying conditions, and what is meant by natural stability is the power of recovery by virtue of qualities inherent in the design. In a ship, for instance, it is just the same. All are affected by the prevailing conditions and roll to a greater or less extent. It is their power of recovery that makes them stable. A very stiff ship, that is to say one that rolls far less than the average, is often regarded with suspicion owing to the feeling that if it once heels over it will capsize.

Aeronautics and Invention.

FROM the annual report of the Comptroller of Patents it is evident that, as usual of late years, during last year the various problems connected with transport were given a great deal of attention by inventors. The report goes on to state that the interest in aeronautics was well maintained. The number of applications showed a considerable increase, but inventors appear to have confined themselves mainly to improving the details of the well-known types of machines. There was also a well-marked increase in inventions dealing with internal-combustion engines, most of which related to engines either for vehicular propulsion or for aeronautics.

Foreign Aircraft News.

New World's Height Record.

Following his successful attack upon the world's record height for pilot and passenger, referred to in last week's issue, Linnekogel on Tuesday attacked the world's record for pilot alone, and reached a height said to be 6,350 metres (20,800 ft.), which beats the old record of 6,150 metres of Legagneux. As before, he used a Rumpler monoplane fitted with a vertical water-cooled Mercedes motor.

New Passenger Record by Garaix.

At Chartres, on the 28th ult., on the Paul Schmitt biplane, fitted with 160 h.p. Gnome motor and Integral propeller, Garaix made a new world's record by taking eight passengers to a height of 1,550 metres in 44 mins. The passengers were MM. Labeille, Andre, Rene, Legros, Pelletier, Poulain, Renault, and Turon, and, in addition, the machine carried 150 litres of fuel and 40 litres of oil, so that the total load was 758 kilogs. The machine landed by a spiral *vol plané* lasting 10 mins.

A further record, this time with nine passengers, was made by Garaix on Tuesday. The machine was exactly the same as for the preceding record and the passengers carried were MM. Brand, Dumez, Garnier, Laisne, Lebaille, Malnou, Peletier, Poulain, Renault. The machine attained a height of 1,580 metres (4,820 feet) in 59 minutes and came down by a spiral *vol plané* taking nine minutes. It also carried 150 litres of fuel and 40 litres of oil, the total load lifted being 833 kilogs.

A German Passenger Record.

On the 25th ult., Albert Puschmann tried to beat the world's record for duration with passenger, but after flying for 5½ hours at a height of 2,000 metres, which is a record for Germany, he was compelled to come down owing to a mishap with the motor. He was using an Ago biplane, fitted with 130 h.p. Argus motor.

E. Vedrines and Testulat Killed.

Wednesday was a black day for French aviation, for in the afternoon two well-known and experienced pilots, together with a passenger, lost their lives. The first accident occurred at Rheims to Emile Vedrines, a brother of Jules Vedrines. He was testing a new monoplane when it side-slipped and capsized, falling to the ground from a height of about sixty feet, Vedrines being killed on the spot. He secured his certificate in July, 1911, and was placed second in last year's race for the Gordon-Bennett cup.

The second accident occurred not far away, at Chalons Camp, about half an hour later. It appears that a machine piloted by Pierre Testulat was flying over the camp when it was caught in a *remous* and in diving, caught one of the pylons marking the flying course. The machine crashed to the ground and both pilot and passenger, M. Avigny, were killed instantaneously, the machine subsequently catching fire.

Three New Loopers.

On Tuesday and Wednesday of last week E. Ehrmann looped the loop in France by way of preparation for an exhibition tour in his native country, Algeria. Pierron also looped the loop last week on a Blériot fitted with a 6-cylinder Anzani motor. On Sunday Bulimbasic, a pupil of the Blériot School at Buc, made a loop.

Anzanis for Looping.

It is interesting to observe that two of the most recent loopers have relied upon motors of the fixed type. In both cases Anzani motors were used, Goodden having a 45 h.p. Anzani on his Caudron, while Pierron also used a 6-cylinder Anzani on his Blériot.

A New Henry Farman.

A deputation of French military officers visited Buc on the 26th inst. in order to witness tests with the latest military biplane of the *blindé* type produced by Henry Farman. Piloted by Bill and carrying a load of 306 kilogs. it climbed 500 metres in 9 mins.

Testing a New Morane.

A new 80 h.p. Morane-Saulnier monoplane of the *blindé* type, built for the Russian Government, was tested by Pequet at Villacoublay on the 26th ult. With a useful load of 160 kilogs., it climbed 500 metres in 2 mins. 30 secs. Subsequently a test was made with an 80 h.p. "Parasol," which took a load of 265 kilogs. up to 500 metres in 4 mins. 10 secs.

Aerial Touring by Maurice Farman.

On the 25th ult., accompanied by Senoucque, Maurice Farman paid a visit to Tillieres, while the Marquis de Larienty-Tholozan, with Derome, made a trip to Chartres, passing by Chevreuse, Dampierre, Rambouillet and Gallardon. Late in the evening, Maurice Farman, with Derome, made a long flight at a good height on a machine fitted with Fallot headlights.

On Monday Maurice Farman with M. Barbarou as passenger made a round trip to Dreux, Chartres, Orleans and back to Buc, a stop being made en route at Etampes. Renaux, on the machine he will use for the Aerial Rally, made a trip to Nonancourt and back to Buc.

Juvisy-Rheims in Fast Time.

On one of the light scouting Ponnier monoplanes fitted with a Rhone motor, Emile Vedrines, on the 30th ult., went from Juvisy to Rheims, covering the 160 kiloms. in 58 mins.

Two Long Flights in Germany.

On Monday, two flights of about twelve hours duration were accomplished in Germany on monoplanes. Krumsiek left Dresden at 5.30 a.m., and made his first stop at 5.32 p.m. having been in the air for 12 hours 2 minutes, while Tersen, who started from Neumuenster at 7 a.m., concluded a flight of 11½ hours at Johannisthal at 6.30 p.m.

German Machines for Turkey.

It is stated that the Turkish Government has placed a large order for military aeroplanes with the Aviatik firm of Mulhausen, and as soon as the weather is more favourable, Ingold is to make an attempt, on one of the machines, to fly from Germany to Constantinople.

German Fatalities.

At Johannisthal, on the 26th ult., Lieut. Groener was struck on the head by a propeller, and received such injuries that he died the next day. On Monday, a military biplane fell near Kurve, and one of the occupants, Capt. Reinhardt, was killed, while his companion sustained severe injuries to his leg and head.

Quick Climbing in Russia.

Some remarkable flying in the order of quick rising was accomplished by Gaber-Vlinsky on a Farman biplane at St. Petersburg last week. Carrying Capt. Shabsky as passenger, the total weight carried being 327 kilogs., the machine in 2 mins. climbed 500 metres; in 4½ mins., 1,000 metres; in 7¼ mins., 1,500 metres, while in 35 mins. the height was about 3,000 metres. A descent then had to be made owing to the carburettor freezing.

The Indian Flying School.

A message from Allahabad states that the new flying school for the Indian Army at Sitapur was inspected by the new Commander-in-Chief, General Sir Beauchamp Duff, on Friday of last week. Subsequently, the General was taken for a flight on a Farman biplane by the Commandant of the School, Captain Massy.

Another American Event.

A project is now being considered in the United States for a race for aeroplanes from New York to the Bermuda Islands, a distance of about 700 miles. It is expected that the prize fund will amount to at least £5,000.

The Aero Club of America has also been considering the organisation of a race for waterplanes from the Statue of Liberty in New York Harbour to the Boston Light and back, a distance of about 550 miles.

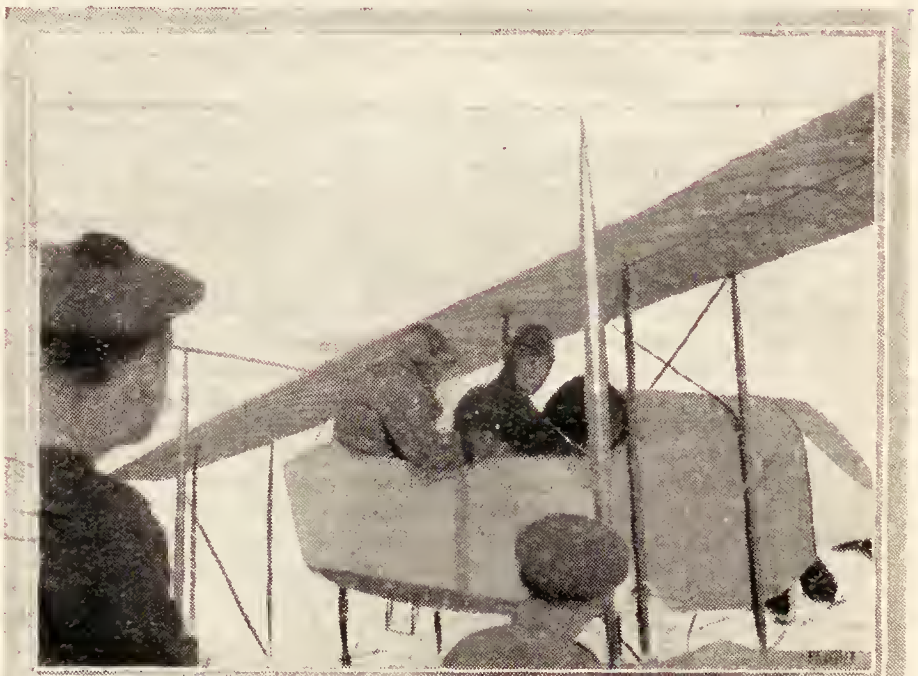


Photo by Capt. Halahan.

Rene Caudron in the pilot's seat of the new Caudron land and water biplane with, as passenger, the French naval pilot who will be flying this craft.

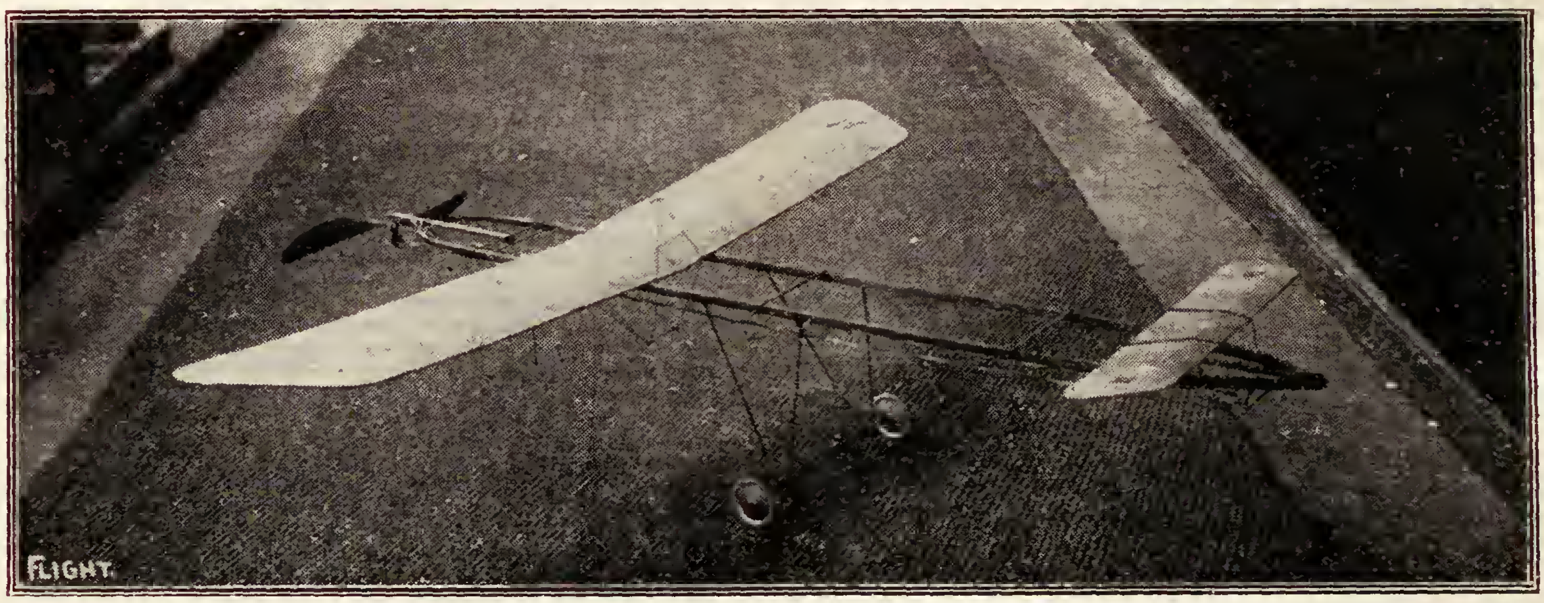
Models

Edited by V. E. JOHNSON, M.A.

Aero Models at Olympia.

(*Continued from page* 352).

REFERRING back for a moment to the question of model and prototype, more than one aeromodellist with whom we had the pleasure of talking at the Show, clearly held the opinion that whereas in other model work one could build *practical working* scale models of full-sized work, in aeronautical matters this was not so, and that therefore to carry the matter to a real logical conclusion, no such thing as a really practical working model aeroplane exists. There undoubtedly exists a line here on which an argument can be hung ; but in the end, either in aeronautical models or others the question is this : How far must one machine resemble another, and how much detail must be put into it before one can be called the *model* of the other ? Logically speaking, they ought, no doubt, to be exactly alike and to scale. But the term model has always been used in a more or less elastic sense, when one machine in its general broad outlines, *dimensions*, and principles did resemble another. We think no greater harm could be done to model aeroplaning than to set up a claim that it is an art to itself—*apart from other model work.* More than one attempt has, however, been made to do this. You will never impress the public (on whom, in the end, you depend for your support), you will never raise the *status* of model work in this country, nor will you get the full-sized worker to regard it as anything else than a sport and a plaything, whilst at public exhibitions the predominant feature is a machine, which to an ordinary person bears but a very slight resemblance to the full-sized article by its side. In a word, you will never be taken *seriously.* The question is such a vital one from the *model movement* point of view, that we trust readers of FLIGHT will forgive this break in the more detailed account proper of the exhibits at Olympia, which contain many points of interest, which will be dealt with in due course, and will be, we trust, especially valuable to aeromodellists and others interested who were unable, owing to distance, &c., to visit the Show.



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Mr. L. H. Slatter's weight-carrying model.

Mr. L. H. Slatter's Weight Lifter.

In Class VI, the weight-carrying models, capable of rising from the ground under their own power, the minimum weight of the machine *unloaded* had to be one pound, and each model had to carry a dead weight of one quarter its own weight, this weight not to be any part or parcel of the machine proper, the weight or weights to be detachable for the purpose of weighing. In order to qualify, the model must show itself capable of making a flight of at least 15 secs. in duration.

In Mr. Slatter's case, the length is 5 ft. 3 ins., the span 5 ft. The *frame*—double spars of spruce tapering fore and aft, solid spruce ⅜ in. by ¾ in. section. Distance pieces or spreaders, bamboo. Chassis of umbrella ribbing with sprung wheels—Morane design. Wheels, aluminium, 2·5 ins. in diameter. Twin gears, 1 in. in diameter. Bonn's geared wheels mounted in a well-designed steel wire frame. Diameter of propeller, 16 ins., driven by 4·5 ozs. of rubber, ten strands, ¼ in. thick being used on either gear. The main plane is constructed of bamboo. Chord, 10 ins., covered with Bragg-Smith silk. Elevator also of bamboo, 22 in. span and 4·5 chord. Weights : Frame and chassis, 11 ozs. ; plane and elevator, 4·5 ozs. ; rubber, 4·5 ozs. ; total, 20 ozs. Dead weight carried by machine, 5 ozs., making a total weight of 25 ozs. Surface about 4·5 sq. ft., and flies about 18 to 20 m.p.h. Best duration (to date) 41 secs. There are several points of special interest about the above particulars, viz., the relation between the span and the length, the latter being only 3 ins. more than the former, and the fact that a machine with such dimensions and of such a size when carrying a dead weight of no less than 5 ozs. can make a duration of no less than 41 secs. and very possibly more. It only serves to show that perfectly adequate result can be obtained with machines built on rational lines, the fact of the matter being that when you come to models of a certain size and above a certain weight, you have got to build them on such lines to achieve any success. We shall be glad to receive particulars of other "weight lifters" exhibited at Olympia.

(*To be continued.*)

Littlestone Model Aero Club.

Extraordinary Moonlight Flights.

We have received the following communication from Mr. Bruce Herd of the above club :—"I am just writing a few lines to see if you can throw any light on the curious flying of some of our members' models. Four of us went out this evening (March 12th) to do some model flying by moonlight, about 9 o'clock till 9.30. All the machines had been flying very well during the past week, when some good all-round flights were made. But to-night one of our members sent off a twin-screw monoplane, and it commenced cutting some extraordinary figures for a few yards, and then dived straight down and broke its back. A second member sent up a similar machine to the first, and it rose to about 50 ft., and dived straight down at a great speed, and suffered the same fate as the first. A machine built from Mr. W. E. Evans' drawings, recently published in FLIGHT, was next sent up by myself. The machine flew about 20 yards, cutting all kinds of capers, and then rose high up, and finished exactly the same as the others, viz., smashed to pieces. At last a machine which had flown well for weeks was launched, and was soon flying upside-down, and this, too, finished with a sudden rise and straight dive, and behold, yet another broken model. Now what do you make of this? Four models smashed in one night and all of them in the same way. We should be very much obliged to you if you could possibly tell us what was the cause of the smashes. I would like to thank you for the benefits I have received from your most excellent column, which I and my club-mates look forward to each week."

We should think the above quite easily creates another record.

Personally, the writer has never done any model flying by moonlight, and would therefore prefer, in the first instance, to receive the opinion of some who have. Our correspondent says nothing about the nature of the ground, nor the atmospherical conditions, save that it was moonlight. More information on this point is wanted. Models, of course, fly much better in the daytime, but the mere difference between day and night would not account for such a state of things as described above. What about the wind at the time? Were the models all of the Canard type?

We shall be glad to hear from any reader who can throw any light (other than moonlight) on the affair. So far, we have never known a "model" have a thirst other than for lubricant, and no lubricant that we know of contains anything stronger than salicylic acid, or (as a wag) one might suggest the "models" had had a drop too much.

Proposed Model Aero Clubs.

Mr. G. Greenwood-Bentley of "Mabledon," 5, Waveney Avenue, Peckham Rye, S.E., writes: "An effort is being made to form a model aero club in the vicinity of Peckham Rye, and I should be glad if you could find space in your valuable columns to announce that I shall be glad to hear from those interested who would care to become members and help to form a club. It is proposed to run the club on social and mutually instructive lines, and we hope it will in every way be successful. Should this be so, I shall be glad to send you periodical reports as to our progress."

Mr. H. S. Digby, of 78, Thornbury Road, Spring Grove, Isleworth, W., also writes: "I should be very glad to hear from anyone desirous of forming a model aeroplane club in and around this district. My idea is to, first of all, obtain a rough idea of the number of model enthusiasts in this district."

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration ..	D. Driver... ...	85 secs.
Twin screw, do.	Distance ...	R. Lucas	590 yards.
	Duration ...	G. Hayden ...	137 secs.
Single screw, rise off ground	Distance ...	W. E. Evans ...	290 yards.
	Duration ...	W. E. Evans ...	64 secs.
Twin screw, do.	Distance ...	L. H. Slatter ...	365 yards.
	Duration ...	J. E. Louch ...	2 mins. 49 secs
Single-tractor screw, hand-launched	Distance ...	C. C. Dutton ...	266 yards.
	Duration ...	J. E. Louch ...	91 secs.
Do., off-ground	Distance ...	C. C. Dutton ...	190 yards.
	Duration ...	J. E. Louch ...	94 secs.
Single screw hydro., off-water	Duration ...	L. H. Slatter ...	35 secs.
Single-tractor, do., do. ...	Duration ...	C. C. Dutton ...	29 secs.
Twin screw, do., do. ...	Duration ...	L. H. Slatter ...	60 secs.

Trials at Hendon.—Will all competitors kindly assist the hon. sec. in running off these trials, especially on Saturday morning, by standing to their respective stakes and by getting ready when called upon? The hon. secretaries of the various clubs will assist by placing their men in position and reporting non-attendance of any member who will be unable to compete.

President.—The Council beg to announce that the Right Hon. The Earl of Lonsdale has kindly consented to become the President of the Association, he having been nominated by Sir Bryan Leighton and duly seconded. The date of the general meeting will be fixed and announced in next issue.

Membership.—Will any member who was able to enlist the support of any friends at the Aero Show kindly forward their name, addressed to the hon. sec.? One of the latest recruits to the Association is Mr. A. B. Clark, the hon. sec. of the South-Eastern Aero Club, and the hon. secretaries of the affiliated clubs hope to see this club affiliated so that it will be eligible to compete in the Farrow Shield Team Contest.

Exhibition at Felixstowe, May 6th to 16th.—The secretary of the Felixstowe Advancement and Winter Season Association visited Olympia with a view to seeing the various models and asking the exhibitors to lend them for his exhibition. He selected Exhibits Nos. 44, 51, 60, 63, 77 and 79, 83, 200, 202. If any of the gentlemen who own these models will show, his association will pay the carriage both ways and see that they are carefully packed for return journey.

Anglo-American Exhibition at Shepherd's Bush.—If possible, a model section will be arranged for at this exhibition, and the hon. sec. will be pleased to arrange if the modellists will give him their support. The exhibition is open from May to October, and the models will be looked after while on show. Will all wishing to exhibit send in their names at once to Mr. Akehurst? Also it is hoped to arrange contests in the Stadium for steering and hydro-aeroplanes.

Letter from R. V. Tivy, of Bristol and West of England Aero Club, and Provincial Exhibitors.—"I duly received this morning by passenger train the model (No. 82) which I exhibited at Olympia. The model was excellently packed in a crate and arrived quite undamaged. I must congratulate you on the excellent arrangements which were made for dealing with the exhibits. No one need have any hesitation in sending models from the provinces to any exhibition which is under the management of the Kite and Model Aeroplane Association."

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY AND REPORTS.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (N. Branch) (27a, Sedgemere Avenue, East Finchley, N.)

April 5th, practice at 10 a.m. April 11th, handicap duration competition 3 p.m.

Monthly Report.—Owing to the unfavourable weather, little flying has been done during March. Messrs. Coleman, Root, Claflin, Fletcher, Tosh, and Hindsley have had machines out when possible, and other members have visited the ground. A good deal of constructional work is going on, however, and several interesting machines should make their appearance shortly, including a compressed air model of Mr. Fletcher's, a similarly driven machine of Mr. Murray's, and a steam-driven twin screw model of Mr. Claflin's. The Association's shield has been won this quarter by Mr. C. C. Claflin by a flight of 60 secs. duration with a tractor, Mr. F. G. Hindsley being second with 50 secs. The Aero Show has, of course, been the chief attraction of the month, and two club visits were paid to it. The Association exhibited the following models:—Twin screw, loaded elevator, A frame models by Messrs. R. L. Rogers, A. Rogers and J. McBirnie; hydro-aeroplanes of similar type and each fitted with detachable wheels by Messrs. McBirnie and R. L. Rogers; a twin screw, loaded elevator, hollow spar model by Mr. C. C. Claflin; a twin screw, loaded elevator model with built-up *fuselage*, low c.g. and the propellers arranged one above the other instead of the more usual manner; a twin gear, hollow spar tractor by H. E. Fletcher; a twin gear, hollow spar tractor by F. G. Hindsley; single propeller, loaded elevator, bow frame models by E. Coleman, O. W. Root, and W. Knight, Mr. Root's being twin geared; a single propeller, floating tail, built-up frame, model by T. W. Dann. Evening meetings were held at the club-room as usual.

Bristol and West of England Aero Club (Model Section) (42, Royal York Crescent, Clifton, Bristol).

Mr. B. C. Hucks will give a demonstration of flying, including flying upside down and looping the loop, at the Buffalo Bill field at Horfield on April 8th, Good Friday, April 10th, and Saturday April 11th, each day at 3 p.m. Admission 2*s*. 6*d*., 1*s*., and 6*d*. Members' badges and tickets, price 2*s*. 6*d*., admitting to the Aero Club enclosure and to the hangar at 2 p.m. on any one of these days, may be obtained in advance by applying to Mr. P. A. Thompson, c/o, A. Alan Jenkins, Star Life Buildings, Bristol. The annual general meeting of the Model Section will be held at the earliest possible date. There will be model flying meetings at the Sea Walls at 3 p.m on Saturdays, April 4th, April 18th, and following Saturdays, except when otherwise notified to members.

Croydon and District Ae.C. (82, Clarendon Road, Croydon).

Farrow Shield.—The club will compete for this trophy. Change of address.—All communications in future must be addressed to the hon. sec., W. J. Finnigan, 82, Clarendon Road, Croydon.

Monthly Report.—March has not been a busy month with this club as regards the actual flying of models, but Messrs. Bell, Mullins, Smither, Pavely, Carter, and Taylor have been out. However, members have been fully occupied with matters in connection with the Aero Exhibition at Olympia. The club had twelve exhibits, and it is hoped to considerably improve on this number next year. Will those members who are entered for the competitions at Hendon Aerodrome on Saturday, April 4th, please apply to the secretary immediately for their passes to admit them to the aerodrome? Messrs. P. Hart and W. Finnigan have kindly offered a cup amongst the members, and it will be flown for probably in the Easter holidays, but the exact date will be announced later in Flight. This competition will be for r.o.g. machines of all types—tractor and single propeller models will receive a suitable handicap. Marks will be allotted as follows: Design, 50; stability, 25, and 1 mark per second duration. The heading "Design" covers the general efficiency of the model, *i.e.*, quantity of rubber required to fly the model proportionate to its weight combined with its duration, design, and strength of landing chassis, workmanship, &c. Stability will be regarded in this competition as steadiness in the air, gliding angle, and directional control. Members are very enthusiastic over this competition, and everyone has entered.

Leytonstone and District Aero Club (64, Leyspring Road).

April 5th, flying on Wanstead Flats at 6.30 and 10 a.m. The competitions in connection with Olympia take place to-day, April 4th, at the Hendon Aerodrome and Welsh Harp.

Monthly Report.—March 1st, 10 members met on Wanstead Flats, and Mr. H. Bedford obtained some good flights with an 8-oz. hydro. Mr. H. Bond was flying a r.o.g., and Mr. F. Grattan a hand-launched model. March 8th, members met at club-room. March 15th, 3 hand-launched models were flown. March 22nd was again wet and members met at the club-room. March 29th, 11 members met 6.30 a.m. to tune up models exhibited at Olympia. 8 hydros were flown with varying success, both off water and off ground. 10 r.o.gs. were in evidence, flown by different members, and also a single-screw r.o.g. There was a slightly larger number when the members again met at 10 a.m., and the process of tuning up was continued throughout the morning. This club exhibited 34 models at Olympia, and while on the subject, it may be of interest that at the close of the Exhibition Mr. Charles Hersom's hydro. rose successfully from one of the tanks provided for the models.

N.E. London Model Ae.C. (47, Jenner Rd. Stoke Newington, N.)

Flying on Hackney Marshes at 3 p.m. Saturdays; the club extends a cordial welcome to non-members at their meets.

Monthly Report.—The following Olympia models have been under test—W. A. Dore's twin canard (r.o.g.) Burton's tractor, and a triangular framed tractor with special main plane and a 15 oz. hydro. by the secretary. A 3 ft. by 10 ft. r.o.g. board made of three-ply wood has been obtained for the club. The competition programme for the year will be ready in a fortnight.

Paddington and Districts (77, Swinderby Road, Wembley).

April 4th, practice at Sudbury. Members who exhibited in Class 2a at Olympia take part in the trials at Hendon Aerodrome.

Monthly Report.—Feb. 28th, Mr. C. C. Dutton obtained many good flights with his hydro, the pond in the flying ground providing the necessary rise-off surface, the best duration being 39 secs. In the competition for medals offered for Olympia Show models Mr. W. E. Evans made an average of 35 secs. in Class 2a; Mr. F. W. Johnson made a single flight of 48 secs.; Mr. H. Weston tuning up 6 oz. tractor and 8 oz. twin propeller models; Mr. M. Levy, with single propeller model, obtained 47 secs. h.l. Mar. ,th, in the Olympia models competitions, Mr. D. Driver made an average of 49 secs. in Class 2a, and Mr. W. E. Evans an average of 36 secs. in Class 2b; Mr. T. Carter tuning up single propeller weight-carrying model, found to be underpowered; Messrs. M. Levy and D. Driver tuning up single propeller models, the latter obtaining 64 secs. h.l. Mar. 14th, members took models to Olympia Aero Show. The exhibits were as follow: In Class 2a, 8 oz. twin propeller—Messrs. J. R. Barrett, R. Bird, T. Carter, D. Driver, W. E. Evans, F. W. Johnson, M. Levy, and H. R. Weston. In Class 2b, 6 oz. single propeller—Messrs. D. Driver, W. E. Evans, and M. Levy. In Class 6, single screw weight-carrying, Mr. T. Carter. Mar. 28th, the last day for competitions for Olympia models, in Class 2a the averages were: R. Bird, $53\frac{1}{5}$ secs., won 1st prize, silver medal; D. Driver, $42\frac{3}{5}$ secs., 2nd prize, bronze medal; T. Carter, 33 secs.; F. W. Johnson, 28 secs.; and W. E. Evans, 22 secs. The two bronze medals offered in Classes 2b and 6 were not won. These may be put up for competition later on.

Reigate, Redhill and District (The Cottage, Woodlands Avenue, Redhill).

April 4th, period for winning Messrs. Bonn & Co.'s prize terminates on this date.

Monthly Report.—Very little flying during the month owing to weather and Olympia Exhibition. Members visited Olympia on 21st. Mr. R. G. Wilson has been making very creditable flights with a floating tail mono. Messrs. Key, Morton, Sutton, Hooton, Funnell, Hoyle and Greenhead have also been out. Mr. R. G. Wilson is "in the running" for the Bonn prize, and competition is becoming keen.

Sheffield Ae.C. (41, Coniston Road, Abbeydale, Sheffield).

April 4th, members wishing to take part in the *Sheffield Daily Independent* Prize should arrive at the Aviation Ground, Owlerton, as early as possible. April 11th, tractor biplane contest. April 13th, weight carrying, also novices and juniors' competition. General meeting April 4th postponed owing to aviation meeting.

Monthly Report.—March 7th, general meeting at Mr. O. H. Broomhead's restaurant. Decided April 11th next date for tractor biplane contest; time and place later. March 28th, through the kindness of the *Sheffield Daily Independent*, who have made arrangements with Mr. Harold Blackburn for a week's flying demonstration at the Owlerton Church Grounds, Penistone Road. A good number of the members turned up, six with machines. Mr. W. H. Bagshaw's and Master C. Dewsnap's machines accomplished some good flights, circling over the people, then disappearing for nearly half a mile. The flying is to continue up to April 4th (inclusive), on which day the *Sheffield Daily Independent* is giving a special prize to the member of the club who makes the longest duration record flight with a hand-launched machine. Mr. Blackburn has expressed a desire to act as judge. He was greatly interested in the constructional part of Mr. W. H. Bagshaw's machine.

Stony Stratford and District Kite and Model Ae.C. (Old Stratford).

April 1st, meeting at Wolverton at 8 p.m. Subject: Reading of Mr. Handley Page's address to the K. and M.A.A. April 4th, postponed March competition at Old Stratford, to commence at 3 p.m. April 16th, lantern lecture at Public Hall, Stony Stratford. Subject: "Progress of Aviation"; admission 3*d*. Members please note that the building evening will not be held on April 15th, on account of the lecture. Flying every Saturday at Old Stratford, from 2.30 p.m.

Monthly Report.—Buckingham Branch.—A discussion was held Feb. 27th, topic "R.O.G. Models," when there was a good attendance. March 18th, building night, new members signed on and active work on new machines for branch competition. The members, especially the juniors, are improving considerably in their flying. During the month every moonlight night has seen flying and also lost models. March 21st, competition for branch members only for prizes contributed by local tradesmen. Competition flown in strong winds, the results being: Mr. W. Sturgess 1st, B. Williams 2nd, W. Palmer 3rd. Flying every Saturday at 3 p.m., London Road ground. Stony Stratford.—Business meeting held at Wolverton, March 4th. During the month regular flying has been indulged in, some of the members trying cross-country flying, with dire results to machines.

Wimbledon and District (165, Holland Road, W.).

April 3rd and 4th, Aero Show Trials at Hendon. April 5th, flying as usual.

Monthly Report.—Fifteen machines were exhibited on the Club stand at the Aero Show, there being 7 twin-screw machines, 7 single-screw, and 1 ornithopter. March 28th and 29th, Mr. Easdale flying his tractor weight-lifter, getting fine flights both h.l. and r.o.g. carrying weights. Unfortunately, however, a troop of Territorials rode over his machine at the conclusion of a flight, breaking nearly everything except the propeller. It is hoped that he will be able to repair it in time for the trials on April 3rd. Mr. Laing had out his tractor, and after some adjustment got it going very well flying at a great height and doing about 50 secs. duration. Mr. Tucker also had out his tractor, the machine proving very fast and climbing well. Mr. Slatter was doing long flights with his twin-screw r.o.g., doing durations up to 100 secs. Mr. Powell's r.o.g. was flying well, making one flight of 110 secs. out of sight. Mr. Hayden obtained the same duration with his twin-screw, also flying very high. Single-screw pushers were flown by Messrs. Houlberg and Boniface, the former flying very high and doing durations up to 40 secs.; the latter, though not so high, obtained durations up to 50 secs. and showed great stability. On the 29th flying was spoilt by the rain, which fell during the greater part of the day, but Mr. Houlberg, flying his twin-screw, made some fine flights, the best being one of 138 secs. Mr. Hayden too was flying well, his best flight being one of 100 secs. Mr. Slatter had out his hydro. fitted with wheels, which proved a good climber, the best duration being 62 secs. Mr. Laing's twin-screw with swept-back wings was also flying well, showing good stability.

Windsor Model and Gliding Club (10, Alma Rd.).

Monthly Report.—Unfortunately the two members who were entering engines for the Aero Show were unable, through lack of time, to finish them, and this detracted some of the interest in the club exhibit. The models, nevertheless, which were shown compared quite favourably with the others, and the similarity in design was not so evident as in other exhibits. Some valuable lessons were learnt, the full-size machines being studied diligently by the members. One of the old members, Mr. E. A. Dousett, exhibited a model on the club stand. In regard to the full-size machine, unless more support is forthcoming, it is extremely doubtful whether the club will be able to start; although the sum required is quite small, great difficulty has been experienced in getting help. The engine has been tuned up splendidly by Mr. G. Petit and Mr. H. Deller, although quite a lot of alterations had to be made. It is hoped, however, that matters will turn out more favourably. One of the new members is Mr. A. Payze, an old Bristol pilot, and whose experience in the flying and construction of machines will be of great assistance to the club, and members are to be congratulated upon securing such a useful member. A little flying has been done by S. Spicer, F. Camm, E. Stanbrook, S. Dandridge and S. Camm. Messrs. W. Rogers, S. Camm and E. Stanbrook are competing in the tractor class at Hendon on Saturday, and Mr. Dousett in the rise-off twin propeller class. Local readers are urged to join, so that a successful season may ensue. The club is now affiliated, so that members will be able to enter more competitions, and also take part in the inter-club contests for the Farrow Shield.

UNAFFILIATED CLUBS.

Bath and Somerset Aero Club (199, Wellsway, Bath).

An open competition will be held on Combe Down on April 25th. Events as follows:—1, r.o.g. duration; 2, distance h.l.; 3, speed 100 yards; 4, duration h.l.; a prize of 10*s*., kindly presented by Mr. Gait, for the longest flight during the afternoon, provided there are six entries. Further particulars can be obtained from hon. sec.

Monthly Report.—Despite the inclement weather much useful work has been done both indoor and out. Jennings, Knight and Brampton with twin-screw monos., Cross single-screw mono. and twin biplane, Tolman and Pickett with single-screw monos., Lewis with tractor mono. and White with twin-screw biplane. All steadily improving. Seven new members were elected at the annual general meeting on March 23rd.

Burton and District Aero Club. (156, Shobnall Road.)

The Good Friday competitions are:—1st, duration, any type of machine. Event 2, r.o.g., any type of machine. Event 3, distance in a straight line, any type of machine. A silver medal will be given as first prize in each event. A complete machine and other aeroplane material will be given as 2nd prizes. Fifteen entries have already been received for above. Junior competition, duration. A silver medal will be given to the winner. The Club are to give a waterplane exhibition in connection with the Burton Fête and Gala on June 27th, and flying exhibitions at the Burton-on-Trent annual flower show, for which each committee are offering valuable prizes. Model makers' catalogues will be welcomed at the above address.

Monthly Report.—Weather has spoilt flying, but a great deal of work has been done in view of forthcoming Club Competition, Good Friday afternoon. As this is the first competition of the club the rules have been made very simple. The Treasurer of the Club, Mr. T. Smith, has given a gold centred solid silver medal, which is to be the first prize in event one. Three other silver medals have been given by Mr. C. G. Lamb, Mr. F. Robinson and Mr. G. Metcalf, to whom the club are very grateful.

Dundee Aero Club (4, Forester Street).

Monthly Report.—March 7th, Messrs. Robertson, Maxwell, Stuart, Thomson and Powrie out in Victoria Park. General meeting in Clubrooms Y.M.C.A. on March 18th. The Chairman, Mr. Luis, promised to present a Trophy to the Club, the winner to be the member with the best aggregate of flight in competitions during the flying season (March to August). One Competition each month, winner to hold trophy for one year. Type of machines for competition to be decided later. March 28th, 1st Competition for Luis Trophy, also for hydro-aeroplane, presented by Mr. Farningham, the late secretary: 1st hydro-biplane, D. Robertson; 2nd, aluminium propeller, Wm. Powrie. The competition was flown in a very high and gusty wind, but nevertheless some very good flights were witnessed. Robertson's model was timed 41 secs. out of sight. Hall flying his r.o.g. monoplane (which won first prize at Edinburgh) and succeeded in establishing a r.o. record for the Club, viz., 24 secs. Luis out with a fine tractor r.o.g. monoplane. Powrie with the only 0–1–1–P 2.

Edinburgh Aero Club (13, Hermand Terrace, Edinburgh).

Monthly Report.—A great amount of flying has been done during the past month. Meetings have been held every Saturday at the Meadows, and although the weather has been far from perfect some exceedingly good flights have been made. On the 7th the first Sweepstake Competition was held, Mr. Hubbard being the winner with a flight of 21⅗ secs.; Mr. Watt was second with 18⅕, and Mr. Fiddis third with 15⅖. The wind was very troublesome. At a meeting held on Feb. 26th the various office-bearers and committees were appointed, and new members introduced. On Thursday, 26th, a night meeting was held at the Meadows, Messrs. Ross, Watt, Hubbard, Hogg, Saidler, Fiddis, Clark, Calder, Nesbitt and Ramsay, were present, and some good flights were achieved with the aid of fireworks. All the members are very enthusiastic, and several have been experimenting with hydro-aeroplanes, and it is hoped to hold such a meeting soon. The secretary will be glad to hear from any party who is interested and who would care to join the club. Annual subscription, 3*s*., payable half-yearly.

Finsbury Park and District (52, Lambton Rd., Stroud Green).

April 4th, flying Finsbury Park, 2.30 p.m.

Monthly Report.—March 7th, Mr. Gibbs best flying with Etrich monoplane, Mr. B. H. Barnard with Blériot monoplane, S. Pratt, tractor Deperdussin; H. Mullin, monoplane; A. Richards, Avro biplane; R. Mullin, tractor monoplane. March 14th, B. H. Barnard (Blériot), highest duration, 28 secs.; S. Gibbs (Etrich), 36 secs.; A. Richards (Handley Page tractor); S. Pratt, R. Mullin, H. Mullin, and T. Steer all tractor monoplanes. Mr. S. Gibbs won the competition medal with 136 points; R. Mullin, second; and B. H. Barnard, third. March 21, members visited Aero Show. March 28, Mr. Savage twin-propeller (Canard type), highest duration, 30 secs.; A. Richards, best flying with scale Avro biplane and Albatross double-wing monoplane; S. Pratt with fish-tail monoplane; S. Gibbs, monoplane; F. Steer and B. H. Barnard, monoplanes; all tractors except Mr. Savage's twin-screw Canard.

Ilford Model Ae.C. (83, Endsleigh Gardens, Ilford).

April 5th, 12th, 19th, 26th, flying as usual, new Aerodrome, Hog Hill, Hainault Forest, Chigwell Row, at 9.30 a.m. (weather permitting). Members, please note.—Flying of models must take place from the foot-path and *not* from the brow of the hill. All motor cycles and bicycles must also be left on the foot-path. To members coming to the aerodrome by train.—A train leaves Ilford at 8.9 a.m., arrives at Fairlop 8 15 a.m.; for return—depart from Fairlop 1.33 p.m.

Monthly Report.—The Club's "red letter day" was undoubtedly Mar. 4th. the day of the "First Annual Social and Dance" of the above Club. It was most successful from a social and financial point of view. It was exceedingly gratifying to those who managed the dance, that the first venture in this direction should prove such a success—a splendid idea for filling the Club's coffers. There were about 70–80 guests present, who, without exception, asked if another could not be arranged this season. The three M.Cs. were Messrs. H. Corrigan, F. M. Connellan, and J. B. Fitzsimons. Now as to flying—Mar. 1st, weather fair, wind inclined to be boisterous at times. Large attendance of members. The "pièce de resistance" was a flight made by "Lizzie," Mr. R. C. Nicholls' staggered back-swept-winged r.o g. "pusher" biplane, which climbed at amazing speeds. Good flights were put up Mr. Nicholls' "twin-pusher" r.o.g. monoplane, Mr. H. Oliver's "twin-pusher" h.l. monoplane, Mr. B. Seabright's tractor, Mr. G. Warren's tractor, hollow spar *fuselage*, and Mr. J. L. Hartnoll's "lightweight" r.o.g. "twin-pusher" monoplane. Mr. J. L. Hartnoll must be commended for the way in which his "lightweight" monoplane climbs and flies. Mar. 15th, wind, exceedingly boisterous; best performance put up by Mr. B. Seabright's twin-screw "pusher" monoplane. Mr. R. C. Nicholls' biplane "Lizzie" was soon put out of the running. Mr. E. Jenkinson's A frame monoplane, fitted with two propellers with blades shaped *à la* gull wing, showed itself a very capable flier. Mar. 22nd, good performances were put up by Messrs. R. C. Nicholls, E. Jenkinson, A. F. Lazell, G. Warren, B. Seabright, and J. L. Hartnoll. Mr. J. L. Hartnoll's monoplane, "lightweight" reached close on 150 ft. altitude, ending up with a beautiful spiral *vol plané*. Mar. 29th, weather good—inclined to be boisterous. Mr. B. Seabright must be credited with *the* "flight" of the morning; his A frame reached the ½ mile, the Club's record for distance. Mr. G. Warren's T frame "pusher" exceeded the ¼ mile, and terminated in the lake. Mr. E. Jenkinson brought out a little "looper" that looped not, but flew some good distances. Mr. R. C. Nicholls' "roarer" got away well, and easily exceeded the ¼ mile. It seems that this club ought to be called a motor-cycle and cycle club for these were more in evidence than aeroplanes.

Liverpool Aero Research Club (62, CEDAR GROVE, LIVERPOOL).

ANNEXED are particulars of the flying contests in connection with the Exhibition, May 2nd, 1914, Y.M.C.A. Hall, Mount Pleasant, Liverpool. Admission tickets, 3*d*., may be had from the hon. sec., or Hobbies Depôt, Manchester Street, Liverpool. Date and place of flying contests to be announced later. Entries are invited in the following classes:—Class I, rise-off-ground machines—tractor machines to receive 20 points allowance—1st prize, hand-painted diploma and cash prize 7*s*. 6*d*.; 2nd, certificate and cash prize of 2*s*. 6*d*. Class II, hand-launched (all types)—1st prize, hand-painted diploma and cash prize 7*s*.; 2nd, certificate and cash prize 2*s*. Class III, kites (all types)—hand-painted diploma. The above classes are open competitions. Class IV, open to members only—"Aero Research" Trophy and Diploma of Merit for best exhibit (either model or apparatus), or best performance during flying contests. In classes I and II each second will count as one point, design 10, construction 10. A. Entries will be received up to and including April 18th. B. Entrance fee of 6*d*. per model will be charged.

Monthly Report.—Beautiful weather Feb. 28th. Saw some grand flying by B. Tear, T. W. Bennett and A G. Pugh at Walton. the "flexible wing" of B. Tear proving itself an adept at looping the loop, although high winds on the following Saturday rendered this a little uncertain. T. Bennett and A. G. Pugh trying to outstrip each other with pleasing results. Similar exhibitions at Sefton Park, March 7th, attracted a good audience despite lusty winds, A. G. Pugh finding tree-climbing necessary on two occasions after long flights, T. Bennett's model keeping more within grounds by circling. The latter gave his first kite-flying demonstration at club meetings, and certainly deserves great credit for the pitch he has obtained in bird kites, his example on March 7th proving itself most realistic in its deception of the hovering hawk. G. H. Kilshaw and W. Beale out Feb. 28th with 47-in. span r.o.g. tractor and h.l. biplane 33-in. span. The former machine rising off to about 15 feet, but on turning down wind landed too steep and broke propeller. Wind on March 7th greatly hindered work with this machine, and only flights of about 15 seconds were attempted. March 14th, B. Tear and T. M. Bennett out at Stanley Park; duration on 1–1–0–P2 machines, the former with looping model. M. Payne and W. F. Woods putting finishing touches to tractor machines. The most surprising performance of the month goes to the 21-in. span 1–1–0–P2 machine of B. Tear on March 22nd. This machine continually mounted to a height of over 80 feet, and on one occasion, after circling aloft at this height, made off finally in the distant lake. Even after this ducking it flew quite as well as before. The plane is built on the washout wing-tip principle and seems splendidly efficient. It would indeed be encouraging for the builder to try a r.o.g. slightly larger but on the same principle. T. W. Bennett out with kites and 1–1–0–P2. G. H. Kilshaw also flying 1–1–0–P2 and new tractor 33-in. span. Altogether the month has shown considerable improvement in outdoor work.

Scottish Ae.S. Model Ae.C. (5, DOUNE QUADRANT, GLASGOW).

ON April 18th a Sealed Handicap Competition for duration will be held at Paisley Racecourse. Prizes 5*s*., 3*s*., and 2*s*. in goods. Entry fee 3*d*. All entries must be in by Monday, the 13th, to allow the official observers to draw up the handicap. A very handsome cup named "The Arthur Corbett Cup" has been presented to the club by Lord Rowallan, for the club champion in h.l., r.o.g's. and waterplanes each year. Points being awarded for design and construction. The winner to hold cup for one year and receive a silver medal in commemoration of having won same. The competitions will take place as follows:—H.l. distance and duration, May 2nd, Paisley Racecourse; r.o.g's., distance and duration, June 6th, Paisley Racecourse; waterplanes, duration, July 4th, Maxwell Park, The second half of the session having now commenced, intending members can now be enrolled. Subscription for half session ending Sept. 10th, 4*s*. Full particulars from the Hon. Joint Sec., Mr. Jas. C. Balden, 5, Doune Quadrant, Glasgow. April 4th, 11th, 18th, 25th, Paisley Racecourse, h.l., r.o.g's., tractors, &c.

Monthly Report.—A most interesting and instructive lime-light lecture entitled "Balloons, Airships and Flying Machines," was given by Miss Gertrude Bacon on Feb. 25th, before a large audience. On March 18th, Mr. V. E. Johnson's paper on "The Use of Models in the Development of the Aeroplane," was read by Mr. R. M. Neilson on account of Mr. Johnson being unable to be present owing to the Aero Show. Mr. Johnson's absence was a disappointment to the members, as his coming was being looked forward to by all. The paper was listened to with much attention, and it was generally agreed that Mr. Johnson's proposals were on the right lines. Members visited Paisley Racecourse on March 7th, Mr. J. S. Ross having out his new single-screw h.l. mono. with built up body. Mr. J. C. Balden had also a new single-screw h.l. mono., and was successful in making two official Scottish records (also club records) for this type, namely, 52 secs. and 383 yds. On the same date Mr. T. Graham visited Renfrew to give a demonstration of model flying with his h.l. twin-screw and single-screw r.o.g., getting 60 secs. and over several times with the former. On 21st at Paisley Racecourse, Mr. J. S. Ross experimenting with h.l. twin-screw, best duration 45 secs. Mr. T. Graham with model of same type had several splendid flights at a great altitude, his best durations being $75\frac{2}{5}$, $69\frac{2}{5}$, $63\frac{4}{5}$. On March 28th, at Paisley Racecourse, Mr. Ross had out his twin-screw h.l., his best durations being 41, 45 secs. Mr. Balden had out his new single-screw h.l. mono., and succeeded in raising the official Scottish duration record for this type to $71\frac{3}{5}$.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

FLYING meeting this week-end at Woolwich Common, Blackheath, and the Lee Aerodrome.

Monthly Report.—The final round of the South-Eastern Trophy Weight-Carrying Competition was flown last week-end in very boisterous weather, which necessarily considerably reduced the amount of "dead weight" it was possible for the models to carry. As previously announced in FLIGHT, the competition was for models of either the tractor or propeller types, not weighing more than 8 ozs., and capable of rising off the ground under their own power carrying a "dead weight" of not less than 1 oz., the trophy being awarded to the competitor having the highest product of weight carried (in ounces) multiplied by the duration of flight (in secs.). This resulted in a very popular and interesting contest, although many members found that, owing to the models having to make three official flights without suffering any structural damage, and also to undergo a rolling test, which under the weather conditions reigning at the time taxed the chassis to the utmost, they were unable to reduce the weight of their machines to 8 ozs. After several exceedingly sporting heats, the victor was adjudged to be Mr. A. D. Nicholls, whose entry, an r.o.g. hollow spar "A"-frame, of exceptionally clean design, just weighed 8 ozs. This model carried a "dead weight" of 2 ozs. for 24 secs., thus being awarded 48 marks. Mr. Nicholls consequently holds the South-Eastern Trophy for the ensuing quarter, and also receives model aeroplane accessories to the value of 12*s*. 6*d*., kindly presented by Messrs. J. Bonn and Co., Ltd. Mr. A. F Chinnery came second with a twin-propeller hollow spar mono. weighing 8 ozs., and carried $1\frac{1}{4}$ ozs. for 35 secs., being awarded $45\frac{3}{4}$ marks, and receives 7*s*. 6*d*. worth of Messrs. Bonn's accessories, while the third prize (5*s*. worth) was awarded to R. E. Attwooll, whose model weighed $7\frac{1}{2}$ ozs., and carried $1\frac{1}{8}$ ozs. for $27\frac{2}{5}$ secs., being awarded 31 marks. Several members, among whom may be mentioned Messrs. Westwood, Prance, Edwards, Jones, and Brown made praiseworthy efforts. The next South-Eastern Trophy Competition will be for hydro-biplanes, particulars of which will be announced next week. The usual flying meetings have been held throughout the month, and were very well attended. Mr. H. H. Groves has recommenced flying his steam models, and several members anticipate having power machines out very shortly. G. Brown, with his floating-tail mono., a single-prop. model and a twin-prop. biplane, and F. Edwards with an eccentric hollow-spar machine, and a very efficient "A" frame, have been very busy. E. Campbell is experimenting with a twin-prop. "box-kite," and G. H. Westwood's twin-tractor is still "going strong," while his enclosed *fuselage* mono. now emulates Gustav Hamel's feat of turning over sideways, afterwards continuing its ordinary flight path. But the "biscuit" for looping must be awarded to Mr. McLaughlin's single-propeller all-metal mono. which loops and loops and loops until one is tired of watching it. The altitude of these loops is very good and when so minded this model can attain a very good duration. A. F. Chinnery had some nice flights from a gull's-wing mono. and Mr. Prance has exercised a small "A" frame, while Messrs. C. and A. Beere's stud of tractors are still well to the fore, the former's huge "Futurist" mono. attracting considerable attention. Mr. Plummer's 20-oz. tractor monoplane upholds its name for reliability, and his duration model has been doing some fine cross-country work. This member's latest creation—a tractor with a built-up *fuselage* and fitted with a four-bladed screw—has been causing a sensation by flying as a mono. with the plane raised above the *fuselage*, as on the Blériot "Total Visibility" and the Morane-Saulnier famous "Parasol" type of monos., also with the plane in an orthodox position and as a tractor biplane, these adjustments being effected within five minutes. Messrs. F. Dixson and L. Deniss continue to fly their "A" frames and A. D. Nicholls his r.o.g. and water mono. Another "aerial acrobat" is a twin-prop. model flown by G. R. Vaizey, while a very stately "A" frame has been brought out by W. Jones and an exceedingly neat hollow spar monoplane by A. B. Clark. Members should note that subscriptions are now due and are requested to canvass their friends with a view to increasing the club's membership and so broaden the scope of the good work now being accomplished. Pamphlets and any other information will gladly be supplied if written application is made to A. B. Clark (hon. sec.) at the above address.

Southend, Westcliff and Leigh Model Aero Club (96, VALKYRIE ROAD, WESTCLIFF-ON-SEA).

Monthly Report.—The members have had their time fully occupied with their stand at the Southend Arts and Crafts Exhibition. The exhibits covered 90 sqr. ft., showed intelligent construction, and made an attractive exhibit. The club members also formed a party to visit the Aero Show at Olympia.

S.W. Aero Club (86, STOCKWELL PARK ROAD, BRIXTON, S.W.).

A GENERAL meeting will be held shortly to formally constitute the club. The entrance fee will be about 5*s*. Meanwhile, the secretary (*pro tem.*) will be glad to hear as above of more members.

Twickenham Model Ae.C. (74, CLIFDEN ROAD, TWICKENHAM).

APRIL 4th and 5th, Directional control competition, prizes (1st and 2nd) presented by Mr. C. A. Golding. Apr. 11th, r.o.g. Competition. Apr. 18th, Waterplane meeting at Richmond Park.

Monthly Report.—Last month has been very unsatisfactory for flying, but, nevertheless, the club's activities have in no way diminished. Mar. 7th and 8th a change of ground was made, flying being done at Petersham Park. This change proved rather unsatisfactory, there being far too many trees for members who favour the flying-stick type. Messrs. Stagg, Williams, and Rice-Skinner out with tractors, and Messrs. Whyte, Barnes, Knowles, and Maynard with h.l. types. The meeting came to an abrupt conclusion on Sunday by the lack of soul displayed by one of the keepers, who, not appreciating model aero-flying as a scientific pursuit, asserted that "games" were not allowed. On Mar. 14th several members visited Hendon, those flying at Whitton including Messrs. Barnes, Stagg, Whyte, Franklyn, Ord and Knowles. 15th rain. Mar. 22nd Messrs. Stagg, Whyte, Maynard, Ord, Knowles, Barnes, Franklyn, Williams, Jacker, and Rice-Skinner were flying both tractors and flying sticks. Mr. Jacker, although a new member, has the distinction of starting the rage for heavy 'buses owing to the splendid performances of his $15\frac{1}{2}$ oz. machine. On the 28th and 29th, Messrs. Stagg, Maynard, Williams, Barnes, Golding, Franklyn, Clayton and Rice-Skinner out, mostly with tractors. Mr. Knowles with h.l. biplane which flies at a high altitude ending with a good glide. Mr. Golding put up some very pretty flights with h.l. machine, which earned him his 2nd class *brevet*. Mr. Williams has also passed his *brevet* tests.

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Aeronautical Patents Published.

Applied for in 1912.

Published March 19th, 1914.

26,635. I. BELL. Flying machines.

Applied for in 1913.

Published March 19th, 1914.

1,792. A. E., H. L. AND H. D. SHORT. Aeroplanes.
4,673. A. B. THAW. Stabilizers for aeroplanes.
7,927. S. W. HISCOCKS. Rigid type dirigible balloons.
10,705. F. P. PEËL. Speed indicators and package droppers for airships.
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CONTENTS.

Editorial Comment: PAGE
War Law for Aircraft ... 379
The New Secretary for War ... 380
Men of Moment in the World of Flight: Herr Theleu ... 381
Flying at Hendon ... 382
The 100 h.p. Curtiss Flying Boat (with scale drawings) ... 385
The Integral Variable Pitch Propeller ... 388
Royal Aero Club. Official Notices ... 389
From the British Flying Grounds ... 390
Armchair Reflections. By "The Dreamer" ... 392
Three Years' Experience of Flying. By B. C. Hucks ... 394
British Notes of the Week ... 398
Foreign Aircraft News ... 399
Models. Edited by V. E. Johnson, M.A. ... 400
Correspondence... ... 402

EDITORIAL COMMENT.

War Law for Aircraft.

In the April issue of the *Army Review* there appears a most interesting paper on this subject, from the pen of Dr. J. M. Spaight, LL.D., who is a well-known authority on the laws of war. The paper is far too long for us to deal with in all its detail, even if the subject in all its bearings were of sufficient interest to the general body of our readers to justify our so doing, but certain of Dr. Spaight's main conclusions may be of interest to those who are students of the military side of aviation.

Military aviation and the use of aircraft in war are so much in their infancy that the laws governing the whole subject are necessarily vague almost to the point of non-existence, and Dr. Spaight's paper is more directed towards enquiring for a basis of future legislation than discussive of the law as it exists. In common with other authorities, he agrees that the art of aerial navigation has arrived at that stage when it has become essential that the nations should agree upon some sort of common basis for the treatment of belligerent and neutral aircraft within areas in which hostilities are in progress, and that international agreements must be discussed treating of the rights of neutrals and of belligerent aircraft in neutral territories. The subject is a highly technical one, and is mainly interesting to the layman in international law, as showing the enormously important development of flight as shown by the admitted necessity for a consequential revision of the laws of war.

Dr. Spaight discards the theory of the freedom of the air, and holds that the State must retain control of the air above its dominions. That is to say, it must always retain the right to legislate for aircraft using the territorial air, if we may use the term, and must strictly reserve to itself the right to forbid flying over the whole or any part of its territory. Therein he seems to be in conflict with certain other authorities whom he quotes, but in accord with the views of our own Government as expressed in the Aerial Navigation Acts.

How much, indeed, the coming of aircraft has altered the complexion of war, apart altogether from what we know of the services they can render to commanders in the field, may be gathered from this extract from Dr. Spaight's summing up of the questions involved:

"It is probable that the use of aircraft in war will give rise to new problems regarding armistices, *parlementaires*, military occupation, and the form of indicating surrender. There is no reference to any of these questions in the literature of aerial war law, but they are all questions, I think, which, while they will require for their settlement some experience of the new arm in actual war, will have sooner or later to be considered by soldiers and jurists. In armistices, for instance, it would be easy for the aircraft on each side, without going beyond the advanced lines, to spy out whatever is happening within the other lines if the zone of demarcation is not a very wide one. In fact, there will be similar questions to that which arose in 1878, when Todleben erected high observation posts along his lines during the armistice of San Stefano, and Fuad Pasha, fearing that his troops' entrenchments would be overlooked, threatened to open fire on the posts if they were not removed. Perhaps, where the zone of demarcation is necessarily a narrow one, it will be necessary, in arranging the terms of the armistice, for the commanders on each side to agree not to send up their aircraft during the suspension of hostilities.

"The difficulties in connection with *parlementaires* and military occupation will be, in the former case, that an aircraft coming with a flag of truce would have an opportunity of observing the enemy's dispositions, and, in the second, that there may be a tendency to consider a territory effectively occupied if it is visited by an occasional aircraft representing the authority of a, perhaps, far distant enemy commander. It will probably be found necessary either to declare aircraft ineligible as *parlementaires* or to enforce a strict rule that they must land (and the airman be blindfolded) at a considerable distance outside the lines of the troops to whom the flag of truce is sent; and military occupation will probably not be considered effective unless the aircraft are supplemented by some land forces—mobile columns, &c."

The paper is an absorbingly interesting one, which will certainly well repay close study by all who happen to be interested in this exceedingly wide question.

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The New Secretary for War.

Of the political events of the past week or two, and of the situation which led to the retirement of Col. Seely from the position of Secretary of State for War, there is no need for us to speak. This is not a political journal, and, therefore, has no concern with these matters. It is permissible, however, for us to express some little regret at the manner of Col. Seely's retirement from office, for the reason that, although we have during his term at the War Office often had occasion to criticise the policy, of which he was the responsible director, with regard to matters connected with aerial defence, we nevertheless feel that he had really come to regard the subject with sympathetic appreciation of the necessities, and was doing his best to evolve a workable system. It may be unfortunate that under our present system of government it is the Minister who has to shoulder the responsibility for acts of commission or omission, which have often to be given, for political or economic reasons, an atmosphere of being other than they are in fact—unfortunate, that is from the point of view of the Minister concerned. As a consequence he has to take the blame for a good many things the criticism for which ought more properly to rest upon other shoulders, but on the other hand he will often receive praise for things which are not initiated by him and of which he may possibly not even approve. In the matter of aviation, however, we believe that Col. Seely really took a keen personal interest, and even if at times he found it expedient to enunciate statements which did not always coincide with the facts, we nevertheless credit him at heart with the sincere desire to set our aerial defences on a satisfactory basis. To that extent we can regard his retirement as a national loss—not irreparable, perhaps, but a loss nevertheless.

We doubt not that the Prime Minister, who has taken over the vacant office, will manifest the same keen interest in the subject that, for the purposes of this journal, most concerns us. There is one matter that we would impress most strongly upon Mr. Asquith, and that is that he should take to heart the words we addressed to his predecessor in our Editorial article of the 28th ult., with regard to the accidents which have happened in the Military Wing of the R.F.C. In the officers and men of that branch of the Service, right up to the head of this new great national asset, we have a magnificent *personnel*, keen, skilful, and prepared to encounter any risks in the service of the State. We cannot afford to allow them to run unnecessary risks by supplying them with machines that are faulty in design or construction or which have been repaired in an unskilful and slipshod manner. They risk enough for us as it is, and in return it is surely up to the country to see that they are given nothing but the very best and soundest equipment that can be obtained; and if, unfortunately, similar accidents should in the future occur arising out of similar causes to those we commented upon in the article mentioned, we do not want to hear again that *someone unknown* carried out a faulty repair at some time and place both of which are undiscoverable. Such things as this must give rise to the gravest of misgiving with regard to the organisation existing in the constructional service. Apart from any question of preventing such occurrences in future, we would remind the new War Minister that those to which reference has already been made have not been satisfactorily explained, nor has any responsibility for them been fixed. We trust that Mr. Asquith will hurry on the enquiry which his predecessor in office announced would be held.

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ROBERT THELEN.

Not only is Robert Thelen one of the most prominent of German pilots, but he is also one of the pioneers, for his certificate is numbered 9, and he was the third to learn on a Wright biplane in Germany. For a considerable time past he has been flying the Albatros biplane, and it is in order to demonstrate this type of machine to the British Government officials that he is at present in England. It will be recalled that he holds the world's height record for pilot and three passengers with 3,750 metres. THE HAWK.

Major Gordon, R.F.C., N.W., flying Short 42 at the Leven Air Station. A snap from the passenger's seat at 2,000 ft.

Lieut. Oliver, R.F.C., N.W., arriving at Leven from Dundee on Borel 89 in dirty weather.

MEN OF MOMENT IN THE WORLD OF FLIGHT

HERR THELEN.

FLYING AT HENDON.

SOME more looping demonstrations took place at Hendon on Thursday afternoon of last week, in fact the proceedings were opened punctually at 3 o'clock with a looping display by R. H. Carr on the Grahame-White tractor biplane "Lizzie." He made his first two loops at a height of about 1,000 ft., following these up with three more at altitudes varying from 800 to 600 ft. Closely following on Carr's ascent came L. A. Strange on the G.-W. 'bus 109, Louis Noel with a lady passenger on the Maurice Farman, and W. Birchenough on the other G.-W. 'bus. After Strange had made his flight he handed the 'bus over to N. Howarth, who put up several circuits of the aerodrome in excellent style. Noel then made two more flights on the Maurice Farman, whilst E. F. Norris went up on 'bus 109, and Birchenough took up a passenger on the other 'bus. Another flight was then made by Howarth on the 'bus, whilst Carr put up some more looping on "Lizzie." He made four separate loops at heights varying from 800 to 600 ft. In the meanwhile F. W. Goodden was testing a new British-built Caudron fitted with a 60 h.p. Anzani engine, and R. J. Lillywhite and Birchenough, the latter with a passenger, went up on the 'buses. J. L. Hall next came out on his 50 h.p. Avro, and Birchenough climbed to an altitude of 3,000 ft. on the bi-rudder 'bus, and switching off his engine at this height he made a splendid descent with his propeller only revolving very slowly. Strange then ascended on "Lizzie," and climbing to a height of 800 ft. he executed a double loop, and a single one shortly after, and then descended. Hall now started a series of passenger flights on the Avro, at one time taking up two together. Carr took over "Lizzie" once again, and made three more loops, after which he took up a passenger, whilst Noel made a combined switchback and pancake glide on the Maurice Farman with the writer as passenger. By now the evening was advancing, but several more flights were made by Lillywhite, M. Osipenko, Birchenough, and R. T. Gates on G.-W. 'buses. Noel on the Maurice Farman, and several of the 35 h.p. Deperdussin monos. were hopping about piloted by Barrs, Millar, and Whitehouse, whilst P. Marty was testing an old 50 h.p. Blériot.

The feature of the April Meeting last Saturday was the speed handicap for the London Aerodrome Cup, in which some of the newer G.-W. pilots distinguished themselves. Earlier in the afternoon the weather was somewhat overcast and a light south-westerly breeze made it ideal for flying, but whether it was owing to the omnibus strike at Hendon or the Home Rule demonstration in Hyde Park, there was not such a large attendance as usual. The proceedings were opened at about 3 o'clock with some exhibition flights by Louis Noel with a passenger on the Maurice Farman, L. A. Strange, W. Birchenough, J. M. Cripps and R. J. Lillwhite on G.-W. 'buses, J. L. Hall on his 50 h.p. Avro and R. H. Carr on "Lizzie," who executed a loop at about 800 feet. F. W. Goodden then came out on the new British-built 60 h.p. Caudron and put up a very fine flight. Three ladies then went up as passengers, two going up with Birchenough on the bi-rudder 'bus and one going with Goodden on the Caudron; Carr also took up a passenger on "Lizzie," and E. F. Norris made a solo flight on 'bus 109. A start was then made for the speed handicap, which was flown in two heats of four laps each and a final of six laps. As there were more pilots than machines it had to be arranged that the losing machines in the first heat would be flown in the second by other pilots. The first heat was made up as follows: J. M. Cripps on 'bus 109 (2 mins.); L. A. Strange on 'bus 107, which has just been overhauled (1 min. 52 secs.); W. Birchenough on the bi-rudder 'bus (1 min. 37 secs.); F. W. Goodden on the 60 h.p. Caudron (35 secs.); and R. H. Carr on "Lizzie" (scratch). Cripps maintained the lead until towards the end of the last lap, when he was passed by Goodden, who came in first by one second. Birchenough, who passed Strange on his second lap, came in third, 1 sec. behind Cripps, and 6 secs. in front of Carr. Strange's renovated 'bus was not so fast as was expected, so he had to bring up the rear. Four started in the second heat, N. Howarth on 'bus 107 (2 mins. 25 secs.); R. J. Lillywhite on 'bus 109 (2 mins. 2 secs.); R. H. Carr on the bi-rudder 'bus (1 min. 33 secs.); and J. L. Hall on his 50 h.p. Avro (scratch). The finish of this heat was not so exciting as the first, as the wind had increased considerably, which rather upset the handicapping. Hall came in an easy first, with Lillywhite, who flew with considerable skill, second, and Howarth, another new pilot who flew his first race in fine style, third, whilst Carr followed only ⅔ sec. behind. The finish of the last heat proved quite exciting, for Hall was just about to pass Lillywhite—who flew even better than before—on the home straight, when the control wire of the throttle broke, and he had to make a very hurried landing right opposite his hangar, fortunately without mishap. Lillywhite, therefore, came in first, thus winning the Aerodrome Cup in his first race. Goodden found his handicap of scratch too severe, and only just managed to obtain second place from Cripps by 5 secs. After the race, Goodden demonstrated to the writer the flying qualities of the new Caudron by taking him up as passenger. We climbed to an altitude of about 1,000 ft. in a remarkably short time, and very steadily, in spite of the fact that the wind was by now unpleasantly puffy. The machine is also very free from vibration, and judging from the zig-zag *vol plané* by which we decended it glides extremely well. A few more flights by Goodden and Hall brought the meeting to a close, but at 6.50 p.m. Gustav Hamel arrived accompanied by a passenger on his 80 h.p. Morane-Saulnier, which had been "spring cleaned" and looks like a new machine with its white wings. On landing, the machine very nearly came to grief, for it had all but come to a standstill when it swerved and made for the enclosure, only stopping within a foot or so of the railings. Hamel informed us that he and his passenger, Capt. Robin Duff, had left Bath just under an hour ago, and had had an extremely pleasant journey. The distance from Bath to Hendon is nearly 100 miles, so that they had made very good time.

Some fine flights were put up on the Sunday afternoon, including looping displays by R. H. Carr on "Lizzie," and Gustav Hamel on his Morane-Saulnier. F. W. Goodden made a splendid 20-minute flight on the new 60 h.p. Caudron, reaching an altitude of 9,000 ft. During the afternoon Claude Grahame-White carried as passengers on the Maurice Farman, the Countess of Essex, and Miss Ethel Levy. Several other flights were made by Louis Noel on the Maurice Farman, W. Birchenough and L. A. Strange on G.-W. 'buses.

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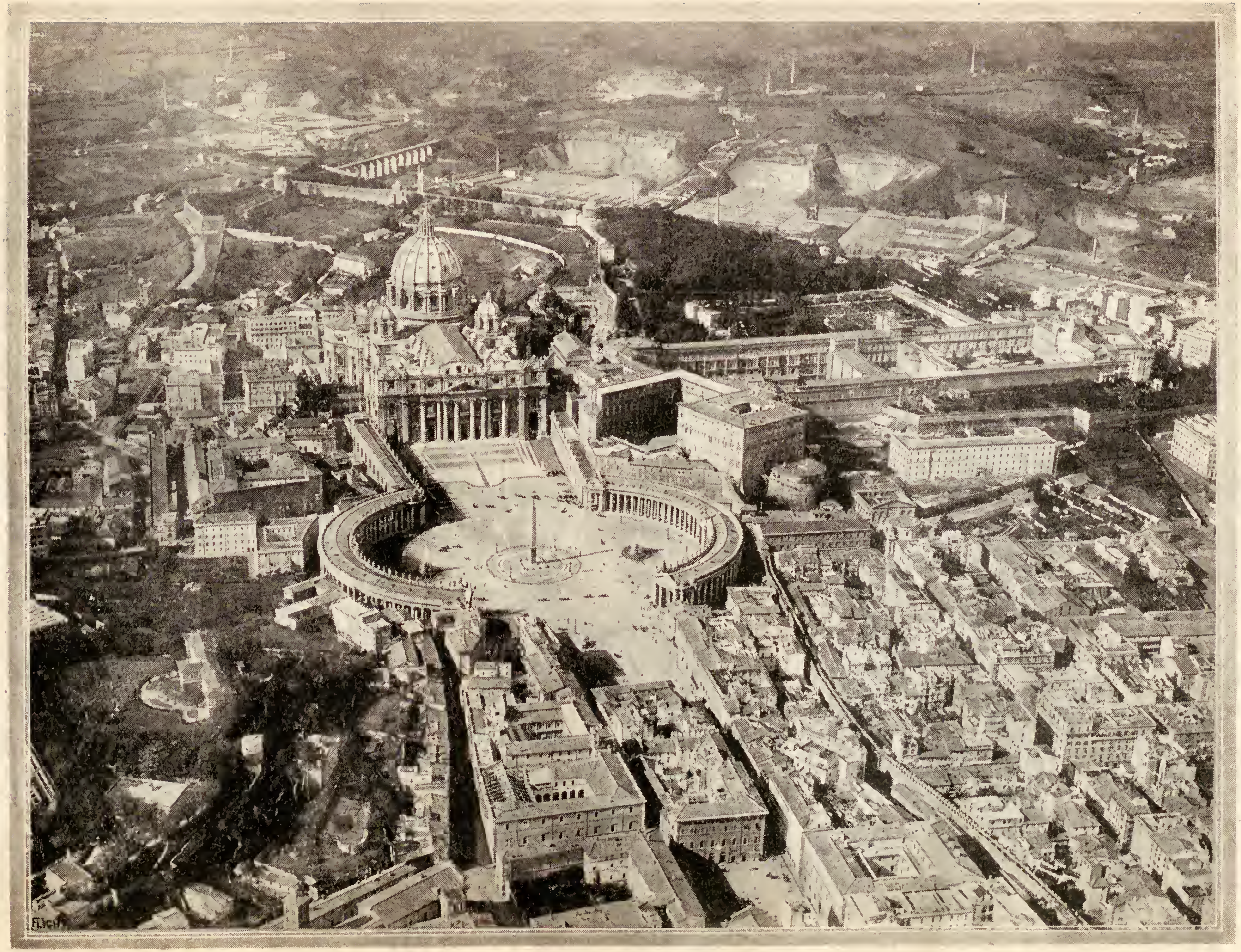
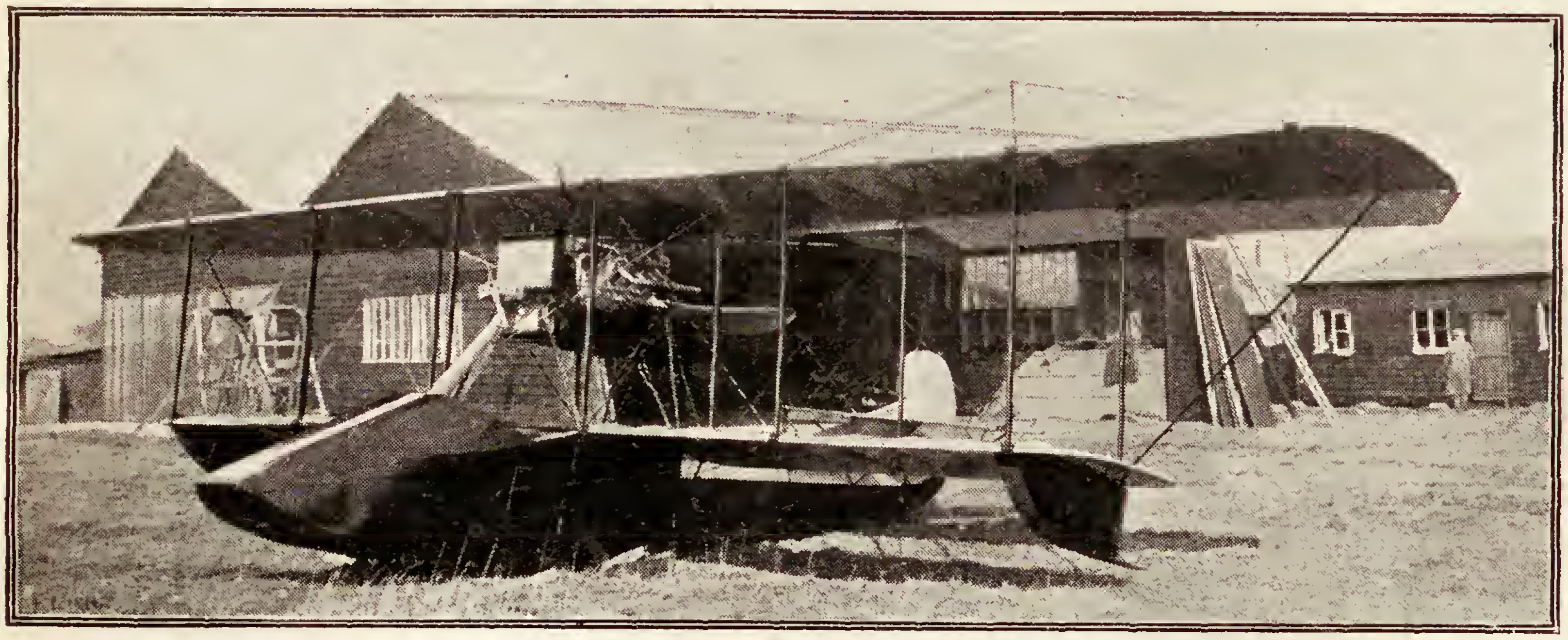
A start for a cross-country race at Hendon Aerodrome with the opening of the present season.



A splendid view of Rome from above, as seen from the Forlanini airship.

THE 100 H.P. CURTISS FLYING BOAT.

WE have from time to time had occasion to describe various types of Curtiss flying boats. The subject of our scale drawings this week is the 100 horse-power English Curtiss flying boat, the rights for which, it will be remembered, are held by Messrs. White and Thompson, of Bognor. Since his return from the States, Lieut. J. Porte has, we understand, been testing this machine, and she appears to be well up to the usual high standard of sea and air worthiness which has made these machines so popular in America. The boat itself is of the usual well-known Curtiss type, having a rather wide nose and tapering to a short vertical knife's edge at the stern. In the nose the bottom of the boat is perfectly flat, running gradually into a V bottom at the step, whilst the rear portion of the hull behind the step is flat. The sides of the boat slope outwards in the front portion, and there is an unusually high freeboard, which protects the occupants against water spray. From the nose of the boat a superstructure forming a wind shield runs back to a point just in front of the pilot's seat.



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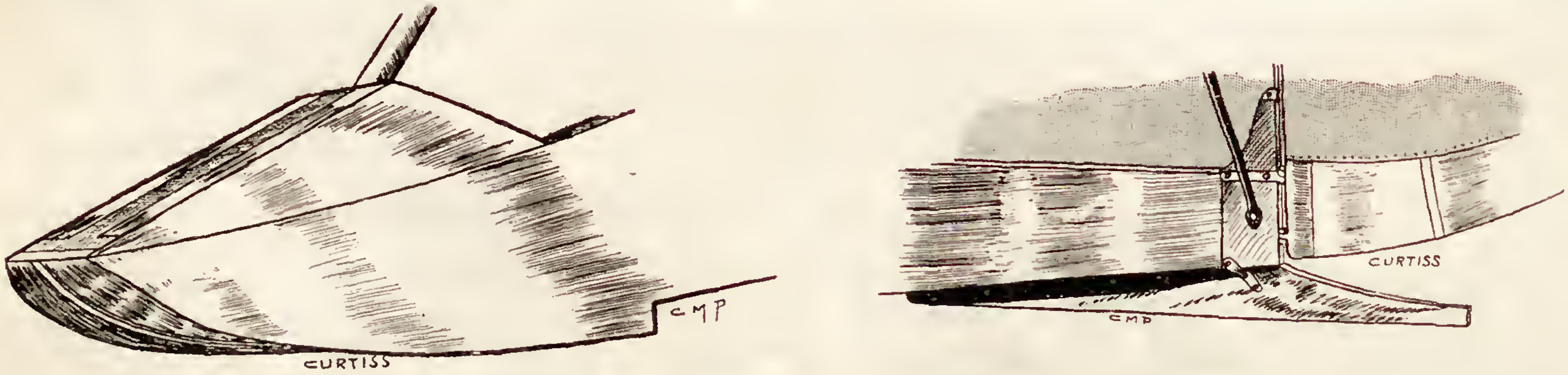
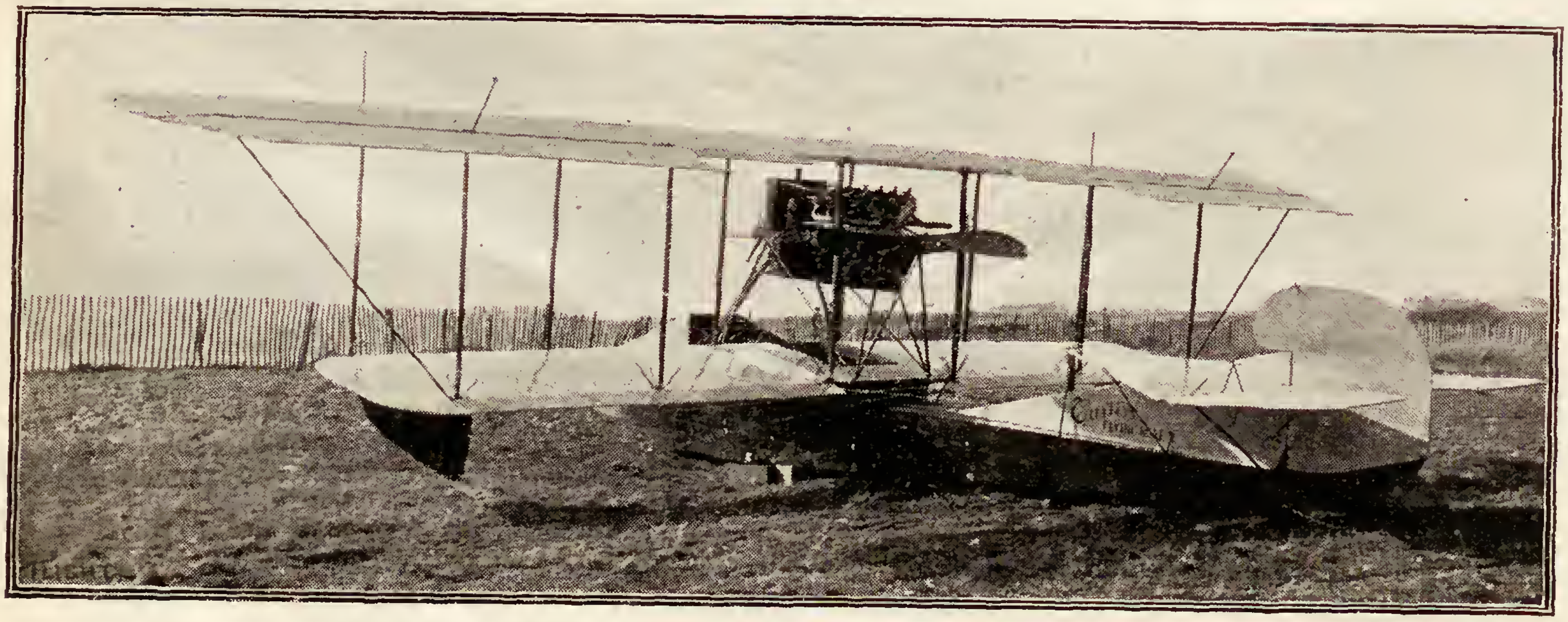
THE 100 H.P. CURTISS FLYING BOAT.—Three-quarter view from in front.



The nose of the Curtiss flying boat, and on the right the tail skid. "Flight" Copyright.



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THE 100 H.P. CURTISS FLYING BOAT.—Three-quarter view from behind.

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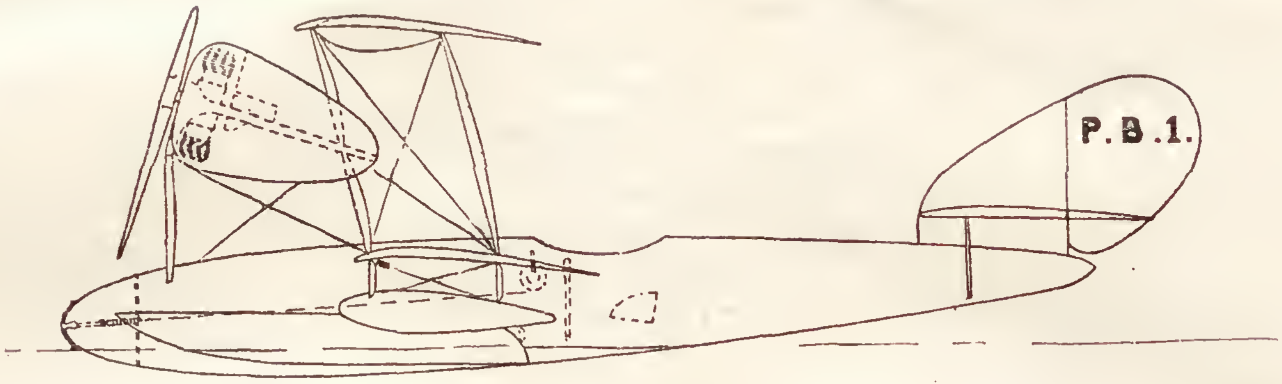
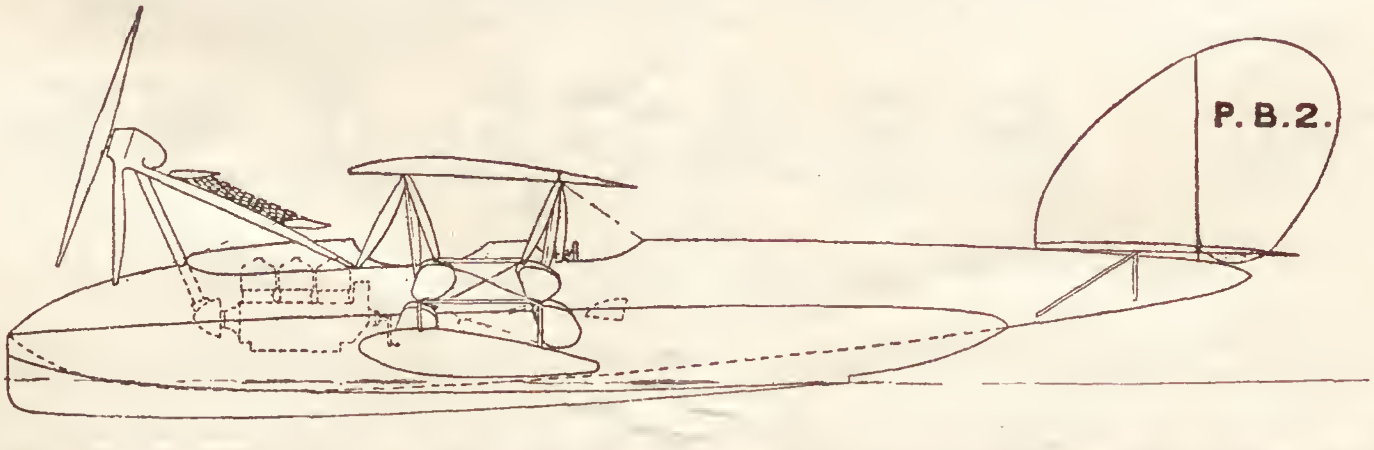
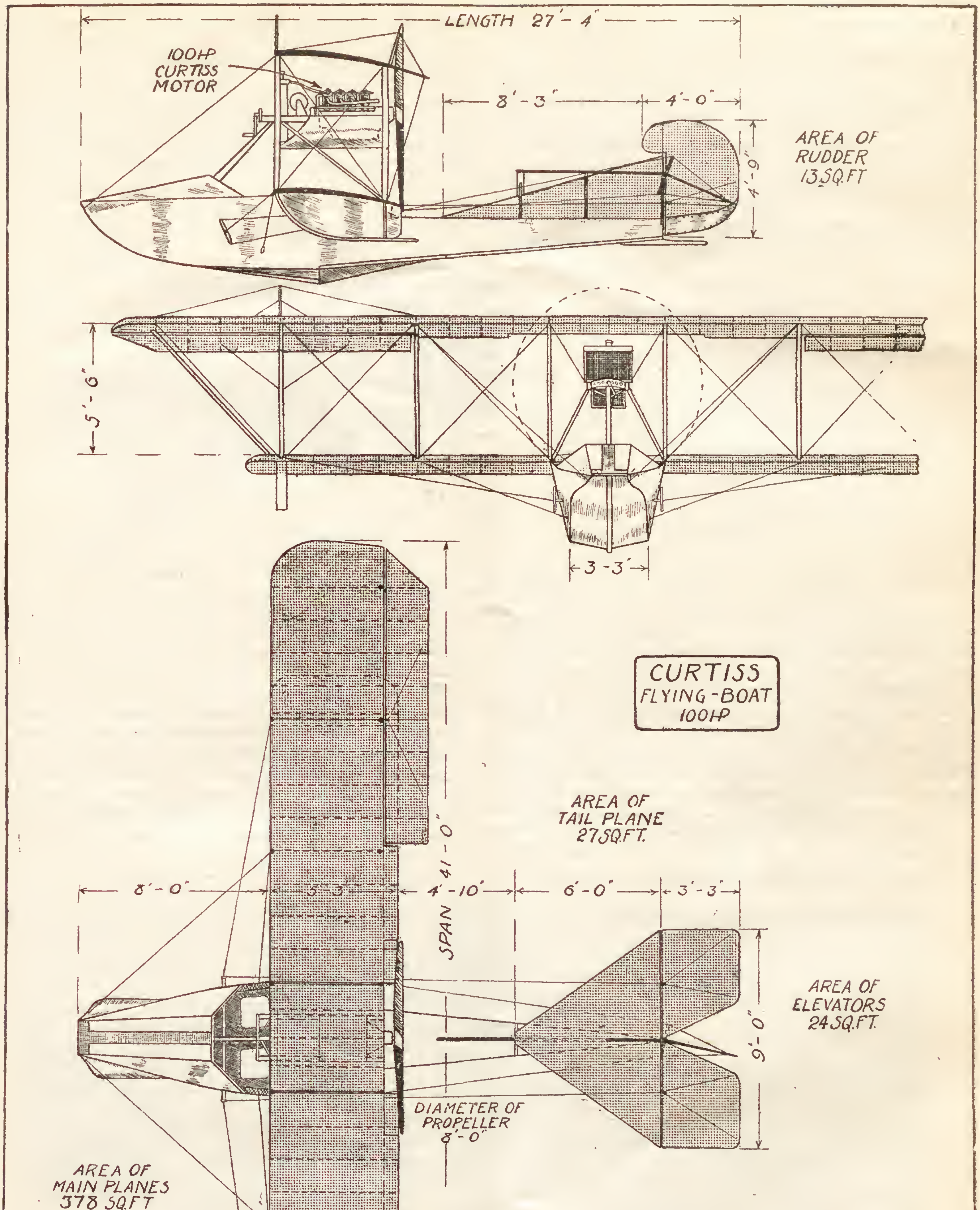
PEMBERTON BILLING



AMONG the interesting features common to all types of "SUPERMARINE" may be mentioned the hull, which, being circular in section, combines lightness with strength; the auxiliary floats, also circular in section, and so disposed as to adapt themselves automatically by a backward motion to the undulations of the water, thus minimising directional instability without loss of lateral support; the inclination of the propeller to the horizontal, thereby lowering the thrust and permitting the use of a propeller of reasonable diameter without fear of breakage by water contact, and minimising the variation of trim when the engine is switched on and off, the P.B. "Trinity" Propeller, a three-bladed air screw of unique construction; the P.B. "Supermeter," which greatly facilitates alighting by warning the pilot when his craft has approached within fifteen feet of the alighting surface, and giving continuous readings until the machine is at rest; and the ground tackle, which both in the case of casting and weighing is operated from the pilot's seat.



SOUTHAMPTON ENGLAND.



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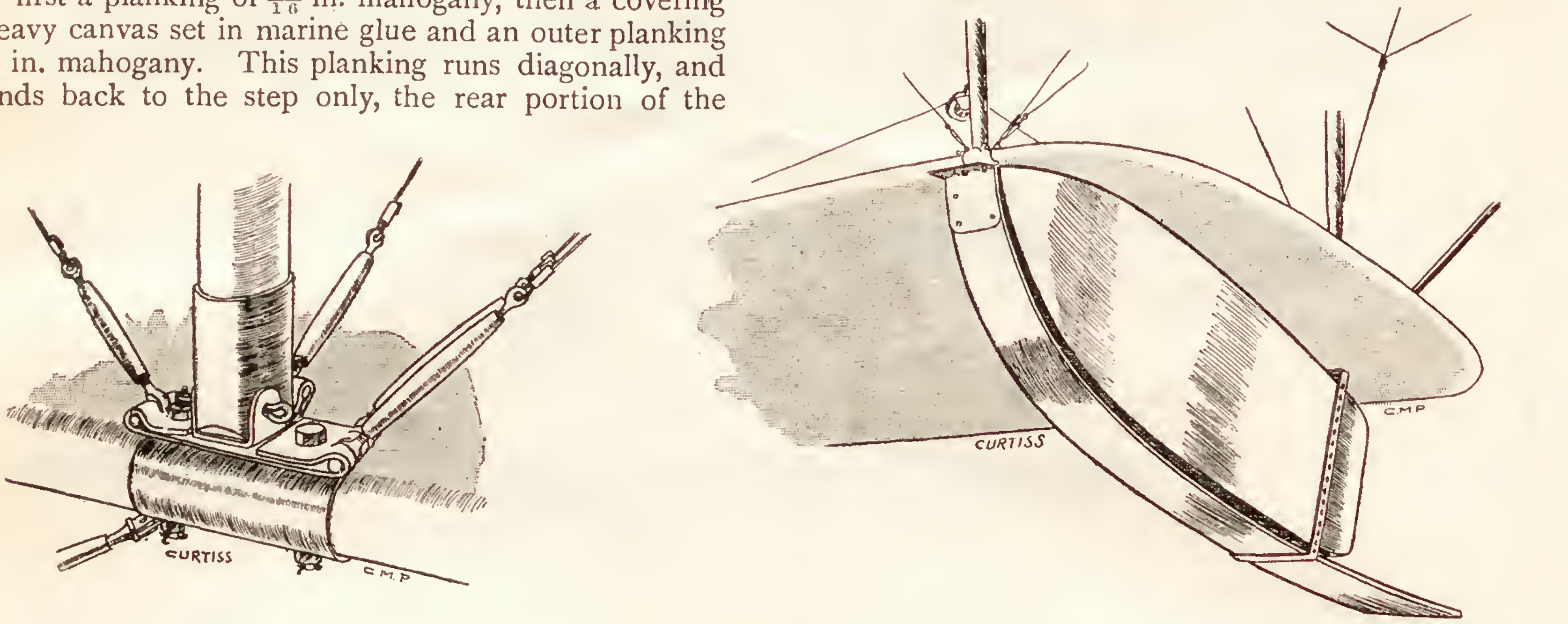
THE 100 H.P. CURTISS FLYING BOAT.—Plan, side and front elevation to scale.

Constructionally the boat is built up over a framework of ash, spaced on three-inch centres, mortised at the corners, fitted with copper corner straps and each frame securely fastened with sixteen copper rivets. Longitudinal ribs or battens of one-inch square ash are run throughout the whole length of the hull. The sides of the boat are covered with a planking consisting of two layers of mahogany, whilst the bottom is triple-sheathed with first a planking of $\frac{5}{16}$ in. mahogany, then a covering of heavy canvas set in marine glue and an outer planking of $\frac{1}{4}$ in. mahogany. This planking runs diagonally, and extends back to the step only, the rear portion of the hull taking only a slight part of the load in rising and alighting. Eight bulkheads divide the boat into watertight compartments, so that it is practically unsinkable, for any two of the compartments are claimed to possess sufficient buoyancy to keep the entire machine afloat.

The workmanship as well as the finish of the boat is of a very high quality, and one regrets that Messrs. White and Thompson could not find the time to exhibit the machine at the recent Olympia Aero Show, where it would certainly have attracted a great deal of attention.

Two sets of seats are provided—one set for the pilot, or rather pilots, arranged side by side in front of the leading edge of the lower main plane, and another set between the leading edge and the rear spar at the lower main plane. The pilot's cockpit is unusually roomy and comfortable, and the view obtained from there is practically unobstructed in all directions. Dual control is fitted, and consists of two rotatable hand wheels, each mounted on a short forked arm which joins the vertical tubular column. This in turn is mounted on a transverse rocking-shaft projecting outside the sides of the boat, where are carried the crank levers from which cables run to the elevator. The rudder is operated by means of a pivoted footbar.



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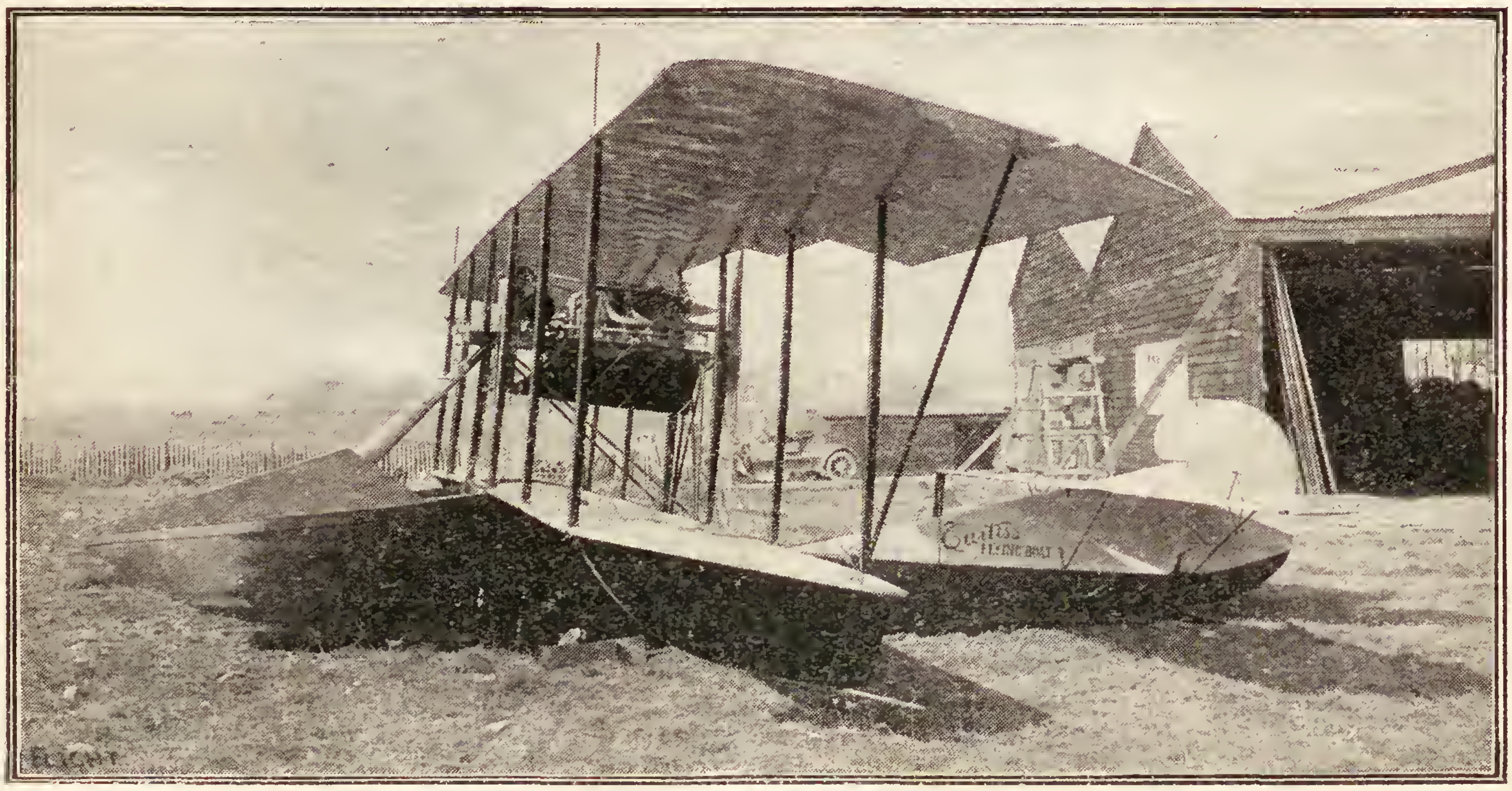
One of the inter-plane strut sockets of the Curtiss flying boat, and on the right one of the wing tip floats.

The lower plane is bolted to the gunwales of the boat from which it is stayed by means of cables. Six pairs of inter-plane struts of spruce separate the main planes, of which the upper one possesses a considerable overhang, the weight of which is taken, when the machine is at rest, partly by a steel tube running from the lower end of the outer rear strut to the end of the extension and partly by cables passing over a king post above and on the front spar of the wing.

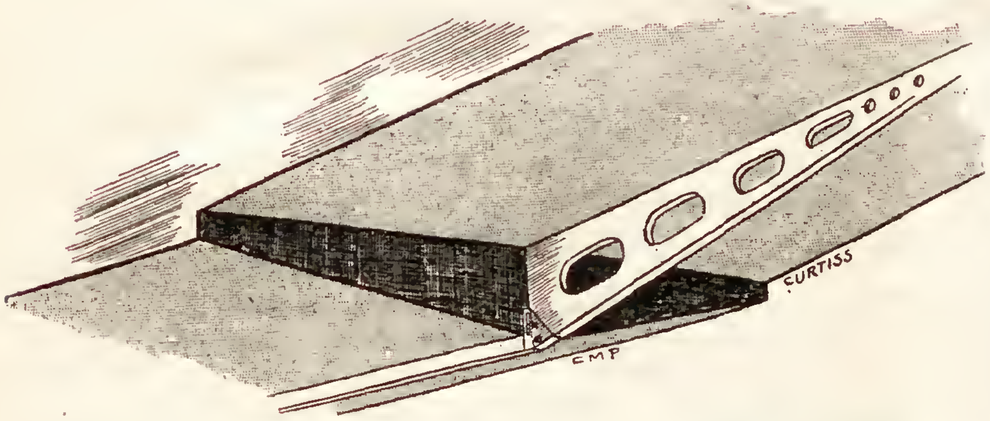
It will be remembered that the usual Curtiss lateral



THE 100 H.P. CURTISS FLYING BOAT.—Side view. "Flight" Copyright.

control consists of two *ailerons* mounted on the struts in the gap between the planes. In this machine *ailerons* of a more orthodox type are fitted to the trailing edge of the outer portion of the upper main plane. From the accompanying scale drawings of the machine it will be seen that the two main spars are set very far apart, the front one forming the leading edge whilst the rear one is placed very close to the trailing edge of the wing.

Metal floats of the shape shown in one of the accompanying sketches prevent the wing tips of the lower main plane from cutting under. The bottom of these floats is protected against too harsh a contact with the water by means of a spring board which is secured to the nose of the float, but the rear end of which is allowed a certain amount of play in the manner shown in the sketch.



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View from underneath of the step in the Curtiss flying boat.

An extension of the stern post of the hull serves as a support for the partly-balanced rudder and the vertical fixed tail fin. The lower portion of the rudder is covered with wood and copper bound in order to allow of steering the machine at low speed on the water. A tail skid or skeg protects the tail planes when the machine is being beached. The fixed tail plane, which is triangular, as seen in plan, is carried on a structure of steel tubes secured to the rear portion of the hull, and to its trailing edge is hinged the divided elevator.

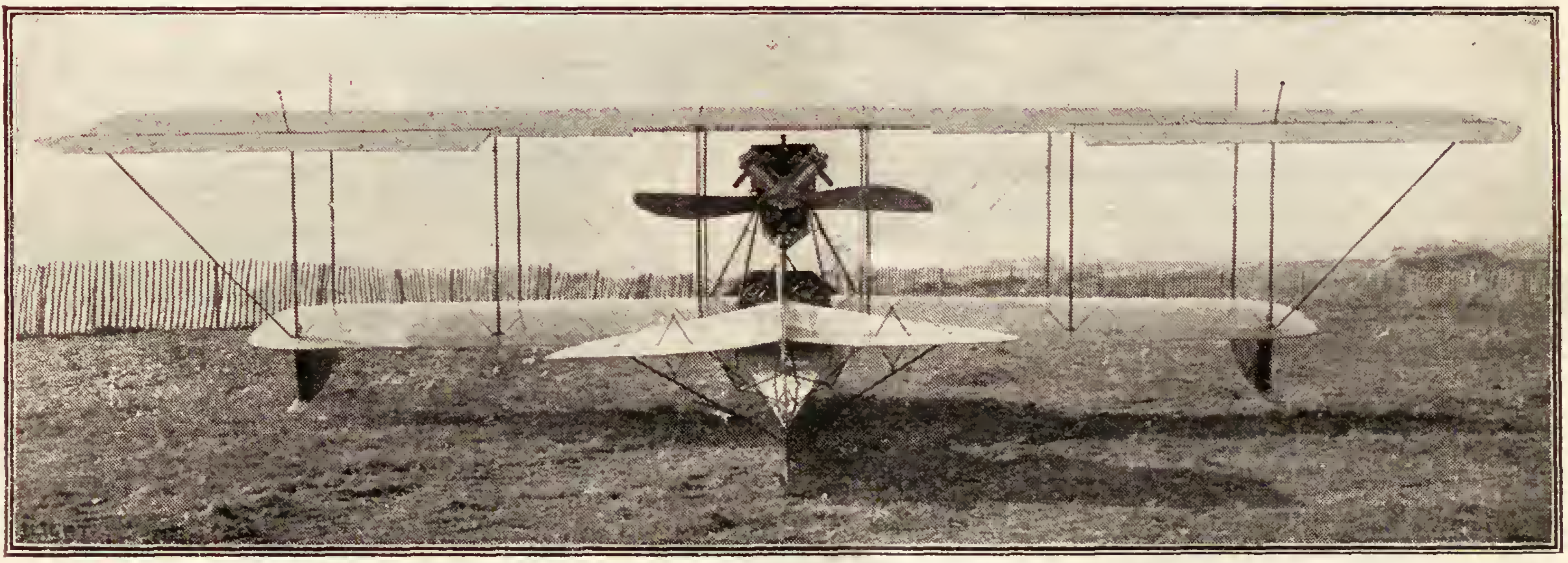
An outside keel in the form of a wooden strip runs along the entire length of the boat, thus protecting the bottom when running the machine up on the beach, and it is even possible, we understand, to run the machine from the hangar down to the beach by taxying along the grass on this keel.

The engine, a 100 h.p. 8-cylinder V-type Curtiss, is mounted on two longitudinal ash bearers supported on a structure of welded steel tubing between the main planes. It drives directly a Curtiss propeller situated immediately behind the rear spar of the upper plane, the trailing edge of which has been cut away to provide clearance for the propeller. A very stout oblique strut runs from the engine bearers down to the bottom of the forward portion of the boat, the purpose of this strut obviously being to transmit the momentum of the engine to the boat on alighting.

The main petrol tank is situated in the boat under the rear pair of seats, whence it is forced to a small service tank between the radiator and engine by means of a small pump driven off the engine. The radiator is mounted immediately in front of the engine on extensions of the longitudinal engine bearers, and projecting in front of it is a starting-handle by means of which the engine can be started from the pilot's seat. It should be noted that this starting-handle does not clear the oblique strut, as it would not be possible from the pilot's seat to give the starting-handle a whole turn. For starting the engine the handle is simply put in a position slightly above the horizontal and pulled down smartly, an operation which is generally sufficient to get an explosion in one of the cylinders.

The speed of the machine with full load is about sixty miles per hour, whilst we understand it is possible to taxy it along the water at any speed up to forty miles per hour.

When taxying at this speed only a small portion of the hull just in front of the step is in contact with the water.



THE 100 H.P. CURTISS FLYING BOAT.—View from behind. "Flight" Copyright.

* * *

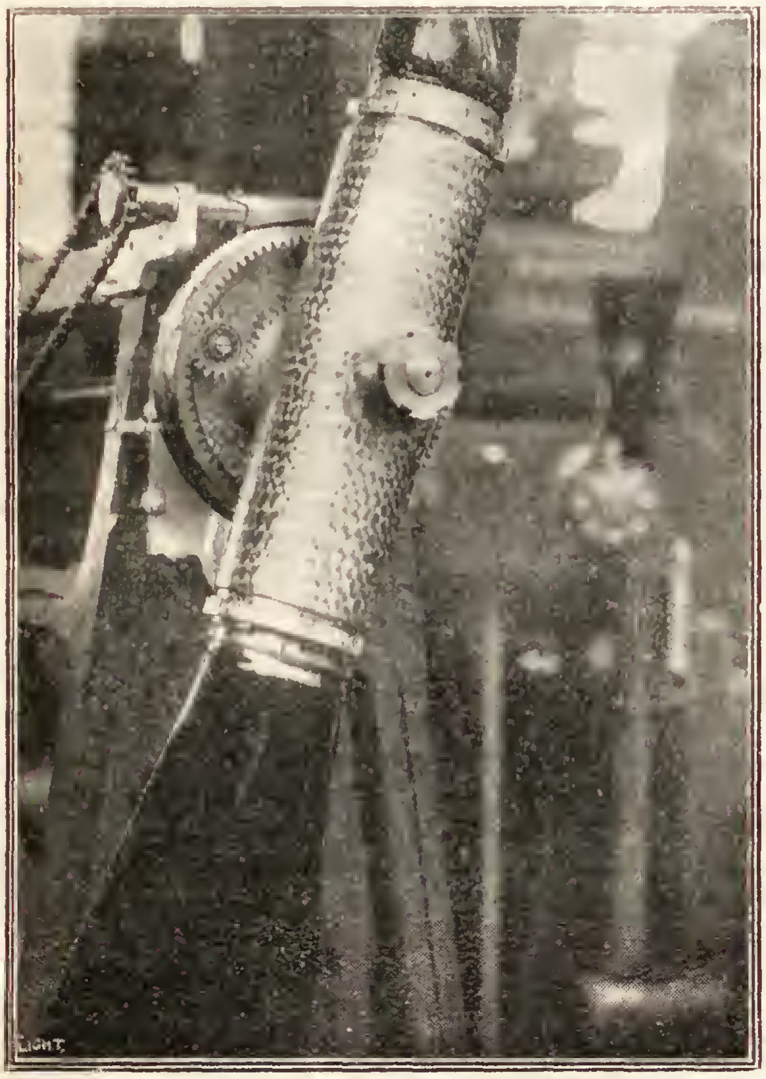
Easter Monday Aeroplane Race at Brooklands.

Twelve entries (six from the Vickers Company) have been received for the Easter Aeroplane Handicap to be flown at Brooklands on Easter Monday, including a "tabloid" Sopwith biplane (C. H. Pixton), an 80 h.p. Sopwith biplane (F. P. Raynham), the new Martinsyde monoplane (Mr. Waterfall), the new 100 h.p. Vickers gun-carrying biplane (R. H. Barnwell), the Sunbeam-engined M. Farman (J. Alcock), and a Bristol biplane (F. W. Merriam).

Extensions at Brooklands.

There has been a great demand for sheds recently at Brooklands, the Blériot Co. (whose factory is now working at full pressure) leading the way with a further batch of five, whilst Mr. Kny has secured more accommodation for his D.F.W. and other machines, and Messrs. Martin and Handasyde, the Bristol Co., and the Perry-Beadle Co. have likewise taken over more hangars. It will thus be seen that the prospects for the coming season are very bright.

THE INTEGRAL VARIABLE PITCH PROPELLER.



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THE INTEGRAL VARIABLE PITCH PROPELLER.—Note the extremely compact form of the pitch-adjusting mechanism.

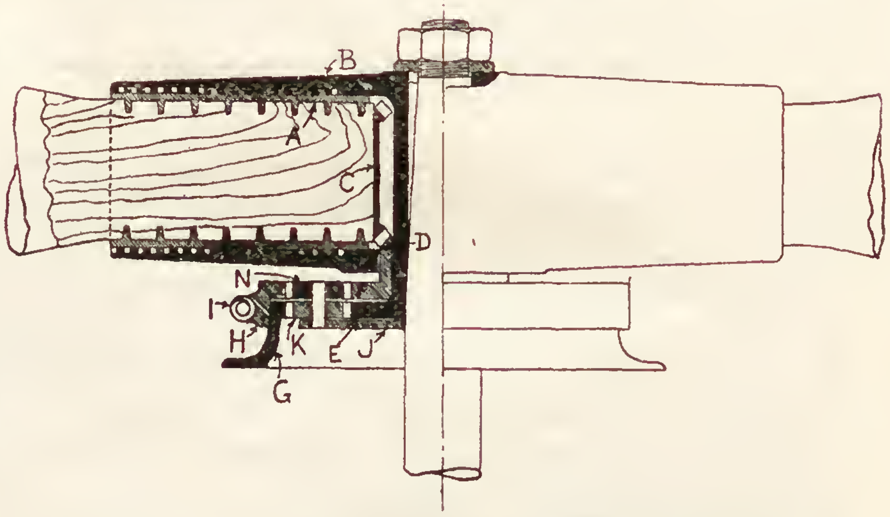
An exhibit of considerable interest at the recent Aero Show at Olympia was to be seen on the stand of the Integral Propeller Co.—the new variable pitch propeller, which is intended principally for use on airships. In this propeller the blades are not formed in one piece with the boss, as is usual, but are mounted in a metal hub keyed on to the propeller shaft. The details of the mechanism employed are shown in the accompanying drawing, from which its compactness is clearly apparent.

A steel sleeve, A, threaded on the exterior, is rigidly attached to the end of the blade by means of the projections into the wood shown in the sketch. This sleeve is screwed into the interior of the boss, B—mounted on the driving shaft, and at the end of the blade a bevel pinion, C, is fitted, meshing with the second bevel wheel, D, which is concentric with the axis of rotation. A double planetary system of gearing then connects the tooth rim of the boss, at E, and the pinion, D, at F, with two annular toothed wheels, H and G—the two sets of planet wheels being mounted upon a floating plate, J, whilst a worm gear, under the control of the pilot, is fitted so as to mesh with the wheel, H. The annular wheel, G, is rigidly attached to the crank-case of the motor or other fixed portion of the machine.

When the propeller is driven by the engine the wheel, D, is carried round by the wheel, C, and with the hub and wheel, E, are rotated bodily as one piece about the axis of the driving shaft, thus causing the wheels, K and N, to rotate on their axes and roll round the interior of the annular wheels, G and H, at a reduced speed. From the fact that the wheels forming each pair of gears, E and F, G and H, and K and N, are of the same diameter, this rotation does not produce any change in the relative position of the blade to the plane of rotation, and as the axis of the sleeve, A, is coincident, or nearly so, with the line of centre of pressure on the blade surface for all working angles of incidence, there is little or no tendency for the air pressure to cause the rotation of the sleeve. The gear wheels employed therefore serve simply to locate the blade in the hub, and are not subjected to heavy loads due to the air pressure.

To vary the pitch of the propeller, the worm, I, is rotated (this can be and is readily done whilst the propeller is in motion), which causes the relative position of the wheels, H and G, to be altered. Since K is meshed with G—a fixed wheel—K and E receive no movement, due to the angular displacement of H, but N is made to rotate about its axis, and causes F to move C through D relative to the hub, B, thus altering the angle of the propeller-blade. It will be observed that the rotation of the sleeve and blade by the wheel, D, tends to withdraw the teeth in C from those in D; but its effect is quite negligible, as the angle of movement is so small and the thread on the exterior of the sleeve sufficiently fine, that in practice the amount of withdrawal only amounts to about one-hundredth of an inch.

The advantages to be derived from the use of this propeller for airship work are readily obvious, as, by reversing the propeller, it permits of the employment of the engine to arrest the forward motion of the airship; whilst at high altitudes, where the density of the atmosphere is reduced, it is possible to increase the pitch in order to maintain the engine revolutions and thus increase the speed of the vessel. It is understood that this particular form of the Integral propeller has already been adopted by a large number of airship constructors in the place of their ordinary propeller, which has been so extensively employed on aircraft of all types throughout the world.



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Sectional drawing showing the internal mechanism of the Integral variable pitch propeller.

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Flying School for India.

Replying to a question in the House of Commons on Tuesday, Mr. C. Roberts (Under Secretary for India) stated that an aviation school had been established at Sitapur. The present personnel included a commandant and three other flying officers, with the necessary medical and subordinate staff. There were three aeroplanes, and five others had been ordered. The immediate object was to gain experience in aviation under Indian conditions with a view to the eventual expansion of the school as a training establishment. One Ruling Chief, the Maharaja of Rewa, had generously presented an aeroplane.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A meeting of The Committee was held on Tuesday, April 7th, 1914, when there were present: The Marquess of Tullibardine, M.V.O., D.S.O., M.P., in the Chair, Capt. R. K. Bagnall-Wild, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Major J. D. B. Fulton, C.B., R.F.A., Prof. A. K. Huntington, Major F. Lindsay Lloyd, Mr. F. K. McClean, Mr. J. T. C. Moore-Brabazon, Mr. C. F. Pollock, Mr. Mervyn O'Gorman, C.B., Com. C. R. Samson, R.N., Mr. A. Mortimer Singer, and the Secretary.

Election of Chairman.—On the motion of Prof. A. K. Huntington, seconded by Mr. A. Mortimer Singer, the Marquess of Tullibardine, M.V.O., D.S.O., M.P., was unanimously elected Chairman of the Club.

Election of Vice-Chairman.—On the motion of the Marquess of Tullibardine, M.V.O., D.S.O., M.P., seconded by Mr. C. F. Pollock, Col. H. C. L. Holden, C.B., F.R.S., was unanimously elected Vice-Chairman of the Club.

New Members.—The following new members were elected:—George G. Astley, R. W. B. Billinghurst, Lord Carbery, Edwin C. Carnt, Charles E. Castellan, Lieut. Thomas Scholes Creswell, Robin G. V. Duff, John H. Edgelow, Lieut. Com. Harry Macleod Fraser, R.N., Lieut.-Col. John E. G. Groves, George Marchetti, Eugene H. Posen, T. Foster Rutledge, G. Farquhar Singer, William Chalmers Stewart, and Pierre Verrier.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

751 Lieut. Henry Allen Edridge-Green (6 D.C.O., Middlesex Regt.), (Grahame-White Biplane, Grahame-White School, Hendon). March 23rd, 1914.

752 Jack Benjamin Graham (Grahame-White Biplane, Grahame-White School, Hendon). March 23rd, 1914.

753 Cyril Frederick Lan-Davis (Avro Tractor Biplane, Avro School, Brooklands). March 24th, 1914.

754 Lieut. Victor Somerset Erskine Lindop (Prince of Wales' Leinster Regt.), (Grahame-White Biplane, Grahame-White School, Hendon). March 24th, 1914.

755 Lieut. Wilmsdorff George Mansergh (Manchester Regt.), (Vickers Biplane, Vickers School, Brooklands). March 25th, 1914.

756 Lieut. Arthur Sheridan Barratt, R.F.A. (Bristol Biplane, Bristol School, Salisbury Plain). March 26th, 1914.

757 Sergt. Charles Albert Hobby, R.F.C. (Maurice Farman Biplane, Central Flying School, Upavon). March 27th, 1914.

758 Capt. Ernest Arthur Hunter Fell (12th Bengal Cavalry), (Bristol Biplane, Bristol School, Salisbury Plain). March 27th, 1914.

759 Leading Seaman Stephen Thomas Clemens, R.N. (Maurice Farman Biplane, Central Flying School, Upavon). April 2nd, 1914.

760 John Bankes Price (Caudron Biplane, Ewen School, Hendon). April 3rd, 1914.

761 Lieut. Athelstan Key Durance George (1st Dorsetshire Regt.). (Bristol Biplane, Bristol School, Salisbury Plain). April 3rd, 1914.

The following certificate was passed in America:—

H. J. Webster.

Gordon-Bennett Aviation Race.

The Race for the Gordon-Bennett Aviation Cup will be held from September 19th to the 28th next in France. The three representatives to compete on behalf of the British Empire will be selected from the following:—

A. V. Roe and Co., Ltd.
Sopwith Aviation Co., Ltd.
British and Colonial Aeroplane Co., Ltd.
Vickers Ltd.
Cedric Lee Co.

The date and place of the eliminating trials will be announced later.

Jacques Schneider International Maritime Race.

The Race for the the Jacques Schneider International Maritime Cup will be held at Monaco on the 20th inst. The British Empire will be represented by a Sopwith waterplane piloted by Mr. Howard Pixton, and Mr. John Carbery on a Morane-Saulnier.

Hurlingham Balloon Contests.

Balloon Contests will be held at the Hurlingham Club, Fulham, S.W., this year on the following dates:—

Wednesday ... ... June 10th, 1914
Saturday ... ... June 27th, 1914
Saturday ... ... July 11th, 1914

Full details will be announced later.

Mr. F. K. McClean and Mr. Alec Ogilvie.

Mr. F. K. McClean and Mr. Alec Ogilvie have returned from their trip up the Nile on a Short waterplane. It will be remembered that they started from Alexandria on January 3rd, and after many stoppages on account of engine troubles reached Khartoum on March 23rd. During the trip through Egypt, a crew of three was carried in addition to the pilot, while through the Sudan, the crew numbered two in addition to the pilot. Thirteen engine breakdowns were experienced and three bad landings were made.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Monday, last week, very windy, rain evening, no flying.

Tuesday, windy morning, calm evening. There was no flying until late in the afternoon, when the following machines went up: 80 Bristol tractor, 70 Deperdussin, 70 Henry Forman, 80 Short, 80 Le Rhône-Blériot.

Wednesday, fair. Flying nearly all day, the machines up were: 50 Shorts (2), 80 Shorts (2), Blériot, 80 Le Rhône, 70 Deperdussin, 70 (Anzani) Deperdussin, Sopwith.

Thursday, fair. 80 Short, 50 Short, instructional purposes, 70 Deperdussin, 80 Blériot-Le Rhône, Sopwith Avro, 50 Short, 80 Short to Eastbourne.

Friday, fine flying day. The Navy made most of the weather, and some fine flying was seen. The machines up were: 80 Blériot (Le Rhône), 80 Short, 50 Caudron, 80 Sopwith, 50 Avro, 50 Short instruction, 70 Deperdussin-Anzani, 70 Deperdussin-Gnome Bristol tractor.

Saturday, showery. 50 Short instructor, 80 Shorts (2), 70 Deperdussin.

Civilian Flying.—The Hon. M. Egerton was out every day on his 50 Short and made some very fine flights. Professor Huntington made a couple of short flights on Saturday.

Brooklands Aerodrome.

On Monday, last week, Mr. Barnwell was testing the latest 100 h.p. Vickers gun-carrying biplane.

M. Bidot flew to Farnborough on Tuesday with a mechanic to deliver an 80 h.p. Gnome-engined two-seater Blériot monoplane. In the afternoon Lieut. Collett, R.N., made several flights on the D.F.W. biplane. Mr. Waterfall was out twice on the new Martinsyde monoplane. Mr. Barnwell was on the 100 h.p. Vickers gun 'bus. M. Bidot flew to Farnborough again with a mechanic to deliver another 80 h.p. Gnome-engined Blériot monoplane. The Vickers and Bristol schools were both busy.

On Wednesday, Mr. Barnwell was further testing the new Vickers gun-carrying biplane. Mr. Waterfall made two good flights on the Martinsyde monoplane with well-judged spiral landings. Mr. Gaskell-Blackburn started rolling practice on his Blackburn biplane. Lieut. Grey of No. 5 Squadron came over from Farnborough on a 50 h.p. Avro biplane. In the afternoon, Mr. Waterfall was again out on the Martinsyde monoplane, and Mr. Barnwell on the Vickers gun-carrying biplane. The Bristol and Vickers pupils were at work. Mr. Manton was out on one of Mr. Hucks' Blériot monoplanes.

On Thursday, the Vickers and Bristol Schools were busy. Mr.

Waterfall was on the Martinsyde monoplane, and Mr. Manton had three quarters of an hour's flight on Mr. Hucks' Blériot monoplane. In the afternoon, Lieut. Collett, R.N., made a couple of flights on D.F.W. biplane No. 2, whilst Herr Roempler was out several times on D.F.W. biplane No. 1. Mr. Manton was out again on Mr. Hucks' Blériot monoplane. The Vickers and Bristol Schools were busy.

On Thursday, Mr. Elsdon made a flight on the Vickers Blériot monoplane, after which Mr. Hinshelwood went up on the same machine.

Sub-Lieut. J. C. Spencer Warwick, R.N.V.R., who secured his *brevet* on a biplane last week at the Vickers Flying School, Brooklands.

Both Bristol and Vickers Schools were at work on Friday morning. Mr. Waterfall (with Mr. Guy Blatherwick as a passenger) made a long flight in the Martinsyde monoplane. In the afternoon Lieut. Collett, R.N., and Herr Roempler made several flights respectively on Nos. 2 and 1 D.F.W. biplanes, afterwards going over to Farnborough. The Vickers and Bristol pupils were at work. On returning from Farnborough, Lieut. Collett came down at Mayford to make a slight adjustment. Mr. Jack Alcock was flying Mr. Coatalen's Maurice Farman (Sunbeam-engined) biplane.

On Saturday the new Vickers gun-carrier was out, and Mr. Merriam was busy with his pupils at the Bristol School. Lieut. Collett, R.N., was flying No. 2 D.F.W. biplane both morning and afternoon. Mr. Barnwell was again on the Vickers gun-carrying biplane. Mr. Waterfall on the Martinsyde monoplane, Mr. Alcock on the Maurice Farman biplane, and Mr. Raynham on the 100 h.p. A.B.C.-engined Avro biplane. Mr. Merriam was also on the Bristol biplane.

The strong and gusty wind kept most of the machines inside the hangars on Sunday, only Mr. Barnwell on the new 100 h.p. Vickers gun-carrying biplane and Mr. Manton on Mr. Hucks' Blériot monoplane being out. The winner of the ballot for the free passenger flight was Mr. E. G. Mathews, of Brockley Combe, Oatlands Avenue, Weybridge.

Bristol School.—No tuition possible Monday, last week, owing to strong wind.

Tuesday, windy during morning, clearing in the afternoon, when Merriam made a test and then gave several tuition flights to Mr. Racine Jacques. Sergt. Deane also did some good solo flying.

Merriam out Wednesday, with Sergt. Deane, and later went up alone to test conditions but found too windy, reaching a height of 3,000 ft. when the wind kept the machine almost stationary over the ground. Late in the afternoon Merriam took Lieut. Smythies (new pupil) for his first trip.

Merriam gave a tuition flight to Lieut. Smythies, Thursday, pupil having control at times, after which Lieut. Smythies took charge of the machine, with Merriam in the passenger's seat. Sergt. Deane made several solo flights, and Mr. Racine Jacques piloted the machine with Merriam as passenger. Merriam finished up the morning's work by making a long cross-country flight. In the afternoon Merriam made a test with Lieut. Smythies as passenger. Sergt. Deane and Mr. Racine Jacques were out flying several solo circuits and landing *en vol plané*. Lieut. Smythies had several tuition flights.

Friday, Merriam testing with Lieut. Smythies as passenger, and then sitting behind this pupil on circuits and landings. Sergt. Deane solo flying on circuits and banked turns, and Mr. Racine Jacques went up as passenger for tuition. The strong wind prevented further tuition, and instruction was given to pupils in the hangars.

Saturday morning, Merriam testing early after the rain with Lieut. Smythies as passenger, afterwards behind pupil on straights, giving him 25 minutes tuition. No other pupils turned up. Afternoon, Merriam up with Lieut. Britten and later with Mr. Racine Jacques and found very gusty.

Vickers School.—Monday, last week, Knight and Elsdon on biplanes with Comte Fitz James, Capt. Phillips, and Lieuts. Leighton and Underhill.

Thursday, Knight and Elsdon on biplanes with Lieut. Underhill and Comte Fitz James. The last named and Mr. Wilberforce solos. In evening Messrs. Hurst and Wilberforce solos. Lieut. Leighton and Comte Fitz James solos. Knight and Elsdon with Lieuts. Acland, Underhill and Leighton. Mr. Hinshelwood solo circuits on Blériot mono.

In morning, Friday, Knight and Elsdon on biplanes with Lieuts. Acland and Underhill. Comte Fitz James, Mr. Wilberforce, Mr. Hurst, and Lieut. Acland solos. Knight with Capt. Phillips. In evening Barnwell and Knight on biplanes with Lieuts. Underhill and Leighton. Comte Fitz James, Lieut. Leighton and Mr. Wilberforce solos.

Sunbeam Activity.—J. Alcock, piloting the Maurice Farman biplane fitted with 100-h.p. Sunbeam engine, on Thursday in the evening was out at Brooklands with Mr. L. Bailey to 2,000 ft. for exhibition flight. On Friday he made several cross-country flights at high altitudes during the day, and on Saturday a fine cross-country flight with Miss C. Pullin, besides an hour's cross-country trip with Mr. Hipwell.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Tuesday, last week, Mr. Smiles and Prince Sapieha straights with Instructors Howarth and Strange in passenger seat.

Lieut. Victor Lindopp, who secured his ticket at the Grahame-White School last week.

Messrs. Kershaw, Parker, Robinson, solo straights, Wednesday. Messrs. Weber and Stewart straights on Blériot. Messrs. Smiles, Lowe, North, Robinson and Prince Sapieha straights with Instructors Strange, Howarth, Birchenough and Lillywhite in passenger seat. Mr. Dunne, solo circuits.

Thursday, Mr. Weber straights in Blériot. Messrs. Lowe, Smiles, Moore, Robinson, North, Major Piercy and Prince Sapieha straights with Instructors Strange, Howarth, Lillywhite and Birchenough in passenger seat. Mr. Parker and Prince Sapieha solo straights. Mr. Kershaw solo straights and circuits.

Mr. Dunne straights on Blériot on Friday. Messrs. Smiles, Moore, Robinson, North straights with Instructors Howarth and Lillywhite. Major Piercy, Mr. Parker and Mr. Kershaw solo straights and circuits. Prince Sapieha and Mr. North solo straights.

Saturday, Messrs. Smiles, Lowe, Moore and Major Piercy straights with Instructors Lillywhite, Howarth and Birchenough in passenger seat. Prince Sapieha and Mr. Kershaw solo straights.

Beatty School.—Things were rather quiet at the Beatty Flying School during last week owing to one of the cylinders of the Gyro motor giving out. This engine will shortly be replaced by a 50 h.p. Gnome.

On Thursday the Moorhouse-Blériot was out piloted by Marty, and on Friday and Saturday mornings Bjorkland was on this machine practising straights and seemed to be handling it very well.

The school will have their second Wright (40 h.p. Wright motor) ready early in the week, and the small single-seater Wright by the end of the week. The latter machine will be fitted with an 85 h.p. single-valve Gyro.

W. H. Ewen School.—On Wednesday, last week, the school was out at 6.45 a.m. After test flight by Mr. F. W. Goodden on *brevet* machine, Mr. Bankes-Price did circuits and figures of eight, and Mr. Curtis half-circuits.

At 6.50 a.m. on Thursday, Mr. Goodden test flight on *brevet* machine, after which Mr. Bankes-Price went through the first half of his *brevet* tests in good style. Lieut. Kinnear circuits on same machine. On 35 h.p. Caudron No. 1 Mr. Carruthers straights, and Mr. Verney rolling.

School out at 6.30 a.m., Friday. Mr. Bankes-Price went through the second half of his *brevet* tests in excellent style, flying very steadily, and landing well. Lieut. Kinnear circuits on same machine. On 35 h.p. Caudron No. 1 Mr. Carruthers doing straights, and Mr. Verney rolling and hops. At 3.30 p.m. Mr. F. W. Goodden out on 60 h.p. Caudron. He took eight passengers up, rising to 2,000 ft. each time.

On Saturday the pupils were out at 6.30 a.m. Mr. Warren made a test flight on the 35 h.p. Caudron No. 1, after which Mr. Carruthers did straights and Mr. Verney rolling and straights. During the afternoon Mr. Goodden gave exhibition and passenger flights on the 60 h.p. Caudron.

Mr. Jack Graham, who passed for his Royal Aero Club certificate at the Grahame-White School, Hendon, last week.

Hall School.—The weather during the early part of last week was very unpropitious for flying, but during the latter part G. L. Hall was out repeatedly on the Avro taking all the pupils for passenger trips at 2,000 ft. On Friday the new Penguin rolling machine was put through its trials and proved a very satisfactory machine. On Saturday G. L. Hall took Miss D'Elsa for cross-country flight round Harrow and Neasden at 2,500 ft. C. G. C. Allen was out many times during the week on his Blériot, and on Friday G. L. Hall flew several circuits on machine testing the warp.

Salisbury Plain.

Bristol School.—Tuition impossible on account of wind, Monday, last week.

Windy during morning, Tuesday. In the afternoon Jullerot gave passenger tuition to Lieut. George, Lieut. Bonham-Carter, Lieut. Myburgh, Capt. Walcot, Mr. Hay and Lieut. Rabagliati. Solo flights were made by Lieut. Harman, Air-Mechanic Locker, Lieut. George and Lieut. Bolitho.

LOOPING SPREADS AT HENDON.—Chas. Weber, a pilot from Hungary, and now one of the "G.-W. Colony," loops the loop, assisted by Mr. Warren.

Wednesday, Jullerot made a test in tractor biplane, and then took Lieuts. Rabagliati, George and Myburgh for trips on this machine. Voigt and Stutt gave tuition to Mr. Hay (3 flights), Mr. Parker (3), Lieut. Rabagliati (2), Lieut. Bonham-Carter and Lieut. Myburgh. Capt. Walcot, Lieut. Myburgh and Lieut. Bonham-Carter then made their first solo flights. Lieut. George and Lieut. Harman each flew two solos and Lieut. Bolitho one.

Passenger tuition was given by Jullerot and Stutt, Thursday, to Mr. Chambers (6 flights), Mr. Parker (6), Mr. Hay (6), Lieut. Bolitho (3), Lieut. Rabagliati (3), Lieut. Bonham-Carter (2), Lieut. Myburgh (1), Lieut. George (3), Lieut. Harman (1), and Captain Walcot (2). Solo flights were made by Lieut. George (7), Lieut. Bolitho (3), Lieut. Rabagliati (5), Lieut. Harman (5), Lieut. Myburgh (4), Lieut. Bonham-Carter (4) and Captain Walcot (1).

Friday, Jullerot testing, then giving tuition to Mr. Parker and Mr. Hay, then taking the former pupil on the tractor biplane. Voigt gave tuition to Capt. Walcot, Mr. Hay and Mr. Chambers. Solos were made by Lieuts. Bolitho, Bonham-Carter and Harman. Lieut. George then flew for his certificate at a height of over 600 ft., doing the tests splendidly.

Shoreham Aerodrome.

Pashley School.—Tuesday, Wednesday, Thursday and Friday last week, C. L. Pashley instructor for week. Up with pilot: Hale, Willett, Gray, Nichole and Mortimer. Straights: Hale and Gray. Circuits: Hale, excellent circuits, height from 50 to 300 ft., landing right by the sheds. Mr. C. L. Pashley took advantage of the improved conditions on Wednesday to indulge in some excellent trick flying. Several spiral descents from 3,000 ft.

On Easter Saturday Pashley Brothers are to race against a motor car and cycle on Bognor sands. An out-and-home course of 1½ miles. Afterward exhibition and passenger flights.

ARMCHAIR REFLECTIONS.

By THE DREAMER.

Aviation as a Career.

It is Wednesday, April the first, and I am writing these reflections nearly a week before they will be wanted to provide employment for the gentleman of the white apron, who so dexterously picks out small types from little boxes into which I could never find room to place finger and thumb.

There must be some reason for this burst of energy, but I may as well disown right away that the date has anything to do with it. The fact of the matter is, that this dreary old world, represented at the moment, so far as I personally am concerned, by a very fine view of the printing works, is bathed in brilliant sunshine. As I sit at my desk, I can see through the windows opposite many of those white-aproned gentlemen, one of whom is, no doubt, busy setting up all that interesting and valuable information about the legal aspect of loitering on roads which a cold, wet day caused me to write over a week ago.

To-day I could not write of law. To-day I have no thought for long, cold corridors round and about courts of justice. To-day I can easily put from me thoughts of ushers in black shoulder-capes who cry for "Silence" at inopportune moments, when nobody but counsel is speaking. To-day I hear not the hum of subdued voices as Leader and Junior talk matters over together, to the embarrasment of counsel on his feet.

Through my open window comes to me the buzz and rumble of giant machinery, which tells me that our sister-journal of the "Yellow Cover," born one day earlier each week than her twin sister FLIGHT, is in the press and spreading her inky information over miles of pure, white paper, preparatory to starting on her journey to the four quarters of the world early to-morrow morning. To me, this buzz is not of machinery but of bees. It is warm and pleasant to-day, and it requires no effort to locate that buzz in the far corner of the orchard, under the apple trees. If I close my eyes for a moment, the breeze, entering by the window and playing with my hair, is the breeze from off the sea. I am at full length on the top of the cliff, cap pulled over eyes, and pipe in mouth, and I dream what reflections I would dream did modern journalism and a benevolent editor but permit of my working (save the word) under conditions of my own choosing.

King Sol is responsible for making this a day on which I want to do things, the more so that I know that in all probability to-morrow will be but a repetition of the wet, cold, miserable days of the past few weeks. On a fine sunny day I feel a quiet joy—at peace with all the world. Should the man I saw last week happen along now, he could touch me for the value of a whole week's luncheons, but should he read this I warn him that to-morrow may be wet, and I shall be in a different mood.

There are days when I write this page because I am paid to do it; days when I would rather do anything than write; but to-day, because the sun is shining, I can, in my exuberance, enter with equanimity upon any task usual to the journalist. It is for that reason that I have saved by me, awaiting the first summer day, a newspaper cutting, which I realised I could not deal with until I was brought to the proper frame of mind under the genial influence of the sun.

On this day, then, I am prepared to see eye-to-eye with the writer of the cutting in question, but will admit that I am more than suspicious, that on a cold, wet day, I might not be prepared to go quite so far along the line of enthusiasm in his estimable company.

The paper in question is, at the moment, running an Information Bureau—a kind of answers to questions—in which they give, no doubt, the best advice they can on a variety of subjects. Here is something asked by a correspondent: "What are the prospects of aviation as a career? How can I learn aviation?—Ambitious (West Kensington)."

In reply, they give, as a first paragraph, the verdict of Mr. Richard Gates, of the London Aerodrome: "The prospects which I see opening up in the next few years are in every way excellent. But in aviation there is no room for the man who is merely fascinated by the glamour of the career. The man of intelligence and hard work can always get on." With this I am in perfect accord, and had it ended with the words of an expert, I should not have had to wait for a sunny day. "If a man is a good pilot he can always obtain engagements. His pay will vary with his ability, and with the terms under which he is paid. Mileage, records, and passengers carried are all items which help to swell the pilot's fee. One pilot at Hendon earned about £1,500 last year; £500 and £600 is almost the minimum for a good man." In agreeing that one pilot at Hendon may have earned the amount mentioned, I will, seeing that it is a sunny day, try to believe the latter statement also. I realise that the statement is qualified by the word "good," but the definition of what constitutes a good pilot should not be so very hard to arrive at. I have, of course, no data to go upon as to the earnings of the many pilots of my acquaintance, but I happen to be sufficiently in the confidence of several whom I should certainly class as good to know that they would be very pleased indeed to accept office with any firm of standing who would be willing to pay them a salary equal to the amount mentioned. Pilots are undoubtedly men of the large-hearted variety, and the risks they take in the execution of their duty are out of all proportion to the pay received. There is, of course, a great fascination in flying, and in addition it is a healthy life, tending to make a man robust and light-hearted; but I am afraid some of the employers have a tendency to look on it as a healthful recreation, into which men are pleased to come, and to underrate their worth as accessories to their business. After all, aviation is a business, so far as flying, apart from Government flying, is concerned, and when a man is sufficiently master of his art that he can be trusted to take valuable machines and lives up into the air, every day, year in and year out, in any kind of weather; when, in fact, he has become a complete master of the art of airmanship, he is a valuable asset to his employers, and should receive remuneration comparable with the position he occupies; and this being a sunny day it pleases me to think that he does so.

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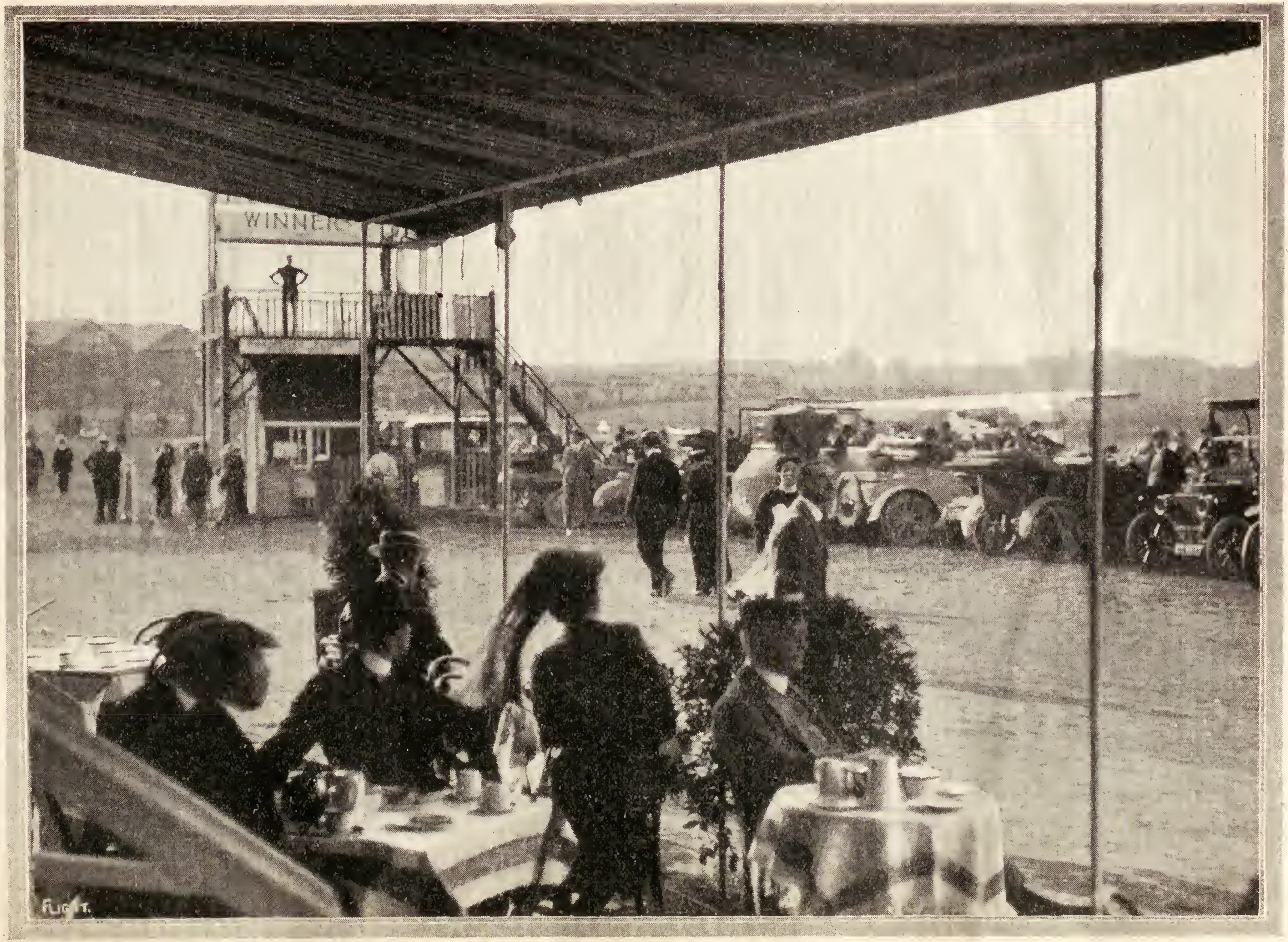
Aeronautics at Yale.

In connection with the Sheffield Scientific School at Yale University, it is proposed to establish a course in aeronautical engineering, under the direction of Prof. Breckenridge, which may be taken by the mechanical engineering students.



A snap from the tea pavilion during the past season at Hendon, where fashion and motors do congregate. "Flight" Copyright.

THREE YEARS' EXPERIENCE OF FLYING.*

By B. C. HUCKS.

THE primary object of the paper which I had the honour to be asked to read to you this evening, is not to be a mere recital of my experiences during the three years I have been actively piloting an aeroplane, although it has the title "Three Years' Flying Experience"; but I hope to be able to give to you a few points which should be of general interest, and perhaps beneficial to fellow-pilots, and to others who have so kindly come here to-night to hear this paper.

I will first give you a few instances of my earliest failures, their causes and remedies. Most of my troubles, when I look back, may be placed under the simple headings of inexperience and want of confidence, which, I suppose, are very nearly one and the same thing. The machines of three years ago, it is true, were not so efficient, nor so safe, but that fact has really, in my opinion, no more than quite a small bearing on the results of those days.

I will give you two instances of failure that happened to me soon after getting my *brevet*, purely through want of confidence, which I think I can safely say with my present experience, would not occur again, even supposing I were piloting the same machine, under identical conditions. The first instance occurred in attempting a cross-country flight from Filey to Leeds, on a 50 h.p. Gnome-Blackburn. All went well for a distance of 18 miles, when suddenly one cylinder ceased firing, a state of affairs which, to-day, would not be very disconcerting, but then, purely through want of confidence, or due to inexperience, I was seized with—shall I say, "cold feet"! I had visions of the machine dropping like a stone, if I dared to try to fly it another yard, so all that was left was to make a wild plunge into the very nearest field; never mind if it was suitable or not as a landing ground—get down somehow, as long as you get to earth. Those were really my feelings in those days, and, I may add, those of most pilots, and the result was, that the field being unsuitable (full of cattle) and rather small, I *vol piquéd* to make the best of it, and smashed the machine to pieces! Now, exactly the same thing happened to me a little later on, under practically similar conditions. It is very likely a good number of you present to-night will remember the start on the Monday morning from Hendon, for the circuit of Britain in 1910. What a perfect flying morning! I was flying the same machine that had been smashed up in Yorkshire, and exactly the same trouble overcame the engine after 35 miles; one cylinder began to misfire; the same terror seized me, and I chose the nearest field, likewise wholly unsuitable, having a practically invisible barbed wire fence across the middle. It was not that I made a bad landing, although the machine was wrecked—the field was hopelessly impossible, and the irony of it all was that less than 400 yards away was a veritable aerodrome waiting for me to land in, had I only had the confidence to try to fly the machine on the 6 cylinders which were still firing. The reason I want to bring these two instances to your notice is that you will see what a simple thing it took in the earlier days to bring about disaster.

As I have said before, I would willingly risk flying the same machine to-day, under the same conditions, and there is very little doubt that I should succeed in keeping it in the air, even with its loss of power, until I had found a suitable landing-place. I daresay there are numbers flying to-day who could relate instances of where, had they but known then what they know now, things would have turned out very differently.

I consider that the present-day high standard of flying is due far more to the improvement in piloting than to the improvement in machines. One has only to be at Hendon, any very bad windy Saturday or Sunday, to see that. It's true that most of the machines there are of the later types, but then see the wonderful way the old Farman-type biplanes are flown. I consider those machines are only slight improvements on the machines of three years ago, and yet they are put through evolutions which, at that time, were not even dreamed of. I can take a good example of the way improvement in piloting has out-distanced improvement in machines—in the case of myself, my "looping" Blériot. Most of you know that there is very little difference between that machine and the 50 h.p. Blériot of three years ago. The difference at any rate is so slight that any 50 h.p. Blériot of that period could have been altered in a very short time so as to make it safe to be flown much in the same way that my "looper" is flown. I can remember Mr. Grahame-White, at the Boston meeting in U.S.A. in the autumn of 1910. He had, as far as I know, the first 50 h.p. Blériot that ever went into America. I can imagine myself with my present knowledge and experience, just altering his machine slightly, and starting off on a flight at that meeting, and causing some slight sensation by turning the monoplane upside down, and putting in a few loops—and it could easily have been done. All that was wanted in those days was just the confidence and knowledge that the experienced pilot of to-day possesses.

I have been telling you what a really valuable asset confidence is to a pilot, and how essential; but there's such a thing as too much confidence. I remember an incident which was probably one of the narrowest escapes I've ever had through over-confidence. I was acting as chief pilot for the Grahame-White Aviation Company at Hendon, and had confined most of my flying to monoplanes (Blériots), when it occurred to me that it would be useful if I likewise mastered the biplane; and accordingly I very comfortably started off on an old "school" Henry Farman type machine, and I found things quite all right. The machine seemed just a little strange, rather more cumbersome and slower to act than the machine I had been used to, but I felt thoroughly at home; in fact rather too much so, for after about two or three circuits, I decided to try a few "stunts," the first in the form of a *vol plané* from about 300 ft. Now, firstly, before proceeding with the relation of this incident it is necessary to explain certain characteristics of the two machines in question. The monoplane being a tractor machine, the propeller slip-stream gave slightly extra support to the main planes, the result being, when the engine was switched off, that this slight extra support was withdrawn, and the machine assumed a more or less natural diving angle, without requiring first to have its nose put down. In the case of the biplane, the machine, being of the pusher type (*i.e.* with the propeller behind the main planes), derives no lift on the main planes through the propeller slip-stream, but the reverse happens—the tail planes alone receive an extra lift through the propeller-draught, and, when the engine is stopped, this extra lift promptly disappears from the tail, so that the tail drops, and the machine tends to assume a climbing position as soon as the power is cut off. This is what happened in my case; instead of putting the nose of the biplane down into a gliding position, I switched off, expecting much the same to happen as with the monoplane—*i.e.*, that it would naturally take its own gliding angle. But, as I stated before, I was over confident, for the tail dropped on switching off, and the machine tended to climb in spite of the fact that I had the elevator pointed hard over for descent. The engine refused to pick up again, owing to over rich mixture, the machine came to a standstill in the air, then commenced one huge side-slip to within, as eye-witnesses state, 25 ft. of the ground, when it pulled itself up, starting another side-slip in the other direction, like the swing of a pendulum, eventually landing sideways on a side-slip, but fortunately sufficiently flat merely to carry away the whole of the landing chassis. There is not the slightest doubt that sheer luck and no judgment saved me. I consider that the natural tendency possessed by most tractor machines to assume a nose-diving position, if left to get out of awkward positions, is an enormous advantage over the pusher-type machine, which I fear does not possess that ready tendency. I have mentioned this instance to illustrate the dangers of over-confidence.

I will next deal with the subject of flying in bad weather. I think all pilots here to-night will agree with me that the worst enemy to flying is not wind or rain, but fog. I know which I would rather fly in. I think perhaps I might illustrate an instance of the extreme unpleasantness—not to say danger—of suddenly running into fog or mist. In May, 1912, I was testing out, at Issy-les-Moulineaux, near Paris, a 70 h.p. tandem Blériot, giving several of my friends joy rides from the Issy ground, round the top story of the Eiffel Tower and back. I think I had my third passenger with me, and was just about to make the turn round the top of the tower, when the machine was suddenly enveloped in a low-lying cloud scudding across the sky. I could see nothing—barely my wing tips—and, knowing my close proximity to the tower, such a thing as colliding with it was not an impossibility. However, by swinging the machine at right angles to its direction by the compass when I eventually came out of the cloud, I had several hundred yards to spare from trouble.

A bad fog makes cross-country flying very dangerous and almost impossible. Many narrow escapes are on record of pilots flying over steadily rising ground and assuming by their barographs that they were at a safe height, but only to find that, on suddenly coming out of the fog, they were literally skimming tree tops. The only redeeming feature—if one can call it so—is that high winds and fog do not go together. Rain is distinctly unpleasant, and blurs the landscape. Heavy rain becomes, at times, almost unbearable, owing to the force with which it is driven against the face, principally by the speed of the machine, and also by the propeller slip-stream. To give one an idea of what high speed in very heavy rain will do, the following instance will suffice. Mr. Sydney Pickles was flying my 70 h.p. Blériot from Coventry to Birmingham last year. On the journey he encountered a heavy rain-storm. On landing, he complained of the pain he had suffered, and upon examination of the propeller it was found that the leading edge of the blades had the appearance of having been gnawed by rats, such was the force of the propeller meeting the rain. I remember seeing Mr. Grahame-White make quite a lengthy flight at Boston, U.S.A., in a fairly heavy rain. His face was much swollen on landing owing to the effect of the rain bruising his face. I myself had quite an unpleasant experience in only a fine drizzle—sometimes called a "Scotch mist." I was persuaded to try a new type of goggles, made of a non-inflammable celluloid, but these had the disadvantage (which I had to find out in practice) of badly steaming up and practically obscuring the view entirely, in a fine rain—in fact there was nothing left but to remove the goggles altogether, the result being that the whole force of the rain, fine as it was, came into the unprotected eyes. The pain was so intense, although it probably only lasted half a minute (time in which to effect a landing), that I suffered with very bad inflammation of the eyes for two days afterwards. I do not think rain affects the flying capacity of the machine to any great extent. Continued rain would, I believe, show its effects on the propeller first of all by being driven into the joints, causing the parting of the laminations.

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* Paper read before the Aeronautical Society, Wednesday, April 1st.

In the case of trouble owing to wind, the velocity of the wind can practically be neglected, excepting that a very strong head-wind makes a cross-country journey a bit longer than it might be. When I say that the velocity of the wind can be neglected, I mean that the nature of the wind is of far more consequence to the pilot of to-day than its speed. I have flown whilst at Southport in 1912 in a wind which I believe I am perfectly safe in estimating at 45–50 miles per hour, because of the little headway the 65 m.p.h. machine made against it, and yet the wind gave no more trouble than a flat calm, because, provided one landed into it, the machine did not run a length and a half; it made landing easier, the machine climbed quicker, and the air seemed more buoyant. The wind in this instance was blowing directly from across the Irish Channel. During my earlier experiments in flying at Filey, on the Yorkshire coast, I invariably found that the wind, no matter what its velocity when blowing off the sea, was perfectly steady, and gave no trouble whatever to the pilot. I think that perhaps one of the most noteworthy examples of the strange behaviour of winds was the start from Brooklands of the first *Daily Mail* Circuit of Britain. The day was a sweltering hot one, with not a breath of wind, and yet I suppose it surprised most of the pilots, and not a few found it too bad altogether. I myself, then quite inexperienced in flying in bad winds, after a start found the conditions so bad that I deemed it wiser to return and wait till conditions improved. The cause of such unexpected conditions was due, I think, to the intense heat, which made the atmosphere literally boil, causing eddies, upward and downward currents, and general disturbances of the air.

There are several outside causes which affect the nature of the wind. One of the chief is the contour of the surrounding country. I mentioned previously how, when the wind blew from across any large expanse of water, it was invariably steady and gave little trouble to the pilot. I have found that when the wind is blowing from across hilly, undulating country, it is a more difficult wind to deal with, owing to the manner in which the currents are broken up and deflected.

In the summer of 1912, I was flying at Strathpeffer in the north of Scotland. My flying ground was at the foot of Ben Wyvis, a mountain 3,500 ft. high—in fact, the whole surrounding country was mountainous. On this day in question there was very little wind (ten or fifteen miles per hour), but I found the way in which the currents were broken up by the mountains was most marked. One usually finds that after reaching a considerable altitude—say 3,000 to 4,000 ft.—the wind gets steadier, no matter how gusty it may have been near the ground. I remember that during one flight at Strathpeffer I reached a height of 5,800 ft., and even at this height one found the unsteadiness of the wind most marked, an effect due in all probability to the proximity of the mountains.

I certainly shall never forget the view I had on that day. From a height of 5,000 ft., I suppose I could see some thirty miles away. On one side was the sea—the Moray Firth—on the other, as far as the eyes could reach, were mountains standing up like saw teeth, with large glistening lakes here and there. The prospects of an enforced landing in such a place were certainly not over pleasant, and it was not surprising that after the wind had traversed such country, it became a bit troublesome to airmen.

There is another instance in my memory which seems to show that the wind is affected by causes other than contour of the land. In the spring of 1912, whilst flying at Weymouth, I found that whenever the machine seemed to pass from the land to the sea, it received a somewhat severe shock, just at the moment of passing from the land to the water. This would happen from a height of about 500 ft. At first I took it to be a coincidence, of just a gust striking us at that moment, but it seemed to happen so repeatedly that I believe the change from the land to over the sea was the cause of it. I cannot assign any definite reason for this, as there were no cliffs, and the land ran down gradually to the sea. As it was quite a warm sunny day, the sudden change of temperature from land to sea probably set up vertical currents.

I have so often been asked the question whether I ever come across air-pockets when flying, and what happens when I do. Personally, I think the term "air-pocket" is a misnomer, as most people are thereby led to believe that such a state of affairs exists in the atmosphere as a partial or semi-vacuum, which, as it were, goes floating about, dealing out destruction to the unwary airman. I really believe that there are quite a lot of people who have not troubled to think out the matter, and actually think that, owing to this partial vacuum, the aeroplane suddenly drops, as its support has gone. The so-called "air-pocket" is, in my opinion, merely a quick downward current. A machine will at times seem to drop as if its support were suddenly withdrawn, behaving much in the manner one would expect it to, if it were possible for it suddenly to come upon a partial vacuum in the atmosphere. But I believe the machine will do, and readily does, exactly the same thing in the other direction, *i.e.*, it gets suddenly caught in an upward current and gets shot up rapidly, the only difference being that the downward current is more noticeable, because the human system is more sensitive to sudden descents than to ascents. I think most of you will agree that, when travelling in the vertical plane in a fast elevator, or lift, one feels the rapid descent far more than the ascent, although the speeds in either direction may be the same. Thence, the pilot will notice his machine drop more readily than he feels it suddenly ascend. The term "air-pocket" is therefore, undoubtedly, a misnomer.

The Efficiency of Pilots.—There is one point which I should like to bring forward here, *i.e.*, the case of a pilot who undertakes the flying of all and sundry types of machines. Whilst it's a very valuable accomplishment, I can't help thinking of the old saying, "Jack of all trades—master of none." I do not suggest that an airman who pilots equally well some dozen different types of aircraft is not master of one of them, but I do think that for the utmost efficiency a pilot should specialize on one particular make of machine. I suppose that for "Service" work it is most essential that pilots should be able to fly any machine which they may be called upon to pilot in an emergency.

But every type of aeroplane has its peculiarities, and it is quite conceivable that a pilot may get confused with these differences. On the other hand, in my opinion, if a universal standard control were adopted, it would tend to reduce this trouble. One can imagine the confusion there would be, supposing a certain make of motor car were steered by the feet, and one were suddenly called upon to drive another make that is steered by the standard wheel steering. I mention this as analogous to the difference in the controls of some makes of aeroplanes. After a pilot has gained a little experience, he does all the controlling of his machine absolutely *instinctively*. He never has to think what to do; the whole operation comes to him as naturally as walking. When walking the deck of a ship which is rolling and pitching badly, it is not necessary to have to think out your movements in order to effect a safe crossing of the deck. Everything is done by mechanical instinct, exactly in the same way that a pilot will fly his machine on a rough windy day. It is easy, therefore, to see how confusing a machine would be to a pilot who is not used to that particular type of control.

Efficiency of Machines.—High speed has been sought after by designers in many cases, at the sacrifice of other desirable qualities in a monoplane. I think that a machine which has merely very high speed as its feature is of very little practical use. An aeroplane should, I consider, be judged from the standpoint of all-round efficiency. An aeroplane that will fly at 100 miles per hour, but required about 400 yards to land in, would be too dangerous a proposition for practical use, as one would have little chance in the event of engine failure of effecting a safe landing on a cross-country flight.

Equally dangerous would be a machine that would not glide sufficiently well with the power cut off. For instance, there are some types which, owing to rather more head resistance of, say, the landing chassis, have a slightly reduced speed. Well, suppose that that landing chassis, with its extra head resistance, is capable of withstanding far greater shocks than the chassis that gives a minimum head resistance, surely it is worth while sacrificing, say, three or four miles per hour, if by so doing you can land ninety-nine times out of a hundred without trouble, as against, say, nine times out of ten with your faster machine.

I mention these points, as so many people are apt to judge the qualities of an aircraft entirely by its speed, and not so much, as should be, by all-round efficiency.

Looping.—I now come to the last part of my paper, which is concerned with "looping-the-loop" and upside-down flying. My advice to any pilot who contemplates these experiments—and they are well worth considering, as I will show later—is, primarily, "be certain that the machine which you intend to pilot through these extraordinary evolutions is suitable for the work." There should be no question as to its strength. The bracing of the wings, especially it be a monoplane, should be such that it will stand as big a strain on the top side as on the underside of the wings. The range of control should be greater than is necessary for ordinary flying, so that the machine will have no hesitation in responding to the sudden calls on the control. The machine must be so balanced that it will assume a nose dive if the controls are abandoned at any considerable height.

The whole secret of the safety of this freak flying lies in the fact of allowing sufficient altitude in which to recover from any precarious position the machine may assume. I have found out that there is no position that the machine can be put into from which it cannot easily be brought back to the normal again, provided, as I say, that there is sufficient altitude allowed in which to effect the recovery. This one point alone, when clearly grasped, adds enormously to that most valuable of qualities which a pilot can possess, confidence.

There is nothing extraordinary required in the piloting of the machine. I find it does practically everything you set it to do in the way of tumbling about in the air. One golden rule which I had thoroughly drilled into me by M. Louis Blériot, when practising for the looping at Buc, was to use the controls "doucement," *i.e.*, gently, as one can easily see that a sudden jerk on, say, the elevator, would throw an enormous strain on the *fuselage*, whereas if that movement were made "doucement," the strain would be negligible. Much the same thing applies to the driving of a motor car—one driver can steer a car fast round a corner by handling his steering with a sensitive touch, whilst another with harsh hands will cause the car to skid, at exactly the same speed, which shows how a much greater strain is thrown on the machine merely by the touch on the control.

The machine on which I have at present made several hundred loops has a far wider range of control than a standard machine. The wing warping is nearly four times as effective, and the tail elevator is considerably larger. The result is that the machine readily answers to the control. For instance, when doing a perpendicular nose dive, the machine responds immediately to the elevator and flattens out without the slightest hesitation, a point of the greatest importance. The same thing happens with the warping. The machine can be banked up so that the wings are perpendicular, by simply turning rather sharply, and warping at the same time.

The machine is fairly easily got into the inverted position, but it is very noticeable how unstable it is when in that position. It requires extreme care in balancing it, as it were, because the moment it is allowed to get only slightly out of the level, it will side-slip and turn the right way up. This, after all, is only what would be expected, as it shows its natural stability, and its tendency always to assume its normal position.

The machine cannot be made to climb when inverted, although the engine may be turning full speed. There is, in fact, very little support in the wings when the wrong way up. If one tries to keep even the same level, with engine full on, the machine will stall, and side-slip round to its normal position again.

The only way I find my machine can be kept in an inverted position for any period (my longest timed inverted flight so far is 2 minutes 5 seconds, and even that seems quite a long time to be hanging head downwards) is by allowing it to plane downwards the whole time. The control when hanging head downwards is not so confusing as might be expected, because the pilot still bears the same relative position to his machine. Needless to say, one has to be very securely strapped in for these evolutions, as otherwise one would certainly fall out. I find it a great advantage to be strapped very solidly and tightly to the seat. I have straps round the waist, thighs, and shoulders. It is true I feel much as if I were in a straight-jacket, but I consider that far better than if the straps were at all slack. When you are tightly strapped in, you feel absolutely solid with the machine, and a sudden bump or jerk does not dislodge you in the slightest. Most of you who are present have no doubt travelled some time or other in the back seat of a fairly fast car, and you must know how unpleasant it is when that car goes over a small bridge, or culvert, on a country road, and you leave the seat and shoot up about a foot. Well, there are times when an aeroplane treats one much in the same way, and you will then see the advantage of being really tightly and rigidly strapped to your machine. Of course, there is a serious disadvantage to being strapped in rigidly to the machine, and that is the difficulty of getting out quickly in the event of even a minor mishap. What is wanted is some certain quick-release device, which cannot by any chance come undone until required. I consider that then strapping in, and rigidly strapping in, would be adopted generally.

I now come to the question of the value of this freak flying. There is not the slightest doubt that every pilot who has looped the loop, or flown upside down, has benefited considerably by so doing. His confidence has increased enormously, and even those pilots who have only seen others do it must benefit. Surely it is nice to know that a machine can be wantonly turned over and righted again. I can remember, not so very long ago, before the looping era, that a very bad gust of wind struck my machine, which sent the planes up vertically. I thought something very serious was going to happen, but the machine recovered somewhat quicker than I did myself. There is no doubt that the same thing occurring to-day would not be nearly so disconcerting, because one knows that it is possible to recover (if there is altitude enough) from any conceivable position the machine may be thrown into.

Then again, it will bring about a general strengthening of machines, because a machine which has successfully looped a number of times has surely proved itself strong enough to withstand the strains of ordinary flying.

It is true that one does not fly the wrong way up, because there is any advantage in so doing. The critics have said that most men are quite satisfied in being able to fly the right way up. But the same thing applies to most things. One might as justly say "What purpose is served by driving a motor car at the rate of two miles a minute on Brooklands track? most men are content if they can drive their cars at half that speed." But, in each case, they are extreme tests, which record the progress of science.

Mr. Gordon Bell, in the course of an extemporaneous address, which was freely interspersed with criticisms, remarked that his earliest experiences were obtained in 1910 on the Roe triplane, and were succeeded by others on the Hanriot and the R.E.P. On one occasion while flying the last mentioned machine, he found that the back wire of one of the wings had broken. As may be expected, he was extremely anxious to regain *terra firma*, and after a deal of cogitation, he decided, in so doing, to come down with the defective wing on the inside of the turn—he hoped that that was the correct procedure. He had often noticed on sundry occasions when flying or approaching certain clouds that the compass exhibited a tendency to dance a tango. Mr. Bell said he had been struck by the deficiency of fin area at the rear of some machines and proceeded to show, by the aid of sketches upon the blackboard, how essential it was to have enough surfaee, not only to the rear, but also above the C.G., remarking that certain machines appeared to him to be quite unsafe. He would like to know whether this was so, or not.

He also referred to the fitting of airbrakes on various machines and observed that such devices should conform to three requirements, which he enunciated as follows—they should (*a*) not tend to produce any upsetting effect upon the machine; (*b*) not mask the controls in any way, and (*c*) should be readily capable of being put on and taken off, if desired. He had noted that some constructors gave the maximum speed of their machines as, say, 95 miles per hour, and perhaps they would be capable of reaching 100 or even 110 miles per hour. But the lower range of speed was sometimes quoted as low as 35 miles per hour and although it might be correctly given, it appeared to him that the fields often required "a lot of chasing." What would be the eventual solution of this problem he could not say, but the proposal of M. Blériot to split the rudder vertically might prove satisfactory.

Mr. Leonard Bairstow said he had been much interested in remarks of the two lecturers, and with regard to the questions that had been propounded, they could be and are the subject of calculation. If the tail fin and rudder areas were made too large, the machines became more dangerous. The machine might sideslip inwards if it had too small a dihedral and too large a rudder, whilst, if the dihedral was made too great and the rudder too small, there would be a loss of control by the rapid oscillation of the machine and it would eventually turn tail foremost.

Mr. Mervyn O'Gorman said that he was inclined to wonder whether Mr. Hucks ascribed too large a share in the credit for the recent progress made by pilots to the increase in confidence, as his increase of skill, which includes so many attributes, makes more for safety than the growth of confidence. In the spirit of enquiry, he would like to know whether Mr. Hucks could elaborate the point that his remarks appeared to convey rather than to state, that flying into a head wind assists the climbing speed, as he knew of no reason why this should be so, and possibly it was an illusion on the part of the pilot, owing to the slower progress over the earth. Isolated instances would be of no value, as in one case, which he cited, a much faster climbing speed was attained when not flying against the wind, due evidently to the fact that the pilot was in the air upcast such as is usually topped by a cumulus cloud. It was more true of the older types of biplanes than of the latest machines, that these did not when the engine was cut off adopt their gliding angle of descent. At any rate, the slip stream of the propeller over the tail need not and should not be such that when interrupted the aeroplane adopts the cabré attitude. Such a machine can be made, so that when gliding downwards if the engine be opened out, it will *without any elevator movement* (the elevator being supposed straight and kept so) first increase its speed and soon turn its nose up, and if the throttle be kept open, climb. He said as regards the effect of the proximity of mountains on the production of eddies, that at the

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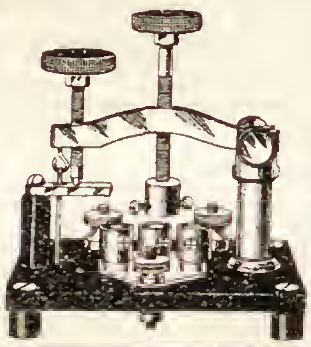

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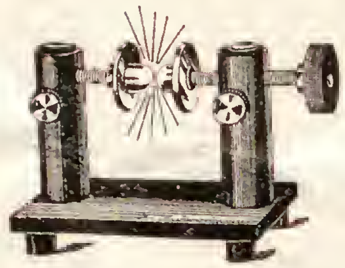

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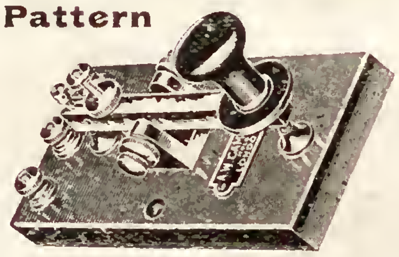

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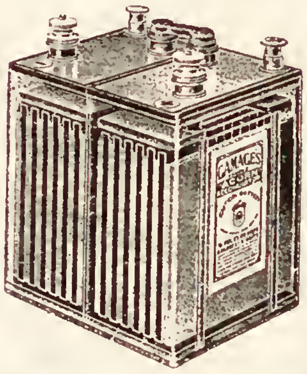

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aerodrome at Vienna-Neustadt, which was quite flat and eight miles long and four miles wide, bordered along one side by high mountains, there was an entire absense of irregular eddies in the wind.

Mr. O'Gorman remarked upon the value of aneroids to pilots as there was little else to assist him in determining his position. In regard to the specialising of the study of particular machines, it was a good point for service purposes that the combination of man and machine should be as efficient as possible and this was obtained by specialising. But for research and experimental purposes, which must cover all sorts of machines, there was always full scope for the versatile flyer. Mr. Bell's record of the effect of clouds upon the compass was astonishing, as any visible variation, by either electrostatic or electro-magnetic effect seems impossible, unless the aeroplane itself were discharging large quantities of electricity, which at the potential difference needed for disruptive discharges to a body of vapour means enormous sparks. What appeared more probable was that the aeroplane in question had a two-bladed air-screw, that the flyer was not aware of the fact that he was turning, that such turning with a two-bladed screw caused the well-known gyrostatic vibration, and that this vibration chanced to have such a period and direction that the needle was caused to make big deflections. It was very good hearing Mr. Bell draw attention to the value of fin distribution. For air purposes, the top fin had much to be said for it, as when properly proportioned with the other fins in the manner indicated by Mr. Bairstow recently, nothing but good could come from it in the air. But the problem of safe flight is nowadays the problem of safe landing in a wind. What is wanted is a righting moment in the air. The top fin gives a righting moment in the air, but also unfortunately introduces a serious side force with side winds which was most inconvenient when, by reason of the configuration of the ground, the aeroplane must be brought down across the wind. Experiments had been made at the R.S.F., and in one case, the fin was so arranged that it pivoted about its leading edges and could be cast off by the pilot on landing, but the complication was unnecessary if an adequate dihedral was used. He considered Mr. Bell's remarks on air brakes extremely sound, and should be closely attended to. This device should be all that Mr. Bell states, and should be powerful enough to produce a sensible reduction in the gliding angle. When once achieved, a notable advance would have been made towards greater speed and safer landing.

Mr. Holdberg commented upon the fin effect of the propeller on model aeroplanes and said that he had to abandon one type of machine because of this.

The Chairman (Col. Sykes), in proposing a vote of thanks to the lecturers, observed: confidence, skill and training were bound up together, and as efficiency increases greater confidence is obtained. A pilot must know a large number of things in order to fly well and these could only be obtained by continual practice. Pilots had increased greatly in efficiency, but machines had also improved enormously, as anyone who had visited Olympia could not have failed to note the great advance made in detail construction. For military purposes, he thought that a pilot should stick to one type of machine and become thoroughly master of it. In France the tendency had been to develop the small fast aeroplane, in Germany to obtain greater endurance, while in this country there was a combination between the two.

Mr. Hucks in his reply said that he still was of opinion that greater confidence had been the cause of the rapid progress made by pilots recently. He thought that there was probably no difference between the climbing speeds of a machine with and against the wind, and observed that the wings on his Bleriot were covered with rubber fabric with no dope which in wet weather became quite tight.

Mr. Gordon Bell briefly replied.

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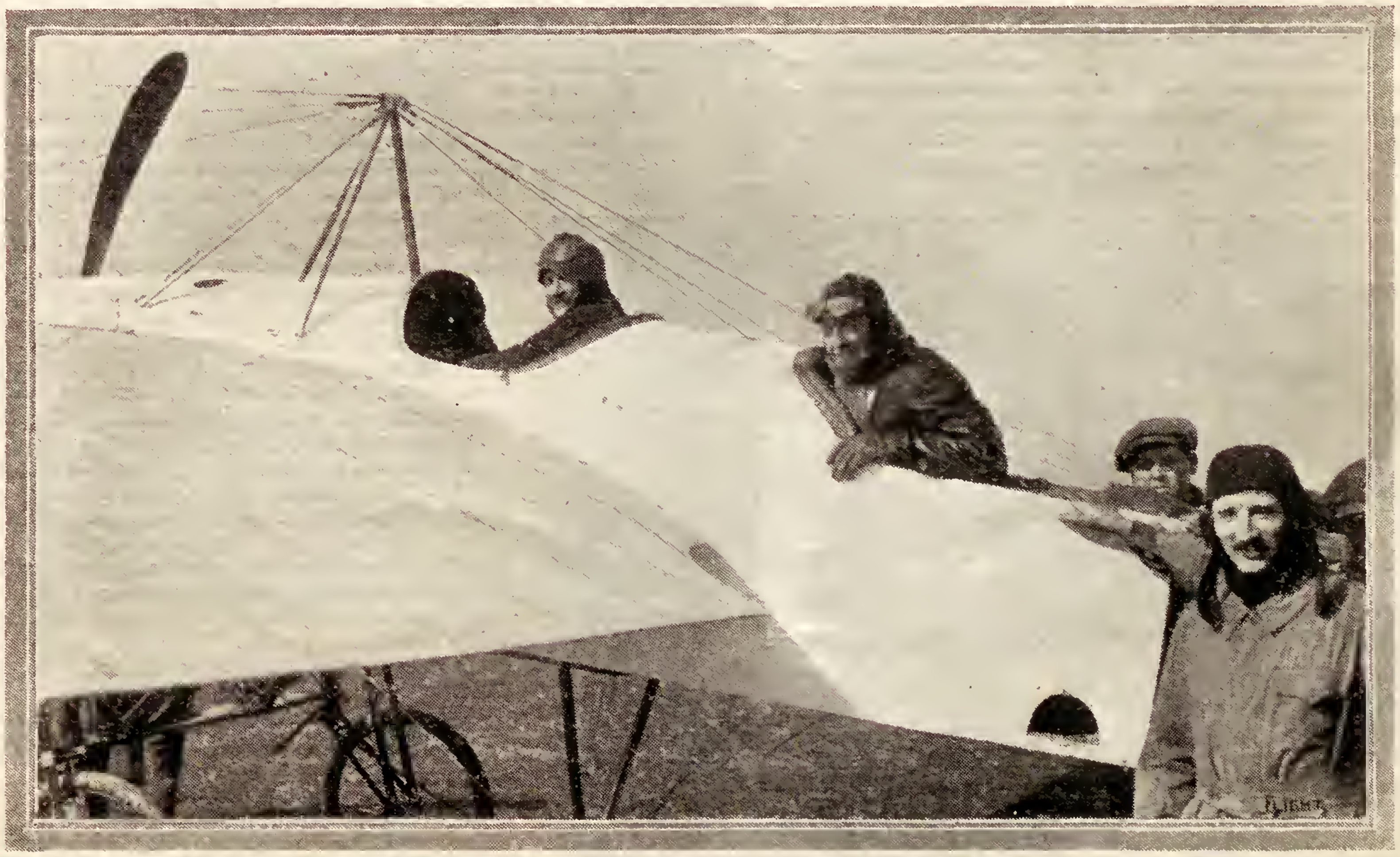
British Army Aeroplanes.

Replying to questions by Mr. Joynson-Hicks in the House of Commons last week, Mr. Harold Baker, Financial Secretary to the War Office, stated that sixteen B.E. aeroplanes had been built at the Royal Aircraft Factory, of which seven were issued as new machines, and the rest were reconstructions of other types.

Mr. Baker denied that in the testing of the new R.E. machines the elevator flaps of several and the rudders of others bent while the machines were being flown, and that in one case the rudder broke off owing to a gust of wind hitting it while it was standing on the ground. He also states that seriously damaged aeroplanes are struck off and replaced by new ones with new numbers. Formerly it was customary to class as reconstruction the practical rebuilding of an aeroplane if the original engine remained available.

The Military Aeroplane Engine Competition.

We understand that since the list of entrants for the Military Aeroplane Engine Competition appeared in Flight for November 1st last, it has been increased by one, Messrs. Tips & Co. having entered a 100 h.p. rotary engine. This makes the total number of entrants 27, but some of the firms have entered more than one engine. Engines entered for the competition have to be delivered at the Royal Aircraft Factory, Farnborough, not later than Tuesday next.



Mr. Salmet and his passenger, Mr. T. Elder Hearn, just before their flight from Buc to Hendon last week. Mr. Hearn hopes to make the same trip as pilot himself in about three weeks' time.

BRITISH NOTES OF THE WEEK.

THE ROYAL FLYING CORPS.

THE following appointment was announced by the Admiralty on the 1st inst.:—

Commander N. Usborne, to the "Pembroke," additional, for command of the Kingsnorth Airship Station. To date April 1st.

The following appointments were announced in the *London Gazette* of the 3rd inst.:—

R.F.C.—Military Wing.—Lieut. Leslie Da C. Penn-Gaskell, 3rd Battalion the Norfolk Regiment, from the Reserve, to be a Flying Officer, and to be seconded. Dated March 18th, 1914.

Second Lieut. Gordon N. Humphreys, Special Reserve, from the Reserve, to be a Flying Officer. Dated February 26th, 1914.

The following promotion was also announced in the *London Gazette* of the 3rd inst.:—

Capt. (temporary Major) Edward M. Maitland, the Essex Regiment, is granted the temporary rank of Lieutenant-Colonel whilst employed with the Naval Air Service. Dated April 1st, 1914.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending April 4th, 1914:—

No. 2 Squadron. Montrose.—The mileage of this squadron during the week amounted to 1,756 miles. The technical training of recruits recently postponed was continued.

No. 3 Squadron. Netheravon.—The Officer and N.C.O. pilots of this squadron were flying daily. Experiments in photography and range-finding were carried out.

No. 4 Squadron. Netheravon.—1,791 miles in all were flown by the pilots of this squadron in reconnaissance flights across country. Practice in landing in restricted areas was carried out.

No. 5 Squadron. S. Farnborough.—The Officer and N.C.O. pilots covered 1,115 miles in all during the week, chiefly on cross-country reconnaissance flights.

No. 6 Squadron. S. Farnborough.—The pilots of this squadron were flying daily over the country round Aldershot. The mileage totalled 1,436 miles. The N.C.O. pilots were given instruction in map reading from the air.

Flying Depôt. S. Farnborough.—Besides experimental flying, much work was done in connection wirh repairs on aircraft and M.T., and with technical training of recruits.

General.—The B.E. 2 type machines of the Military Wing were stopped flying on March 23rd pending the result of an enquiry into certain points of their construction, which was held on the 25th. As a result of the conference, at which the Director-General of Military Aeronautics, the Commandant Central Flying School, and the Officer Commanding Royal Flying Corps (Military Wing) and all Squadron Commanders were present, the B.E.2's were taken back into use the following day.

Mr. Blackburn at Sheffield.

DURING the last week, Mr. Harold Blackburn, on his 80 h.p. Blackburn monoplane, has made numerous flights at Sheffield during a "Flying Week" organised by the *Sheffield Independent.* On Tuesday, Mr. Blackburn made a very fine flight over Sheffield at a height of over 4,000 ft. in half a gale. The weather was much too rough for passenger carrying on this day. The remainder of the week proved to be more favourable, and many passengers were given trips.

Early on Friday morning, Mr. Blackburn, accompanied by a lady passenger, flew to Chesterfield and back with the early morning edition of the *Sheffield Independent*, encircling the famous crooked spire of Chesterfield on the return journey.

From a photo by Mr. M. Purkis.

The remains of a wrecked waterplane at Cannes on March 16th, flown by M. Garros and which came to grief on the rocks during the same evening. The photograph shows the remnant of the machine after being partially dismantled, prior to its being carted away.

Mr. Hucks at Lincoln.

A VISIT from Mr. Hucks is an annual event in Lincoln. Last Wednesday, Friday and Saturday Mr. Hucks paid a third visit, this time to demonstrate "looping." On Wednesday, in glorious sunshine, he first took up his two-seater and showed what a lot can be learnt in twelve months' flying with the same type of machine. On the looper Mr. Hucks made seven loops and flew upside down for half a mile, incidentally reaching his 250th loop.

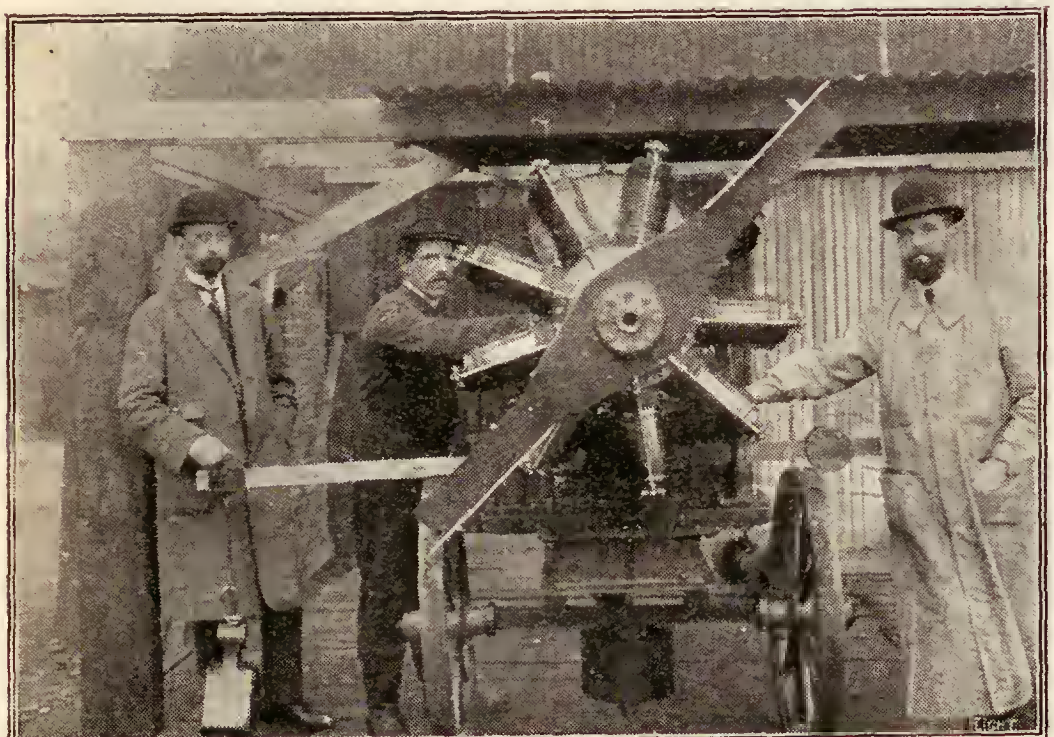
On Friday again, in ideal weather, Mr. Hucks added six loops to his total, and gave five people their aerial baptisms. Amongst these was a local newspaper representative, and his descriptive article next morning proved that the aeroplane has lost none of its power to inspire verbal high flights.

On Saturday there was an immense crowd, both inside and out, and they were given a full afternoon's sport. The wind was choppy and blowing across the aerodrome, but 12 loops were accomplished, and on one occasion, Mr. Hucks flew inverted for over a mile. Four passengers were carried, including two ladies who were the first lady cyclists in Lincoln, and so achieved the distinction of being the first Lincoln ladies to fly.

This week Mr. Hucks is at Bristol. On Easter Monday he will be seen at Coventry. On Easter Tuesday and on Thursday, April 16th, and Saturday, April 18th, he will loop at the Leicester Aerodrome adjoining the Racecourse.

Opening of the *Daily Mail* Tour.

AGAIN on behalf of the *Daily Mail* Mr. Salmet will this summer make a tour of the country, this time keeping to the coast. The tour commences on Easter Monday at Paignton, near Torquay, South Devon. Mr. Salmet will use two machines, one an Avro, and the other a Blériot waterplane.



The first British-built Gnome motor, which has been constructed for the Naval and Military Aeroplane Competition, and has now completed all its tests. On the left is Mr. Holt Thomas, who is responsible for the building and handling of the Gnome motor in England.

Foreign Aircraft News.

The Monaco Rally.

Five competitors actually made a start in the aerial rally on Thursday of last week: Verrier on a H. Farman starting from Hendon, Brindejonc des Moulinais on a Morane from Madrid, Garros also on a Morane from Brussels, while Malard on a Nieuport and Moineau on a Breguet started from Buc. Verrier made a good trip down to Bexhill, but then found such a thick fog in the Channel that he decided to return. Brindejonc, who left Madrid after making the necessary stops at Vittoria, Bordeaux and Albi, reached Marseilles. Garros, after making good progress by Calais and Dijon, had to descend at Orange owing to a backfire which set light to the machine, and in the sudden landing the chassis was damaged. Malard reached Bordeaux, and was so fatigued that he decided to wait there for the night; while Moineau, after making a stop at Chadignac owing to trouble with his petrol supply, had to stop at Cantinolles, close to Bordeaux, and in coming down his machine came into contact with a live electric wire, resulting in serious damage to it.

The following morning Brindejonc completed the journey to Monaco, and his time for the complete course of 1,293 kiloms. was given as 16 hrs. 2 mins. 28 secs. The weather was very rough and the monoplane was damaged on alighting. Verrier made another start from Hendon, and after flying for about two hours passed by Calais, making his way south for Dijon. Unfortunately he was forced to make a stop at Chateauneuf. On Saturday Hirth on an Albatros made a fine flight from Gotha to Marseilles with a passenger. No flying took place on Sunday, but on Monday morning Hirth started on the final stage to Monaco. In coming down at the control at Tamaris, however, the machine capsized and had to be towed ashore, the pilot ahd passenger being picked up by motor boats. The same day Brindejonc set out to try and improve his time over the Italian course, and reached Genoa.

A Night Flight by Rene Caudron.

On a Caudron biplane fitted up with electric lights, Rene Caudron, with Galvin as passenger, made a lengthy flight after dark above Abbeville, Port Mahon and Rue on the 1st inst.

Lyon to Montpellier on Farmans.

Acting under orders from Col. Bouttieaux, Lieut. Gignoux and Adjutant Massonnaud, each on a Farman machine and accompanied by a mechanic, on the 31st ult., flew from Lyon to Montpellier, making a call *en route* at Avignon.

Fatal Accident in Germany.

While an aeroplane was being piloted by Lieut. Lankmeyer at a good height over the Schleissheim aerodrome near Munich, it suddenly collapsed and fell to the ground. The pilot was killed and the passenger, Lieut. Ruchti, very severely injured. It is stated that the accident was caused by the propeller bursting, leading to the breaking of some of the stay wires.

Military Flying in Belgium.

On the 31st ult., Lieuts. Liedel and Debueger made a circuit from Kiewit to Hassalt, Landen, Liege and back to Kiewit in an hour and three-quarters. The next day, Crombez, who is now doing his military training, flew from Brussels to Tournain, where he took up several passengers before returning to the Belgian capital. Also, on the 1st inst., Hagemans and Liedel, each on an 80 h.p. biplane, flew from Kiewit to Brussels.

An Experimental Flight in Holland.

Last week, Lieutenant. J. P. Bolton, of the Dutch Army, made a flight with a passenger at the Soesterberg Aerodrome with a view to finding out whether it was possible to observe the operation of quick-firers from the air. He found that when the gun was placed on sandy soil it was easily observed, but it could hardly be distinguished against a background of moorland. It was impossible to hear the sound of the firing owing to the noise of the engine.

Three Hours' Trial by Schutte-Lanz.

Another long trial was made by the new Schutte-Lanz airship "SL2" on the 31st ult. Leaving her hangar at Mannheim at 11 a.m. she cruised along the Neckar valley for three hours.

An Italian Height Record.

On April 1st, at the military aerodrome near Milan, Lieut. Rolognesi beat the Italian height record by going up to 4,400 metres. The previous national record was 4,170 metres made on the 28th ult. by Capt. Matteucci.

Paris to Rheims and Back on a Nieuport.

On a Nieuport monoplane fitted with a 100 h.p. Gnome motor, Serjeant Piquet and a passenger flew on the night of the 2nd inst. from Villacoublay to Rheims. The next morning they returned to Villacoublay.

Four New Loopers.

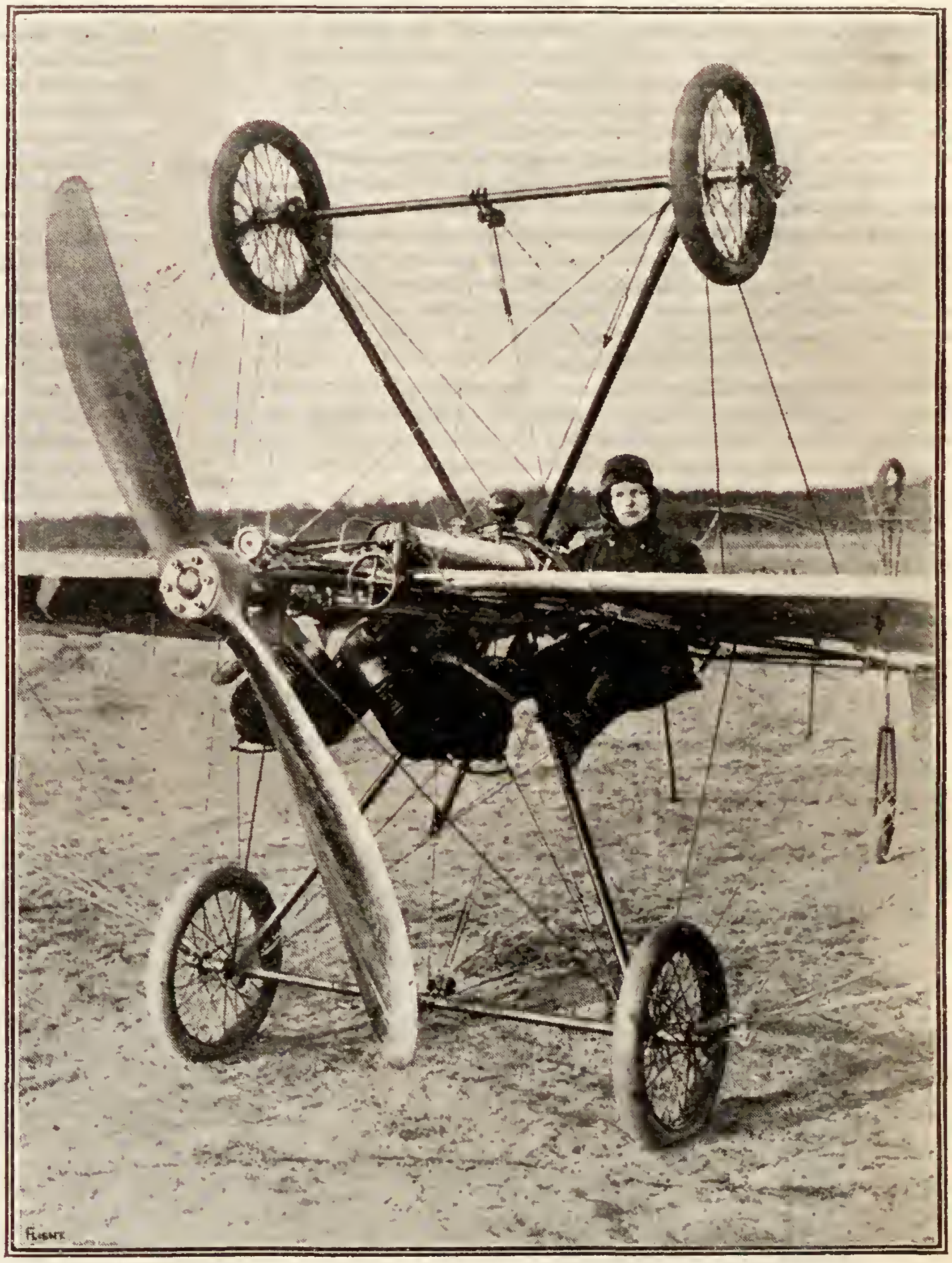
At Buc on the 1st inst. Major Piazza of the Italian Army looped the loop on a Blériot, while at the Chateaufort ground close by Chemet carried out the manœuvre on a Borel. The next day Conard looped the loop at the Blériot school at Buc, while Jupin did it at Chateaufort on a Bathiat-Sanchez monoplane.

Looping on an Anzani-Caudron.

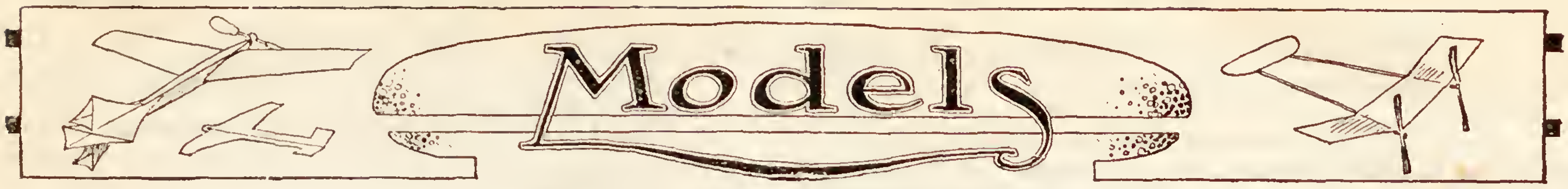
During a test flight on the 1st inst. at Crotoy with a standard Caudron biplane sold to the pilot Simon, Chanteloup made seven perfect loops. The machine is fitted with a 50-60 h.p. 6-cylinder Anzani motor with the ordinary type Zenith carburetter.

Long Flight on a Blériot.

On his Rhone-engined Blériot, Lieut. Gouin on the 2nd inst., made a flight from St. Cyr to Avor Camp and back, a round trip of 300 kiloms.



THE LATEST IDEA FOR LOOPING THE LOOP.—Pilot Gustav Tweer has been making trial flights on the above machine, constructed so that he can land upside down if necessary, having, as is seen, chassis and wheels both above and below the planes. He has been flying this machine at Bork.



Models

Edited by V. E. JOHNSON, M.A.

Aero Models at Olympia.

The Flying Tests at Hendon.

THE flying tests of the models exhibited at Olympia were carried out at the Hendon Aerodrome and the Welsh Harp Lake, on April 3rd and 4th respectively. On Friday afternoon the classes tested were the single-screw r.o.g., the weight-carrying models, and the ornithopters. The day was an almost ideal one for model flying, and competitors had nothing to complain of on that score; there was both a nice breeze and plenty of sunshine.

CLASS 2 B.

In the single-propeller r.o.g. class some very good flying was seen, although, so far as we know, the present record was not broken. Several of the models suffered considerably in their first flight from being over-elevated; and several instances also occurred of the wings "flapping" badly in the single-stick type, owing to the absence of any bracing wires. There was a considerable difference shown in the "steadiness of flight" exhibited by the different models. As a matter of fact, this struck us as being rather more pronounced than usual; but this is merely an impression. The average stability shown was certainly not better than usual; but a considerable number of very good flights were made. Personally, the writer was most struck by those of Mr. H. R. Weston, whose model flew both consistently and well. The stability or steadiness of the model was quite striking. The *fuselage* or motor rod was a hollow tube, with the rubber motor *inside* it; a feature which the writer has advocated on more than one occasion. The tube not only tends to damp out the oscillations of the vibrating as well as the untwisting rubber motor, but being totally enclosed, it also prevents those irregular air reactions which again tend to *un*steady the machine. Aeromodellists who have not tried this method should do so, such tubes are commercially on the market, and they do not of necessity increase the building difficulties of the machine. Moreover, the rubber is out of sight and the appearance of the machine greatly improved.

CLASS 8.

The Ornithopter Competition once more fizzled out; this time, if our memory does not fail us, being the third time that this has occurred. Only one competitor, Mr. G. Hayden, of the Wimbledon Model Aero Club, who exhibited a model on the double-wing roller principle, put in an appearance, and as he was unable to obtain an unofficial trial flight of the qualifying 15 seconds duration, no official flights were made.

One fault that struck us most whilst watching some of Mr. Hayden's attempts was that the rear edge of the wings was not nearly flexible enough, more especially, of course, near the tips.

Whether the prize will ever be offered again we do not of course know, but several aeromodellists who have not so far tried it were struck by what they saw, and informed me that they should have a cut at it, if it was.

One thing that has very clearly been shown is that the matter is one which is not nearly so easy of accomplishment as many appear to have supposed, and if the prize is still to be won, whoever does win it will richly deserve all he gets. That the principle is as good as the present one, or that it is one which can ever be applied successfully to full-sized practice, seems most unlikely. Yet there are the birds, and in model form at any rate something must be possible, and some knowledge would undoubtedly be gained from a successful result.

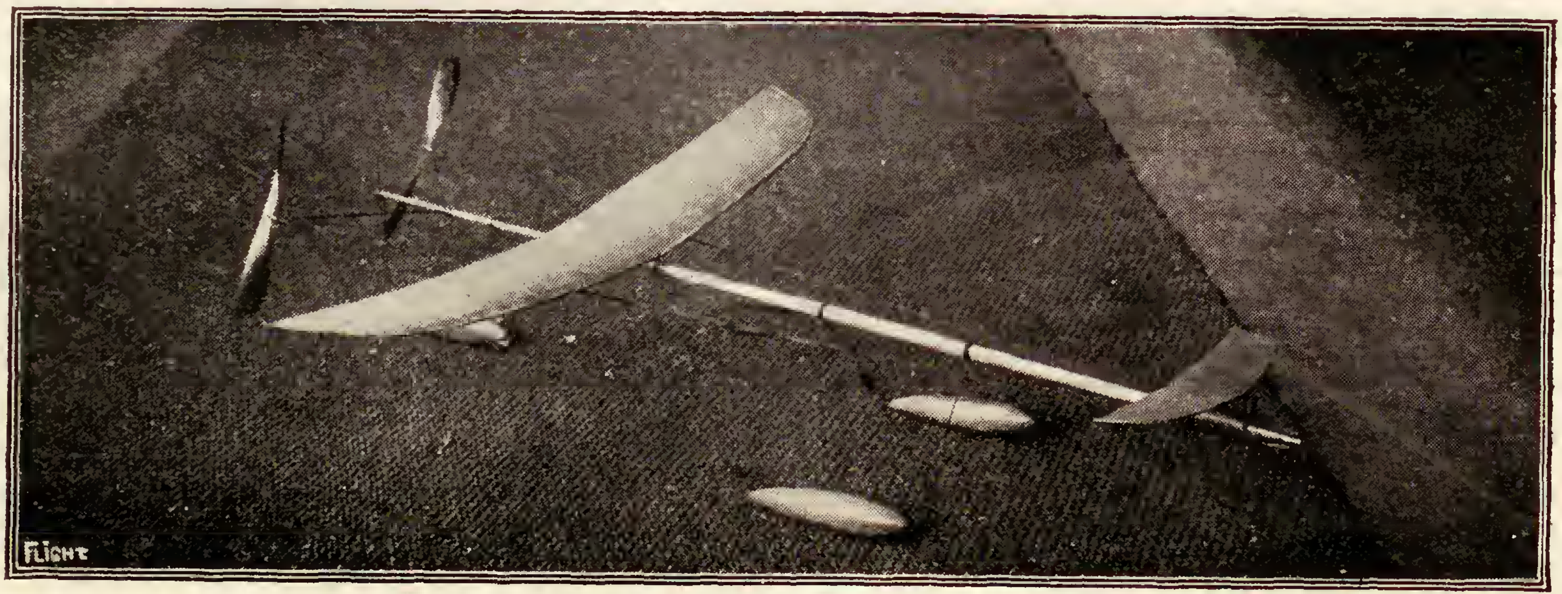
CLASS 6.

The weight-carrying competition was not only the most successful flying exhibition of Friday afternoon, but of the whole competitions. It was in every respect a complete success, and the results obtained go far to prove several points advocated more than once in this section of FLIGHT. The minimum weight of the models *unloaded* was *one pound*, and they had to carry an additional dead weight of a *quarter* of their own weight. The minimum permissible weight was therefore 1¼ lbs., *i.e.*, 20 ozs. As a matter of fact, most weighed considerably more. In spite of all these adverse conditions, Mr. A. F. Houlberg succeeded in putting up a wonderful flight of no less than 1 min. 7 secs.—the best flight of the whole afternoon, beating even the 6-oz. single-propeller (unloaded) models, including one of his own. His other two flights were unfortunately only some 12 and 10 secs. respectively, which naturally had a very bad effect on his average. This once again emphasizes what has often struck the writer, that the twin-screw-behind tail-type model, even in the hands of an expert, is an *uncertain* model. Such a fine adjustment appears to be necessary owing to the extreme sensitiveness of this type of machine, especially if stability has been somewhat sacrificed for the sake of efficiency. However, this in no way affects the result, which we welcome most gladly, because it shows that when a large model is correctly designed for duration it can accomplish it, and even compete quite successfully against smaller models under more favourable conditions.

Mr. D. Easdale flew a large tractor machine some 30 ozs. in weight, and made three excellent and consistent flights, one of 36 secs. The stability exhibited by this model was really remarkable, and the manner in which it both launched itself and descended was everything that could be desired. Moreover, Mr. Easdale was placed at a considerable disadvantage, because some days before, whilst trying the model on Wimbledon Common, it landed in the midst of a number of mounted Territorials, and a model is not improved by having a squadron of cavalry ride over it.

Mr. L. H. Slatter's model was a trifle over elevated in his first flight, but succeeded in accomplishing a duration of 33 secs.; his second flight, although of rather less duration, viz. 30 secs., was a very good one. In his third flight, the model showed slight lateral instability, but it was a very good flight of 38 seconds' duration. Mr. F. W. Jannaway's model got up very nicely, flew well and landed well on two occasions, his best duration being 28 seconds. In his third flight, if we remember correctly, the model was over elevated and the flight was of the usual parabolic type—duration 5 seconds.

Mr. P. G. Cox, who was flying a very heavy model, succeeded in obtaining in his second flight a duration of 24 seconds, a decidedly good result under the circumstances; the chief fault in his model



Mr. A. F. Houlberg's hydro-aeroplane Olympia model. "Flight" Copyright.

was a lack of lateral stability, the model oscillating rather badly from side to side. When Mr. Cox has overcome this the model will be greatly improved.

Mr. H. R. Weston unfortunately smashed his model at the first attempt, owing to its turning to the right and running off the board before it had risen. There was one weak point in the construction where the skid joins the lower longitudinal, and the ground found it out.

On April 4th, the power-driven models, the hydro-aeroplane, the twin-propeller r.o.g. machines and the single-screw tractor competitions were all carried through under far less favourable weather conditions.

CLASS 2A.

The twin-screw rubber driven r.o.g. machines gave as usual a very good account of their flying capabilities. Most of the models were more or less wet, which naturally did not improve their duration powers. In spite of this Mr. G. Hayden (Wimbledon Model Club) succeeded in accomplishing a duration of 2 mins. 7 secs., which although not a record is undoubtedly extremely good considering the state of the weather. The number of competitors was very large, and many good flights were made; but there was nothing of a particularly striking or novel character; in fact, so much has already been done with this particular type of model that it is difficult to see what remains to be done.

CLASS 5.

In this class—the single-screw tractor class—some very good flying indeed was seen, many of the models showing excellent stability and quite a good gliding angle as well. Most of the models, in fact, nearly all of them, had a single-stick *fuselage*, which is not pretty in a tractor. We did not see all the flying, but, so far as we saw it, the ones with the covered-in *fuselages* did not give a good account of themselves; they appeared to be underpowered. Naturally the adverse weather conditions affected them more than their single-stick brethren.

CLASS 3.

The hydro-aeroplane flying tests were carried out on the Welsh Harp Lake in the afternoon; the weather was more propitious than during the morning, and some good flying was seen. In this instance the present record was broken by the holder, Mr. L. H. Slatter, who succeeded in accomplishing a duration of 67 secs. Generally speaking, the flying, whilst quite good, was of the usual character. There was, however, one very striking difference. One of the models, when rising from the landing stage, at the third trial, this time on its wheels, was over-elevated, soared high up into the air at a steep angle, became perpendicular, inclined backwards, and finally looped the loop in fine style, alighting right way up on the water, without upsetting; it then skimmed along, rose off the surface of the water, and after making a short normal flight, finally alighted correctly on land, an incident which, so far as we know, has never happened before, and it will probably be a long time before such an event happens again. Thus has a model once again surpassed its full-sized prototype.

CLASS I.

The power-driven model flying tests, from a competitor's point of view, were of an absolutely heart-rending character. The minimum qualifying duration was 30 secs. In spite of the fact that no less than some eleven power-driven models of varied type actually came up to the scratch, not one of them could do it—the best flight being one of 23 secs. [There is some uncertainty about the exact time, but in any case it was not more.] The smashes were appalling.

What was the reason of such a fiasco? It was very largely due to the totally inadequate provisions that were made for the self-launching of the models. The board provided was neither long enough nor broad enough, and even when it was seen that such was the case no effort was made to attempt to remedy it. Even a hangar door might have done it, but no attempt was made to get one.

The board was long enough for the lightly-loaded compressed air models, but none of these could accomplish anything in the way of actual flight, and the most promising were quickly *hors de combat* through too violent impact with mother earth or collisions with too curious spectators; no roping-off was attempted.

Neither Mr. H. H. Groves, who had two steam-driven models, nor Mr. C. L. Pratt, who also had a model of the same type, could rise in the length of board provided. All three models were in good form and the power plant working well each time, and we have not the slightest hesitation in saying that if these could have only got off they would have done something. On the rough ground they could do nothing. Mr. D. Stanger wisely forbore not to try off the board, but off the rough ground, his models being larger and fitted with bigger wheels. In the end both his machines were smashed more or less; the second one he smashed simply and solely on account of the ground, over which it taxied, upset and smashed before the correct elevation could be obtained. Hurriedly mended, Mr. Stanger once again tried, and this time made a very fine flight of some 23 seconds duration, but the machine was not in a fit state to fly, and it landed badly and broke its *fuselage* clean in two.

Mr. C. F. Fearn was unable to get his petrol motor to run properly, and so this large model made no official attempt at a flight.

To expect aeromodellists to build expensive power-driven models, taking months in some cases to build: to tune up their complicated and delicate motors, only an expert can do it; and then when they come forward prepared to take a sporting chance, because after all it *is* a sporting chance, of a successful issue and an undamaged model; and *not* to give them a fair chance of showing what their model *can* do; *all and every one of them*, is certainly encouraging the more advanced type of model with a vengeance. Obviously the only way out of the difficulty is the abolishment of the board, once and for all. Even some quite small clubs have passed beyond this stage of the art. Have a patch of grass some 40 or 50 yards square cut and rolled, and compel *every* model, rubber-driven or otherwise, to rise from it. It will compel the rubber-driven model to use wheels which *are* wheels, and it will provide the power-driven model with what it requires, a sufficient distance to rise in, more especially if there be, as there was on Saturday, an absence of wind to assist them. The power-driven model competitors have our sincere sympathy.

Canard-Type Models.

"I have been reading with interest the correspondence in FLIGHT *re* Canard-type aeroplanes," writes Mr. H. E. Hervey, "but cannot say that I agree with many of the statements made against this type of machine, especially Mr. W. E. Evans' remark, 'that the Canard-type model has practically received its death-blow as far as scientific models are concerned.' Experiments with any type of model, however unpromising that type may seem, will often give really useful results. I cannot myself see the difficulty in designing a covered-in *fuselage* suitable to this type. I have seen one or two twin-propeller models with covered-in *fuselages*, and I have myself constructed six or seven single-propeller models with covered-in *fuselages*, and have had very good results with them. Although the *fuselages* on these machines may not have given a perfect streamline, they were, at any rate, as good as a great many used on present-day full-sized tractor machines."

Mr. H. Eaton also writes: "*Re* your remarks on Canard-type models, I quite agree with Mr. Roberts. About a year ago I made a model of this type, and I am pleased to say I had some fairly good flights with it; as far as I can remember, the best duration was 28 secs., and the distance 120 yards. The machine showed great stability, which, I think, was due to the covered-in *fuselage*. I shall be pleased to supply further particulars to any readers who are interested."

Perhaps the best and only answer which is necessary with respect to the above is *that not a single canard-type covered-in fuselage model was exhibited at Olympia*, or, at least, the writer failed to find one. We do not, of course, quite know what Mr. W. E. Evans intended to convey by his remark. It appears to the writer that save for sporting purposes and junior competitions the canard-type model has served its purpose, and could well be, if not dropped, certainly relegated to a subordinate position for reasons already stated. It has proved a most valuable servant, but that is no reason why it should be allowed to become a ruling taskmaster. For anyone taking up model aeroplaning it is an excellent model to commence with, because it is the easiest with which to get successful results. For this reason, if for no other, it will always be popular. It must not be forgotten that an enormous number of experiments have been made with this type, far more so than with any other. The most valuable type of model is naturally that which promises the best as applied to full-sized design, at present for military and naval purposes.

* * * *

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

International Aero Exhibition. Flying Tests.—The flying tests of models in connection with the International Aero Exhibition took place at the London Aerodrome (by kind permission of the Grahame-White Aviation Co.), on Friday and Saturday, April 3rd and 4th, and the hydro. contest at the Welsh Harp. The competitions were keenly contested, and the full results will be published in next issue. The team competition, as far as is known, shows Wimbledon 1st, Leytonstone 2nd. It was pleasing to see some of the well-known aviators present at all the trials, and among those who attended the Welsh Harp Mr. Gordon Bell was noticed.

General Meeting.—The annual general meeting will be held at Caxton Hall, on Thursday April 16th, at 8 p.m., and the notices will be sent out during the week, and it is hoped that all members will endeavour to be present. Any notice of motion or nominations must be in the hands of the secretary by the 14th. Any suggestions for competitions should be forwarded to the hon. sec. at once, and it is hoped that several will be received from members and friends who would like to see any particular competition held, as now is the time, so that rules committee can decide on programme.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, Leyspring Road).

April 12th, at 6.30 a.m. and 10 a.m., flying on Wanstead Flats as usual. If wet at 10, meet at clubroom.

Paddington and Districts (77, Swinderby Road, Wembley).

Good Friday, practice flying at Sudbury; April 11th, scratch competition for twin-propeller models: weight, 6 ozs.; loading, 4 ozs. Prizes, 3*s.*, 2*s.*, 1*s.*, for best averages. Easter Monday, handicap competition for twin propeller models, same weight and loading. Prizes. 2*s.*, 1*s.* 6*d.*, and 1*s.* Scratch competition for single-screw models. Weight, 6 ozs.; loading, 4 ozs. Prizes, 2*s.* and 1*s.*; average of three flights.

Sheffield Ae.C. (41, Coniston Road, Abbeydale, Sheffield).

April 11th, tractor biplane contest postponed owing to members having to make special machines for 4th inst. April 13th, at 2.30 p.m., at Standhouse Aerodrome, Intake (weather permitting only), first contest for weight-carrying machines, r.o.g. and hand-launched, novices and juniors, for medals presented by Mr. C. F. W. Cudworth.

Wimbledon and District (165, Holland Road, W.).

April 10th, 11th and 12th, flying at 11 o'clock and 2.30. April 13th, sealed handicap competition for Olympia machines; time will be announced later. Members are reminded that subscriptions are now due.

UNAFFILIATED CLUBS.

Ilford Model Ae.C. (83, Endsleigh Gardens, Ilford).

April 11th, flying as usual at Hog Hill, Hainault Forest, Chigwell Row, at 9.30 a.m. (weather permitting). There will be no official flying meeting on Easter Monday.

Liverpool Aero Research Club (62, Cedar Grove, Liverpool).

April 11th, Sefton Park, 3.30 p.m. Easter Monday, Sefton and Stanley, 10.30 a.m. and 3.30 p.m. April 14th, general meeting, 62, Cedar Grove, 8 p.m. All urgently requested to attend.

S. Eastern Model Ae.C. (1, Railway Approach, Brockley).

April 10th, Blackheath, 6.30 to 10 am; 11th, Woolwich Common, 3.30 to 6.30 p.m.; 12th, Blackheath, 6.30 to 10 a.m., Lee Aerodrome, 10.30 a.m. to 1.30 p.m.; 13th, Blackheath, 6.30 to 10 a.m., and Lee Aerodrome, 10.30 a.m. to 1.30 p.m.

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CORRESPONDENCE.

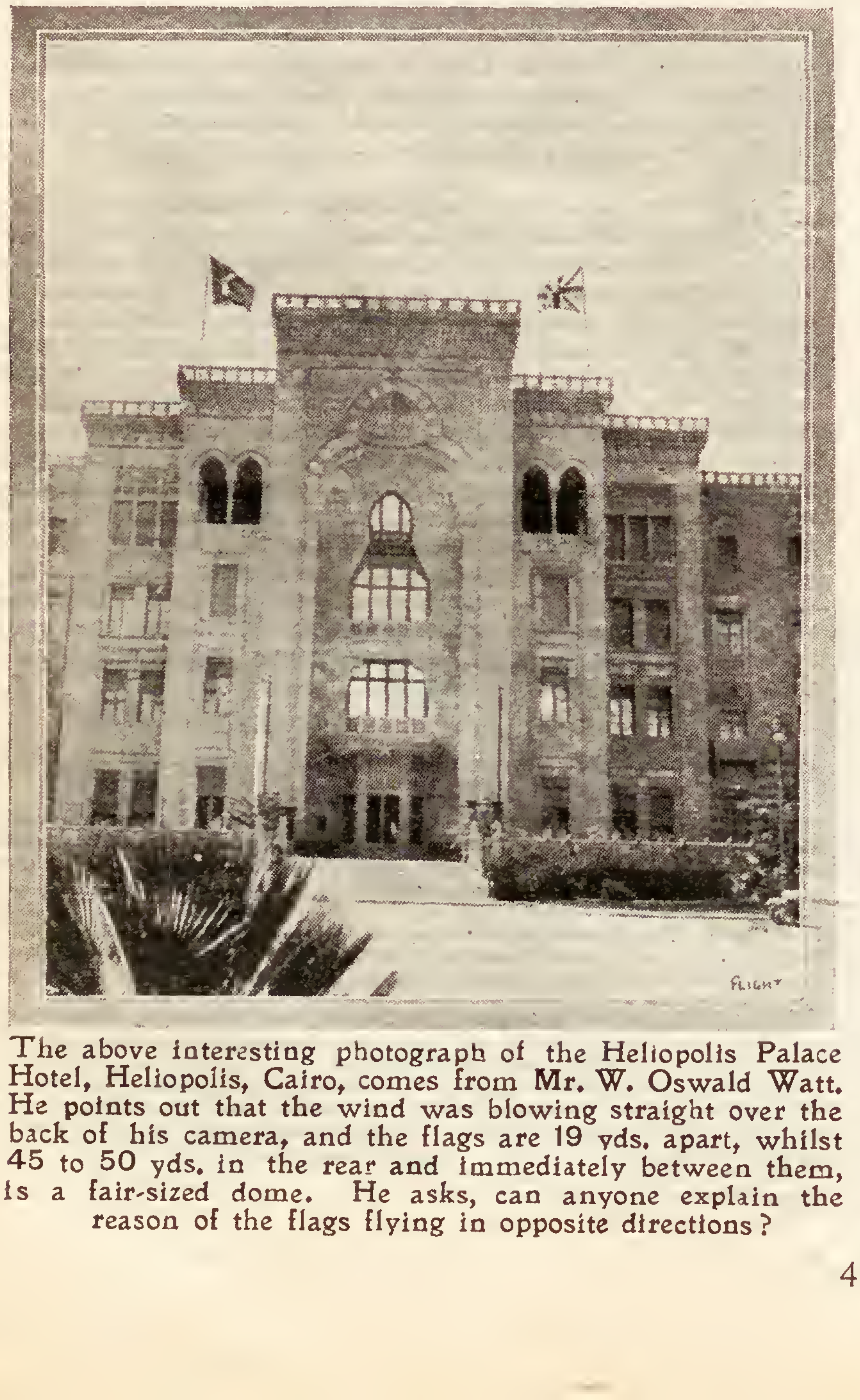
Rotary Engines.

[1851] It is not at all clear to me how the Statax engines described in FLIGHT convert the force of the explosions into rotary movement. In other words, the inclined rotary disc to which what one might call the big-ends of the connecting-rods are fixed does not seem at all an efficient method of converting reciprocating into rotary movement. Perhaps someone amongst your readers better able to deal with the matter than myself would compare this combination with the more generally used crank-shaft, pointing out the advantages and disadvantages of each.

Leeds. MECHANIC.

[The fundamental *principle* involved in the design of the Statax engine is that the pistons are connected to a "swashplate" attached to a central shaft, and various constructions have been evolved at different times embodying this principle. As in the conventional engine, there is no tendency to rotary movement when the pistons are at the ends of their strokes, but so soon as the dead centre is passed, the thrust due to the pressure on the piston is transmitted to the inclined rotating ring to which the connecting-rods are attached, and because this ring is inclined the cylinders, &c., are caused to rotate.

There is no reason, neglecting all structural considerations, why this method of converting rectilinear into rotary motion should be inferior to the usual construction.—Ed.]



The above interesting photograph of the Heliopolis Palace Hotel, Heliopolis, Cairo, comes from Mr. W. Oswald Watt. He points out that the wind was blowing straight over the back of his camera, and the flags are 19 yds. apart, whilst 45 to 50 yds. in the rear and immediately between them, is a fair-sized dome. He asks, can anyone explain the reason of the flags flying in opposite directions?

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AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

1. **Meeting.**—The eleventh meeting of the present session will be held on Wednesday, April 15th, at 8.30 p.m., when Brigadier-General D. Henderson, C.B., D.S.O., will preside. Mr. Griffith Brewer, A.F.Ae.S., and Lieut. J. N. Fletcher, R.F.C., will read a paper, to be followed by a discussion, on "The Value of Ballooning as a Training for Flying."

Tickets for visitors, not introduced, may be obtained from the Secretary, 11, Adam Street, Adelphi, W.C.

2. **Election of Chairman.**—Maj.-Gen. R. M. Ruck, C.B., has been elected Chairman of Council for 1914–15.

3. **Appointment of Committees.**—The following Committees have been appointed:—

(a) *Inventions Committee*—T. W. K. Clarke, B. G. Cooper, and Col. H. E. Rawson, C.B., R.E.

(b) *Library Committee*—H. F. Lloyd and B. G. Cooper.

(c) *Research Committee*—Harris Booth, T. W. K. Clarke, B. G. Cooper, Col. J. D. Fullerton, B. Melvill Jones, Archibald R. Low, Mervyn O'Gorman, F. Handley Page, and A. P. Thurston.

(d) *Finance Committee*—Maj.-Gen. R. M. Ruck, A. P. Thurston, and B. G. Cooper.

(e) *Technical Terms Committee*—L. Bairstow, Harris Booth, A. Graham Clark, T. O'B. Hubbard, A. R. Low, Mervyn O'Gorman, C.B., Dr. T. E. Stanton, and Lieut.-Col. F. H. Sykes.

B. G. COOPER, Secretary.

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Cellon Loopers and the Desoutter Fund.

With reference to the letter quoted in Eddies last week from a visitor to Olympia who grumbled at being charged 3*d*, for one of the Cellon loopers, Mr. Wallace Barr subsequently received another letter, dated previous to the publication of last week's FLIGHT, in which the grumbler apologised and explained that he did not see the notice *re* the Desoutter Fund. By way of atonement for his meanness he sent along 12 penny stamps. The amount realised by the sale of the Cellon gliders was £11 1*s.* 5*d.*, and 5 francs.

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Aeronautical Patents Published.

Applied for in 1913.

Published April 2nd, 1914.

6,299. H. Coanda and British and Colonial Aeroplane Co. Ships for use in water and air.
7,514. R. J. E. Fielding. Brakes.
9,538. E. Gérard. Aeroplanes.
9,958. C. J. L'E. Malone. Gun mountings, &c., in aircraft.
25,193. B. De Beer. Control of aeroplanes.

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CONTENTS.

Editorial Comment: PAGE
The Wright Patents in America 403
Men of Moment in the World of Flight: Mr. J. E. B. Thornely 405
The E.A.C. Tractor Biplane (with scale drawings) 406
Looping the Loop 410
Flying at Hendon 411
From the British Flying Grounds 413
Some Impressions of a Cross-Country Flight 416
The Paul Schmitt Biplane 418
The Latest G.A.C.-Roold Safety Helmet... 418
The Value of Ballooning as a Training for Flying. By Griffith Brewer and Lieut. J. N. Fletcher 419
Foreign Aircraft News 422
Correspondence... 424
Models. Edited by V. E. Johnson, M.A. 425
International Aero Exhibition Model Trials 427

EDITORIAL COMMENT.

The Wright Patents in America.

For some time it has been common knowledge in aviation circles in this country that the decisions of the United States Courts in the matter of the Wright patents were having a very adverse effect on the development of the American industry. Just how deeply that effect was being felt was not clear, though in the light of the information conveyed in a communication from an American contributor in Boston to FLIGHT, it would seem that if the Wright Co. persist in their present policy they will succeed, not in making money for themselves, but in wrecking the whole industry. Fortunately for the British industry, there is no threat of any such monopoly as that possessed in America by the Wright Co., for whatever may be the case in other directions, our own patent laws compare favourably in these matters with those of other countries. Leaving aside all these questions, however, it is something upon which to plume ourselves that the only machine which appears to hold out any promise of avoiding the Wright monopoly is one of British design, the Dunne. Even that appears a little doubtful, according to our contributor. However, we will let the latter speak for himself through the medium of his article, which is as follows:—

Boston, Mass., April 1st.

A very interesting situation, from the English point of view, has arisen in America over the Wright aeroplane patents. In January, the Federal Circuit Court of Appeals rendered a judgment for the Wrights which is considered as final, affirming as it does the decision of the lower court. The opinion of the lower tribunal was sweeping in its scope, and gives exclusive control of the aviation industry as it exists in this country to-day to the Wright Co. Following the lower court's decision, Mr. Orville Wright has come out with a momentous announcement which from its terms virtually prohibits the manufacture of aeroplanes by any other concern than the Wright Co., whose plant is situated at Dayton, Ohio. The force of this prohibition lies in Mr. Wright's demand for a royalty of 20 per cent. on the retail price of each machine complete, including motor and equipment. On an aeroplane sold for $5,000, therefore, the royalty would be $1,000, and on an aeroplane worth $10,000 the licence fee would be $2,000. Furthermore, not only must such royalties be paid on all future machines, but before the Wright Co. will license any constructor now in business, royalties on an equal percentage must be paid on every machine produced in the past. In the case of Mr. Glenn Curtiss, for instance, against whom the judgment was rendered, the back royalties would reach a total of nearly $50,000, and their payment, under the present precarious conditions existing in the American industry, would be an absolute impossibility.

It will be seen then that the Wrights hold a complete monopoly over aeroplane production in America, so far as the machines now in use are concerned, and propose to exercise this monopoly to the extent of driving every competitor out of business. This has already happened in the case of Mr. Curtiss, who is soon to transfer the seat of his factory at Hammondsport, N.Y., to Europe, where his hydro-aeroplanes and flying boats have met with an excellent reception.

Mr. Wright defended his course of action by denying that his prohibitory attitude would hamper the development of American aviation, and declared that it would prove a stimulus to the production of types which would avoid the Wright patents. Constructors here are following his advice, and are making every effort to bring out machines which cannot be held to be infringements. In this endeavour one of the most interesting developments is the attempt to escape the Wright patents by means of the Dunne biplane, the American rights to which were secured last Fall from the Blair-Atholl Syndicate by W. Starling Burgess, of Marblehead, Mass., one of America's most prominent aeroplane designers and constructors.

Several years ago the late Wilbur Wright expressed the opinion that the Dunne did not infringe his patents, but since the Federal Court judgment, Mr. Orville Wright, in view of the possibility of competition from the Dunne, has denounced this as a violation of the Wright claims, and has threatened to block the manufacture and sale of the Dunne biplane in the United States. The question of whether or not the British machine does infringe, therefore, will probably assume great importance, for it is the only possibility in sight at present for breaking the Wright monopoly. In this connection there looms up in large proportions a British patent, 1,469, granted in 1870 to Richard Harte. The controls used by Harte in his machine were followed with exactitude by Lieut. Dunne, and the Harte patent was raised in the Wright suit in America as being an "anticipation" of the Wright device.

Stripped of its technicalities the recent judgment upheld the claim of the Wrights to stabilizing control exercised; first, by moving the wing tips, through "means for simultaneously imparting such movement"; and second through the use of the vertical rudder in connection with the movement of the wing tips.

The justice of the decision no one disputes. The brothers Wilbur and Orville put a milestone in history when they taught the world that flight was an actuality. One must seriously question the wisdom, however, of Orville Wright's prohibitory attitude. That his course will mean an actual monetary loss to his company is generally agreed, for every constructor in the country to-day is ready to pay a reasonable licence fee.

As the case stands now, however, attention has been focused on the production of an aeroplane which will not infringe the Wright patents.

Harte was probably regarded as a bit "out," in his day. He was one of the unfortunates, in fact, who can see too far ahead. Here is Harte's specification for his aeroplane control:—

"At the end and back or hinder part of each wing is a flap which moves up and down upon a hinge in the back edge of the wing. This hinge is prolonged in the shape of a rod, and this rod is in connection with a lever, by means of which the flap is made to rise above or fall below the rest of the surface of the wing, this lever being in connection with a second lever which is within the reach of the person who steers the machine."

Now mark how close to this is Claim 1 in the Wright United States patent of 1906:—

"In a flying machine, a normally flat aeroplane having lateral marginal portions capable of movement to different positions above or below the normal plane of the body of the aeroplane, such movement being about an axis traverse to the line of flight, whereby said lateral marginal portions may be moved to different angles relatively to the normal plane of the body of the aeroplane, so as to present to the atmosphere different angles of incidence, and means for so moving said lateral marginal portions, substantially as described."

The Wrights, however, apparently escaped an adverse decision on the ground of anticipation from the fact that in Claim three they included the provision, quoted above, "for simultaneously imparting such movement," namely, the movement of the wing tips, to "different angles relatively to each other." So much is made clear in the opinion of Judge Hazel, of the lower court, who said:—

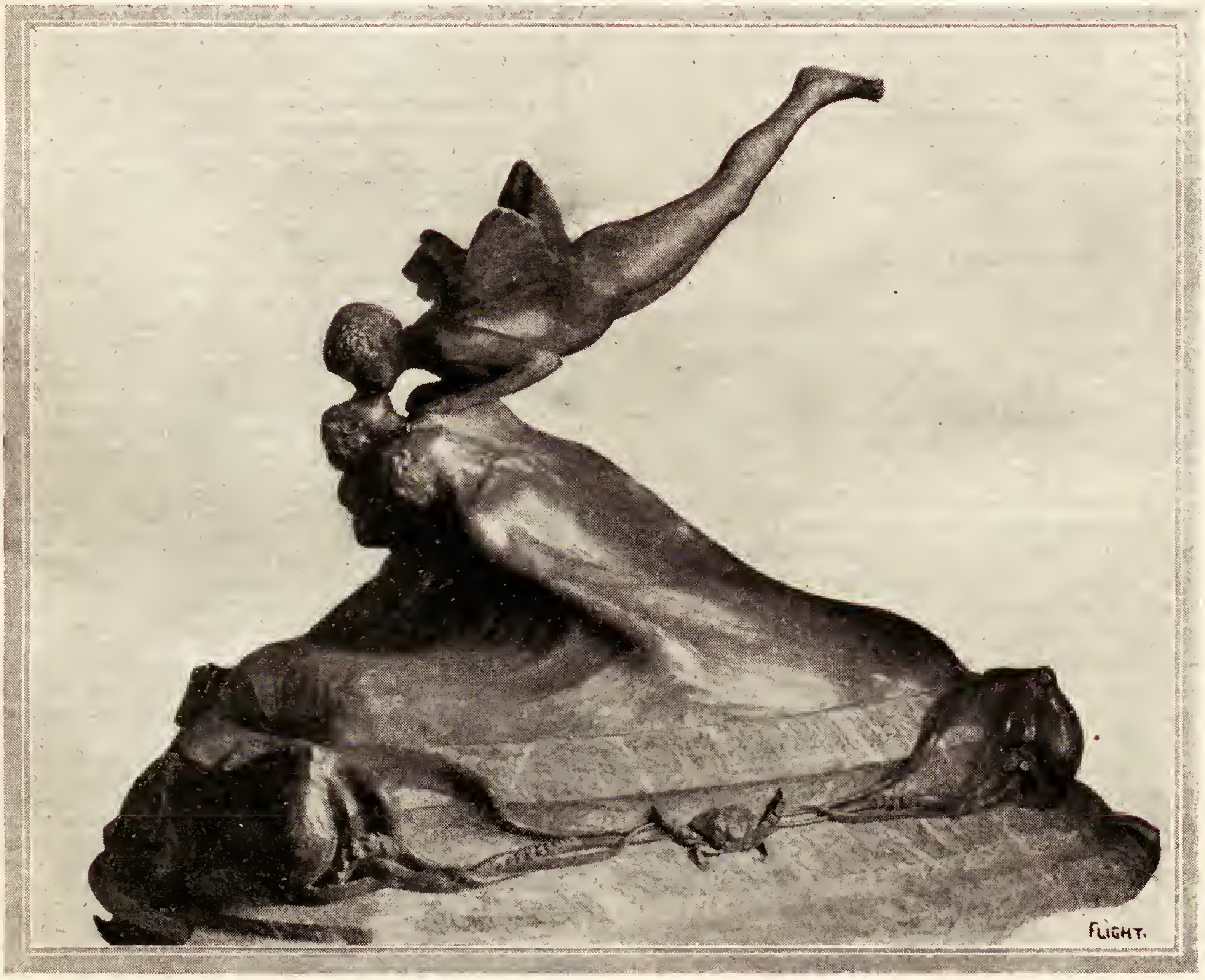
"While the extensions (of the Harte aeroplane) may be movable above and below the normal plane of the main body yet there is no *simultaneous* manual control, and therefore, in my opinion, the described means do not correspond to the combination in Claim III of the Wright patent."

In the Harte device, as in the Dunne, which follows it exactly, the control of each "flap" is separate. Let us consider for a moment the manner in which an inventor of 1870 purposed to keep his craft on an even keel. After telling of the tendency of his machine to tip he goes on to say:—

"This I counteract by means of the flaps of the wings, each of which acts upon the principle of a ship's rudder, and their combined action is such that when one flap is turned up and the other down they simply counteract this tendency of the machine to rotate and keep it steady. When both flaps are depressed the machine will descend, when both are equally raised it will ascend, and when both are raised, but unequally, the machine will make a curve towards the side on which the flap is most raised."

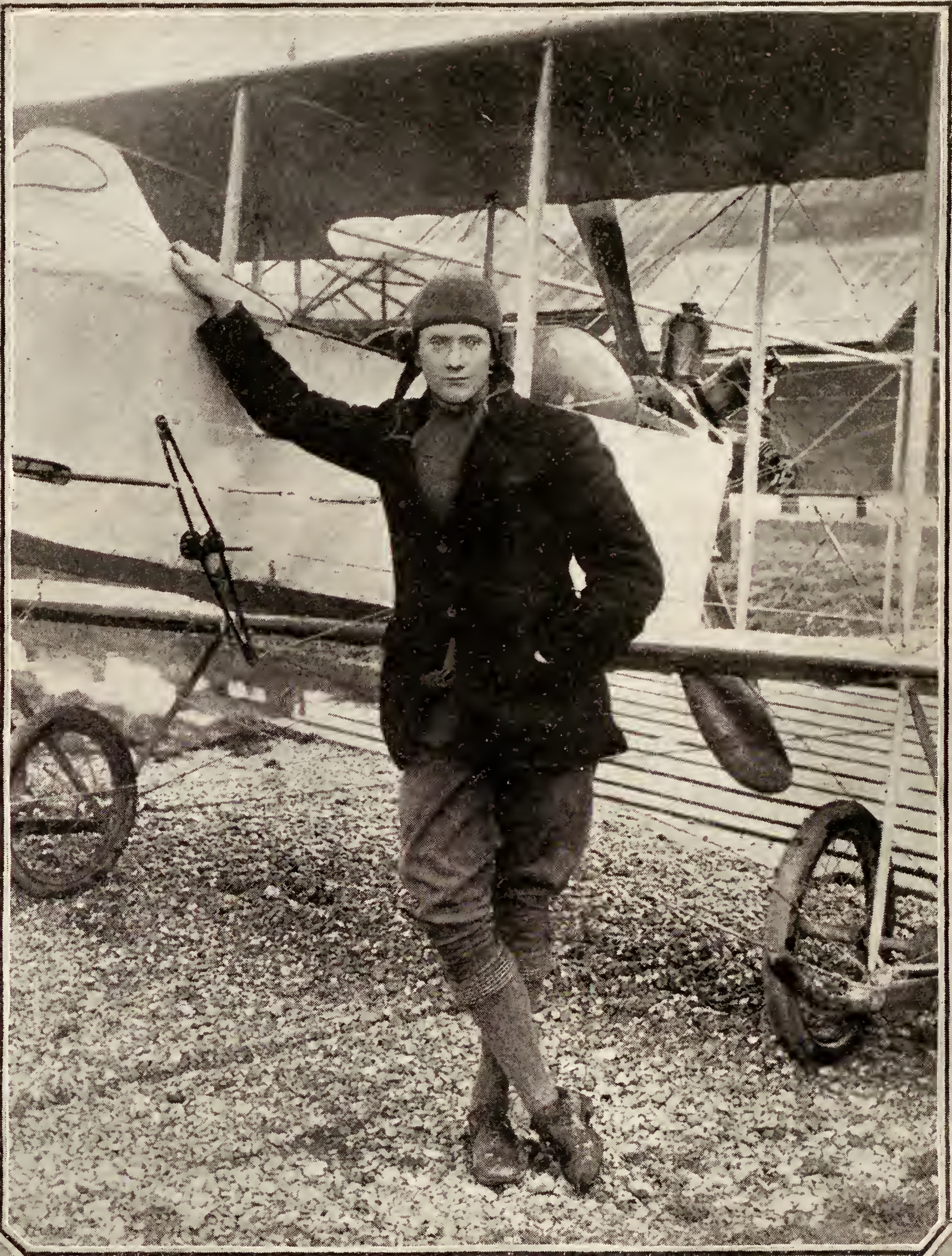
The control there described is identical in every detail with that of the Dunne, indicating that Mr. Harte, back in 1870, was a man of brains, and added something quite beyond a "paper" patent to the annals of aviation. It would be curious, indeed, if this old invention should prove a stumbling-block to the monopolization of the air by the Wright Company.

* * * *



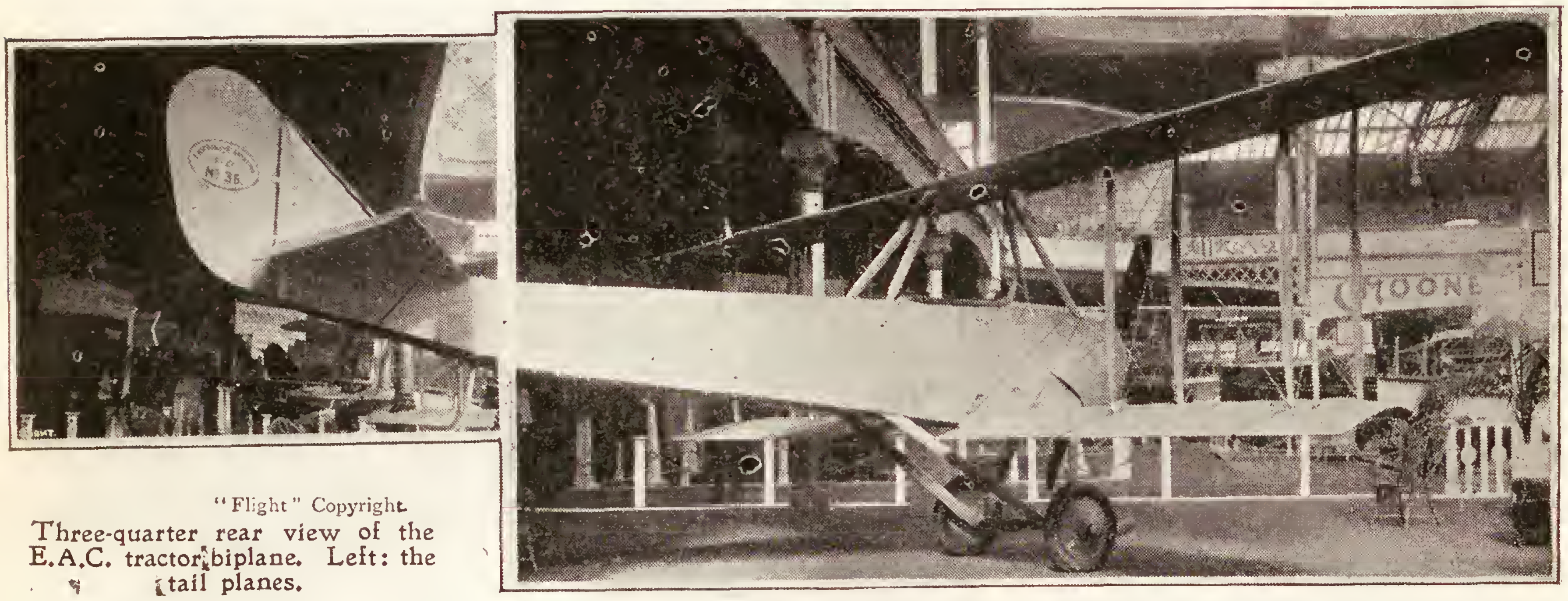
The Jacques Schneider Aviation Cup, one of the important trophies offered for competition at Monaco flying meeting.

MEN OF MOMENT IN THE WORLD OF FLIGHT



MR. J. E. B. THORNELY, who, as recorded in FLIGHT for March 28th, recently looped the loop on a Farman biplane at Eastbourne. Mr. Thornely, who will not be 18 until July 5th next, joined the Eastbourne Aviation Co.'s School in October, 1912, and last year practised on a Blériot monoplane and later on a Bristol biplane.

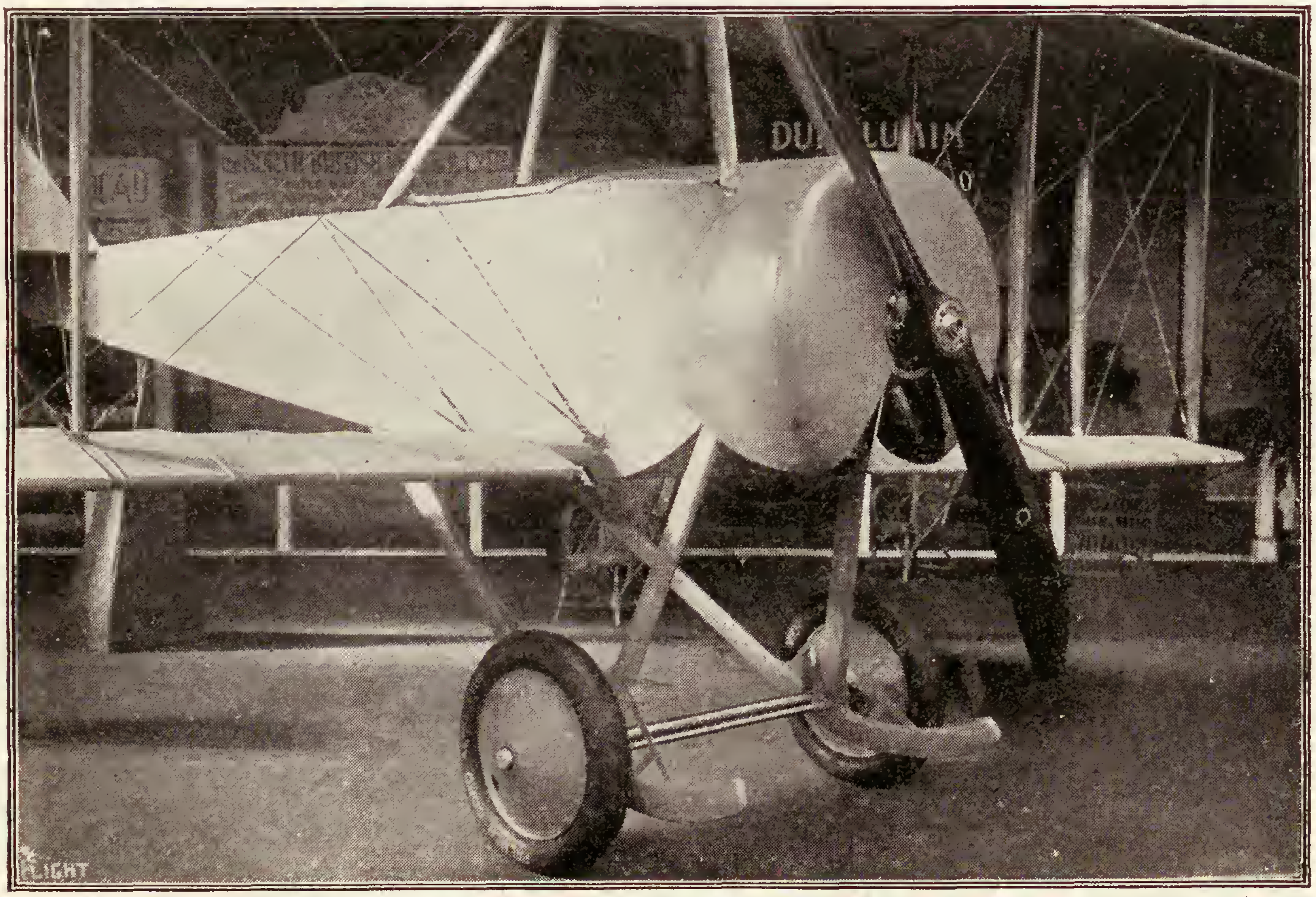
THE E.A.C. TRACTOR BIPLANE.



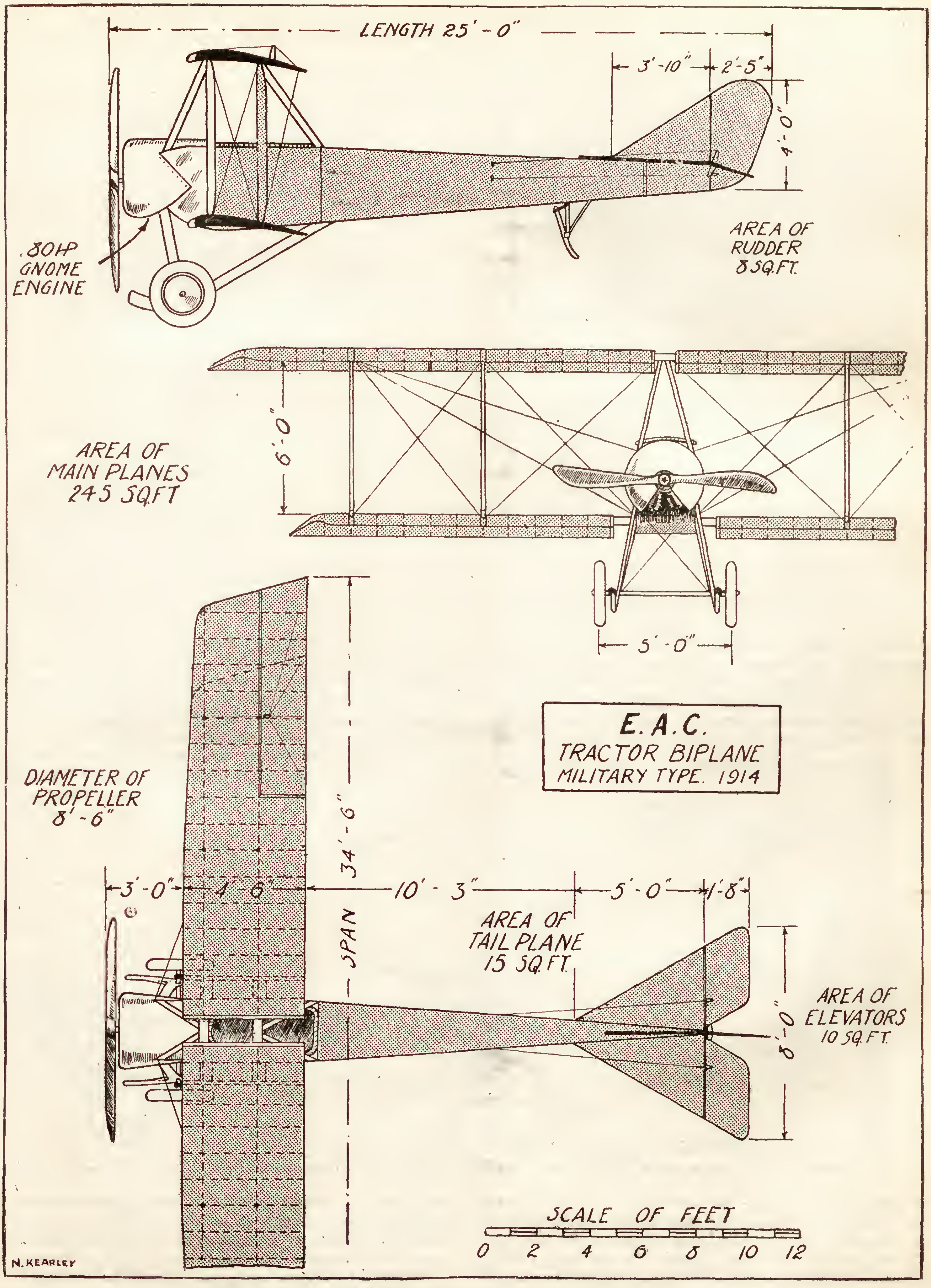
"Flight" Copyright.
Three-quarter rear view of the E.A.C. tractor biplane. Left: the tail planes.

ALTHOUGH the biplane with which the Eastbourne Aviation Co. made their *debut* at the recent Olympia Aero Show does not differ radically, as a type, from already existing machines, there is ample evidence of the careful attention which the designer, Mr. E. L. Gassler, has paid to constructional details. Designed primarily to comply with military requirements, such features as would be desirable in a military machine have been closely studied, and every effort has been made to produce a machine which, whilst being sufficiently strong to stand reasonably rough usage, is still light enough to provide a good climbing capacity. Another feature which should be a point in its favour, is the ease with which the machine may be erected and dismantled for storage and transport, operations occupying, we understand, only a few minutes.

The rectangular section *fuselage* is of the usual girder type, built up of ash *longerons* connected by struts and cross members, of which the front ones are steel tubes, whilst the rear ones are spruce. The *fuselage* is rather longer in proportion to the span than one usually finds on machines of this type, thus providing a good leverage for the tail planes. Mounted on overhung bearings in the nose of the *fuselage* is the engine, an 80 h.p. Gnome, which is partly enclosed by an aluminium cowl for the protection of the pilot and passenger against oil spray. Inside the *fuselage* and between the engine and pilot's

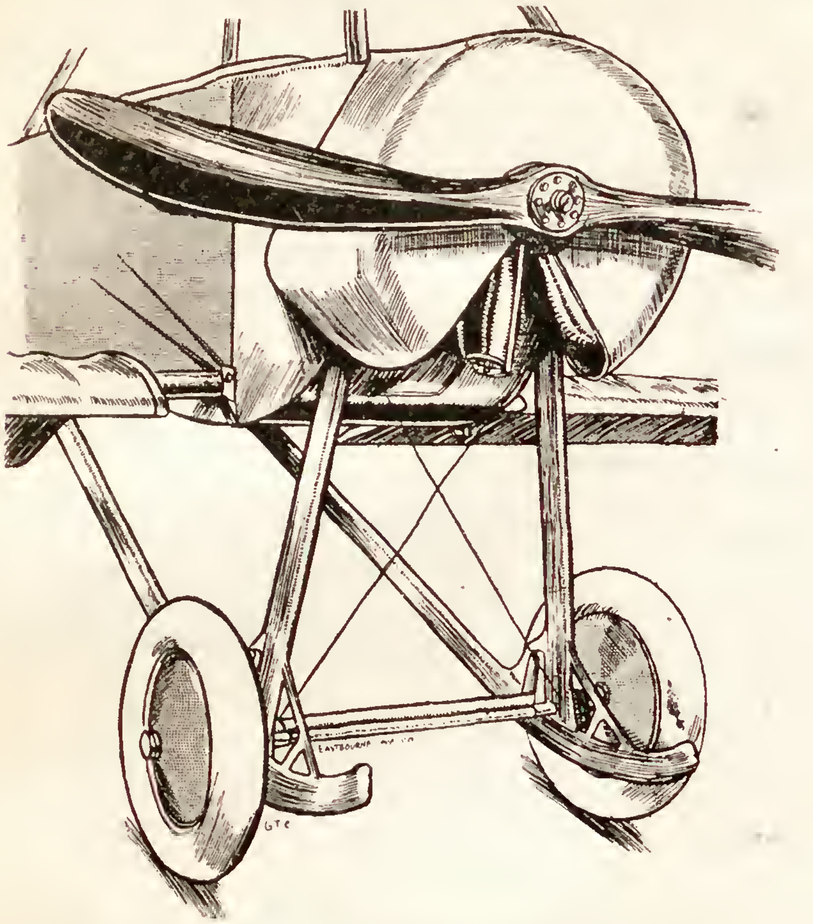


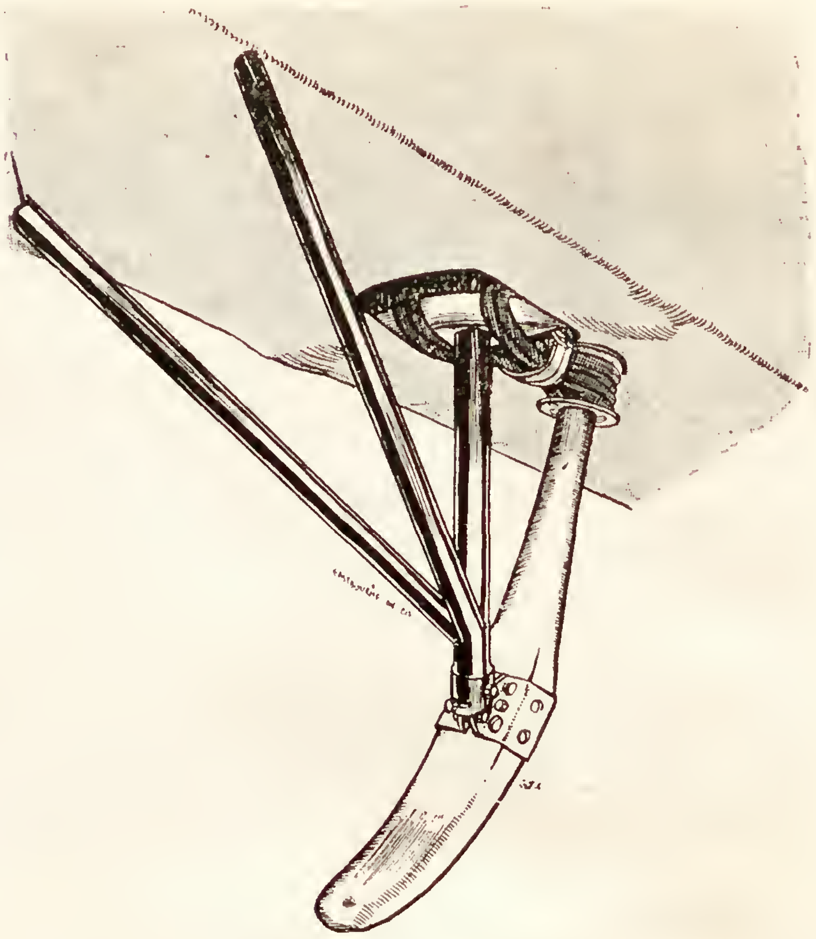
View of the chassis and *fuselage* of the E.A.C. biplane from in front. "Flight" Copyright.

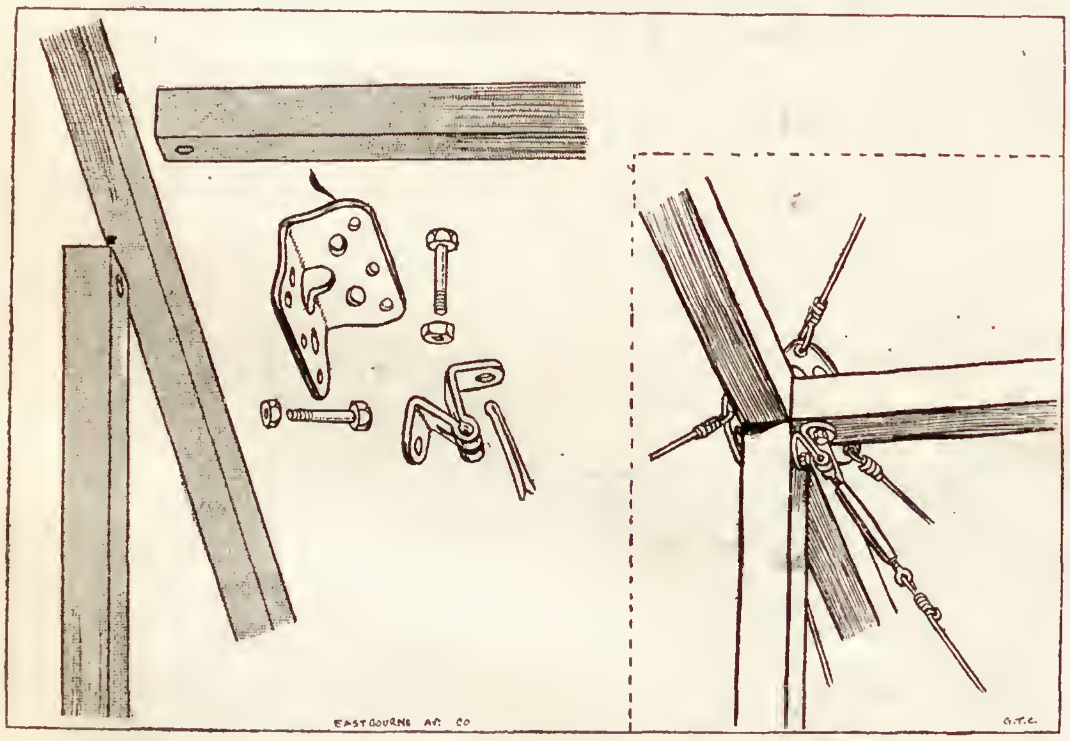


THE E.A.C. BIPLANE.—Plan, side and front elevation to scale.

seat are the oil and petrol service tanks. Petrol is forced to this service tank from the main tank carried behind the pilot's seat by means of a hand operated petrol pump. The pilot's and passenger's seats are arranged tandem fashion, the pilot occupying the front seat. From the passenger's or observer's seat an excellent view is obtained, this being further enhanced by leaving the inner portion of the lower main planes uncovered where they join the *fuselage*. In order to reduce head resistance on the thus uncovered spars, these have been enclosed in streamlined casings, as shown in one of the accompanying sketches, which also shows the method of attaching the spars of the lower plane to the *fuselage*. *Ailerons* and elevator are operated by a single central column in front of the pilot, whilst the rudder is actuated by a pivoted foot-bar. The instruments carried are the usual for cross-country work, such as altimeter, compass, clock, revolution indicator and air-speed indicator. A starting handle in front of the pilot makes it possible to start the engine without the necessity of any preliminary swinging of the propeller, a point which should be especially valuable for cross-country flying, as it enables the pilot to make a start without any outside assistance, which is not always available when making forced landings during a prolonged cross-country flight.

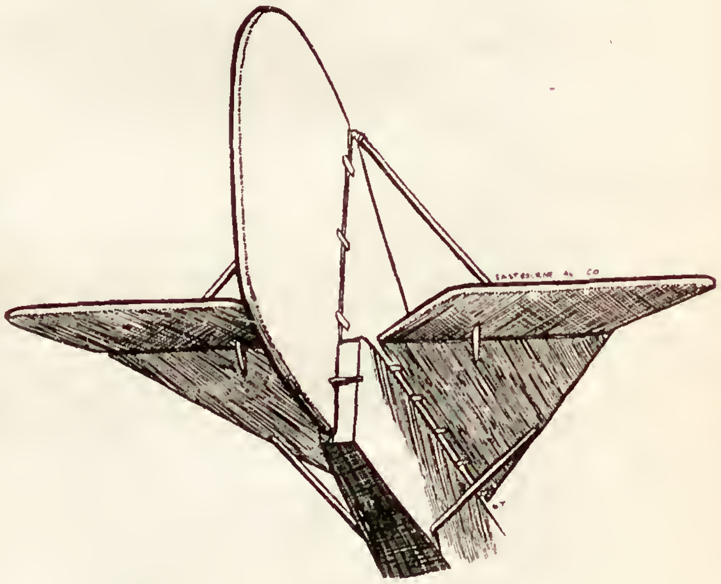

Chassis and engine housing of the E.A.C. biplane.


The E.A.C. tail skid.



Method of mounting upper main plane on E.A.C. *cabane*.

As will be seen from the accompanying scale drawings, the trailing edge of the planes is slightly longer than the leading edge, and the upper main plane has a slight overhang. The wings are built up over two ash spars of approximately rectangular section, to which are secured the ribs. These are built up of poplar flanges on three-ply webs. The leading and trailing edges of the wings are formed by spruce stringers. It will be noticed that in the outer portion of the wing the leading edge slopes


View from underneath of E.A.C. tail planes.

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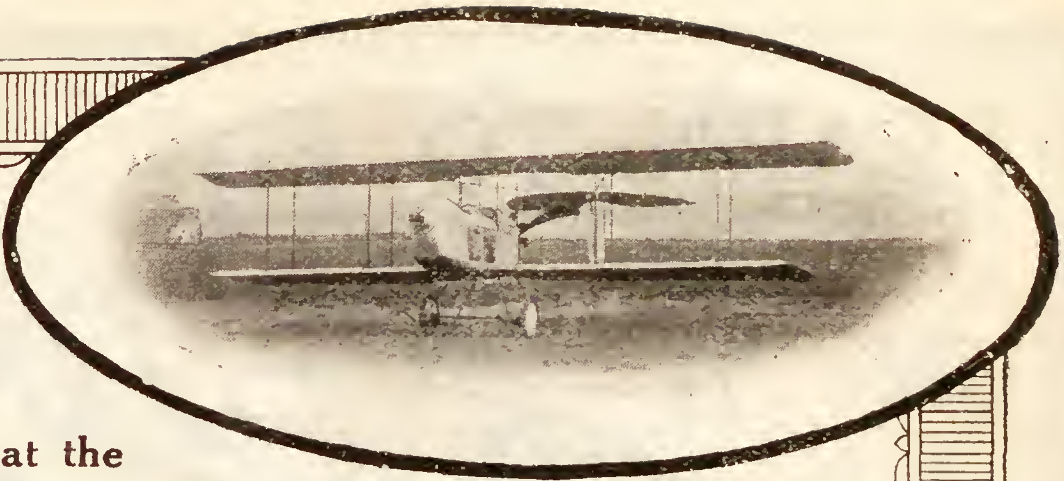

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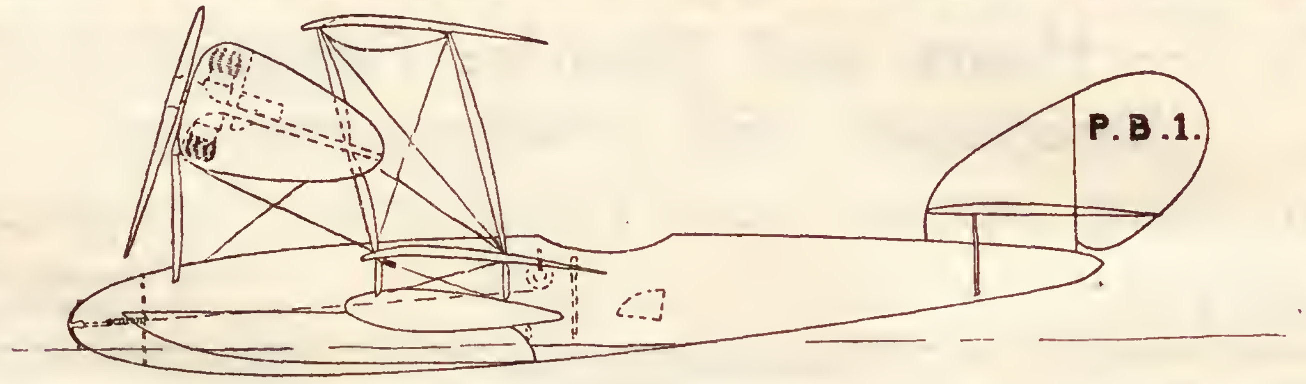
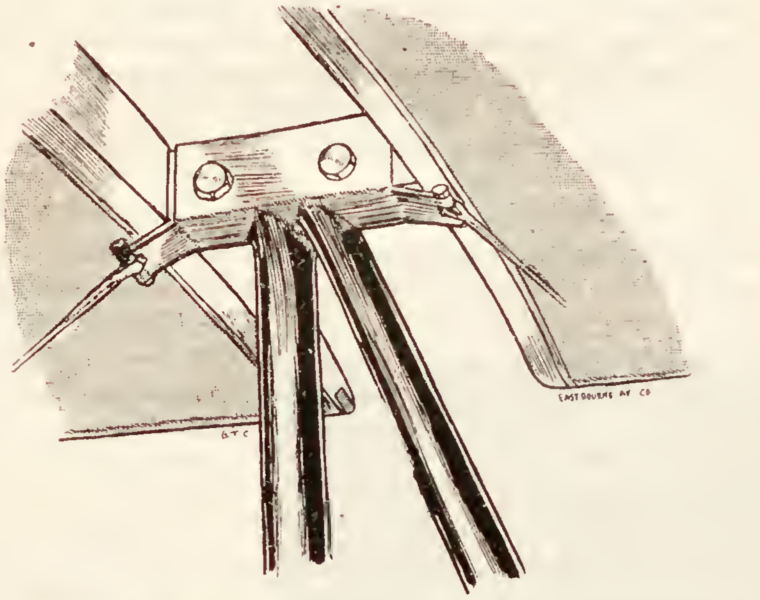


AMONG the interesting features common to all types of "SUPERMARINE" may be mentioned the hull, which, being circular in section, combines lightness with strength; the auxiliary floats, also circular in section, and so disposed as to adapt themselves automatically by a backward motion to the undulations of the water, thus minimising directional instability without loss of lateral support; the inclination of the propeller to the horizontal, thereby lowering the thrust and permitting the use of a propeller of reasonable diameter without fear of breakage by water contact, and minimising the variation of trim when the engine is switched on and off, the P.B. "Trinity" Propeller, a three-bladed air screw of unique construction; the P.B. "Supermeter," which greatly facilitates alighting by warning the pilot when his craft has approached within fifteen feet of the alighting surface, and giving continuous readings until the machine is at rest; and the ground tackle, which both in the case of casting and weighing is operated from the pilot's seat.

SOUTHAMPTON — ENGLAND.

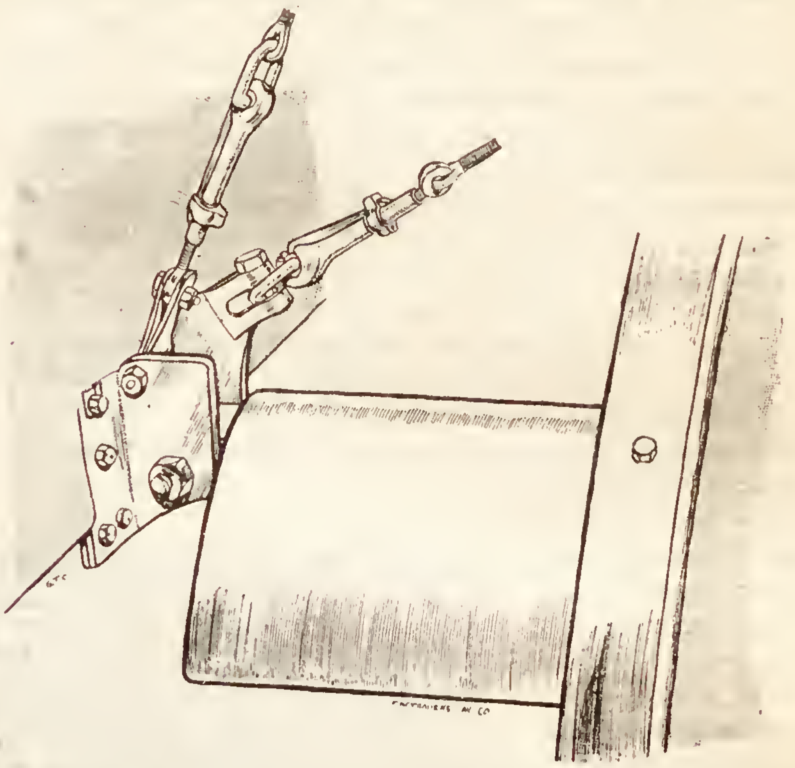
backwards towards the front spar, but in later machines this feature will be discarded as making the wings more expensive to build and being of no particular aerodynamical value. The main planes are separated by four pairs of poplar struts, two pairs each side, whilst a *cabane*-like structure mounted on the upper *longerons* of the *fuselage* takes the place of the usual four upright struts in the central *cellule.* Cross bracing is effected by means of stranded cables terminating in the quickly detachable devices illustrated in one of the accompanying sketches. By undoing these combined quick releases and turn buckles, the wings can be dismantled in a very short space of time. The angle of incidence is 4½ degrees, and there is no dihedral angle. *Ailerons* are fitted to the top plane only.



A neat way of joining struts and cross members to *fuselage longeron* of the E.A.C.

The chassis is of a very simple type, consisting of two Vs of streamline steel tubes extended forward to form short tusks or skids. The axle rests in slots in flange pieces in the angle between the struts, and is sprung by means of rubber cord. Palmer cord tyres of large size are used, and the wheels are enclosed in fabric covers, in order to reduce the head resistance.

The tail planes consist of a flat triangular stabilising plane hinged to the upper *longerons* of the *fuselage.* The divided elevator is hinged to the trailing edge of this fixed tail plane, and by undoing a few nuts both stabilising plane and elevator can be folded down flat along the body, thus taking up very little room. A small triangular vertical fin is fitted in order to counteract the forward side area of the *fuselage*, and to the trailing edge of this fin is hinged the rudder. A tail skid of the type shown in one of the accompanying sketches protects the tail planes against contact with the ground. The weight of the machine empty is 950 lbs., and her speed is expected to be from 50 to 75 miles per hour.



Attachment of lower spar to *fuselage* of E.A.C. biplane. Note streamline casing round spar where wing has been left uncovered.

As soon as the machine is completed by the Eastbourne Aviation Company, she will be put through her tests, and there seems little doubt but that she will give a good account of herself, for Mr. Gassler is not only a designer of considerable experience but is also a very capable pilot.

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The Fatal Accident at Brooklands.

At the inquest on the 9th inst., at Weybridge, on Sergeant E. N. Deane, who lost his life at Brooklands on the previous day, the evidence of those who witnessed the accident showed that the pilot was thrown from his seat through too steep a descent being attempted. Having completed figure eight tests for his *brevet*, Sergeant Deane went up for the altitude test, but instead of going up to 400 feet as instructed went up to 1,000 feet. He then shut off the engine and started a spiral descent at a very steep angle. When about 350 feet from the ground he was seen to fall from his seat, and the machine, after turning over twice, crashed to the ground. An examination of the machine showed that the controls were all in order, and Mr. F. W. Merriam, who had instructed the deceased, described him as an apt and intelligent pupil who gave promise of becoming an excellent pilot.

The jury returned a verdict of accidental death, and in a rider expressed the opinion that the Aero Club should be recommended to insist that all machines should be provided with straps and other necessary life-saving appliances to prevent possible accidents. If pupils did not use them, this would relieve schools of the responsibility.

French Pilots Killed in Morocco.

It was announced by the French Minister of War last week that a French flying officer and a mechanic had lost their lives under peculiar circumstances in Morocco. The officer, Capt. Herve, accompanied by Corporal Rooland, started on Sunday week from Casablanca to fly to Fez, along the Bou-Recreg valley. Apparently they had been forced to land, and, on setting out on foot for the nearest military post, had been assassinated by robbers. Their bodies were found by natives on the following day.

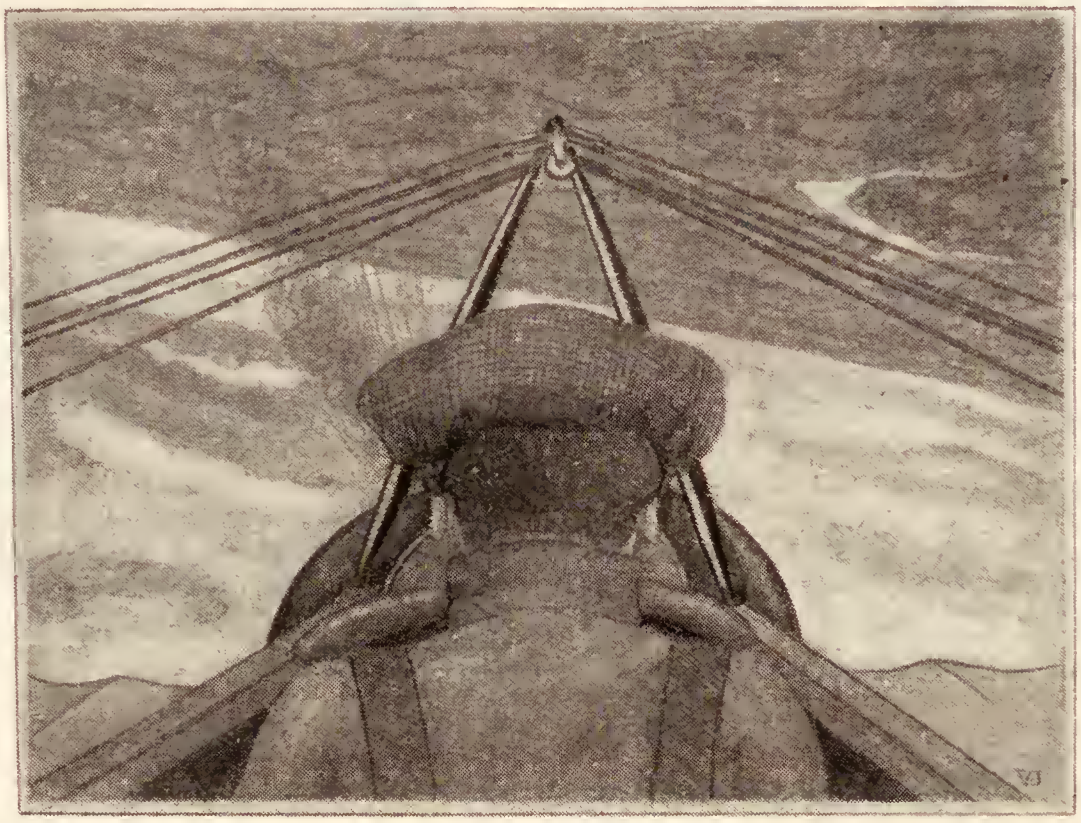
The Forlanini Airship Disaster.

The catastrophe which overtook the Forlanini airship "Citta di Milano" on Thursday of last week was the first serious accident which has occurred to the airship fleet belonging to the Italian Army. It appears that the airship with four officers, four ladies, and four mechanics on board, started from Milan with the intention of cruising to Como, but had only proceeded as far as Cantu when a serious leakage of gas necessitated a sudden descent, and in effecting this further damage was done to the airship. Not unnaturally, the landing caused a large crowd to gather, and as there were not a sufficient number of soldiers available to keep the crowd in check the work of repair was considerably hampered. The onlookers, many of whom were smoking, would insist on keeping close to the vessel from which the gas was escaping rapidly. Eventually there was an explosion, and the whole vessel was quickly reduced to a mass of tangled metalwork. About 50 people were injured as the result of the explosion, and one died in hospital the next day. It may be recalled that the airship, which was described and illustrated in Flight for January 24th last, was 72 metres long and 18 metres diameter, and was fitted with two 85 h.p. Issota Fraschini motors. The airship was built as the result of a public subscription, and was presented to the Italian Government by the City of Milan. Several similar vessels are on order for the British Government.

LOOPING THE LOOP.

A PILOT'S AND A PASSENGER'S IMPRESSIONS.

It was just a year ago that I gave my impressions in Flight of Chevillard's *chute de côté.* I thought it a wonderful experience then and said I would not forget it until someone took me up and flew a couple of miles upside down. I little thought at the time that it would really be possible for such a thing to happen, but aviation has made very rapid strides since then. I have not yet flown that two miles upside down, although it is now a by no means impossible proposition, but I have experienced the next thing to it—looping the loop, and I think that I must admit that the *chute de côté* is put in the shade somewhat by this latest method of flying. Before I received my *baptême de boucle le boucle* I asked Louis Noel, who by the way, is the first pilot to loop the loop on both biplane and monoplane, to give me his impressions of looping, and I cannot do better than record them here in his own words. Thus Louis Noel:—



An impression of looping the loop with Noel at Hendon.

"In asking me for my impressions of looping the loop, I fear you have given me a difficult problem; however, I will try, but I really think there are no words in which to express the sensation. As it is, the ordinary flight is quite exhilarating, but this new stunt quite exceeds everything in the world: in fact, in a word it is superhuman. When once you have done it you feel you must repeat it again and again; you are so intoxicated with the wonderful sensation. You start off, and rise to a height of between 600 ft. and 700 ft., and then you can begin the joke absolutely without danger. After executing a gentle *vol piqué* you pull the lever back, and the 'bus leaps with tremendous speed upwards—which it loses at the zenith of the loop. At this moment you are completely isolated from the earth and you can see nothing but the planes. Then it is that an incomprehensible sensation runs through you at being absolutely alone, suspended by an invisible string amid air. I assure you it is a unique position; nothing to fear—only happiness. All this of course (unfortunately) is done and finished in a second or so, and, after diving again, you have the first glimpse of the earth under you and you can only regret that the looping is over. There is just one thing to consider, however; I think that if I 'loop' often I shall lose that wonderful feeling."

This last statement of Mr. Noel's is, I think, rather interesting, for although, no doubt, there would always be a certain amount of exhilaration when looping, the first sensations are so strange, so unlike anything one previously imagined, yet not so very startling, and the whole proceedure is over so quickly, that once you have done it you feel that you have been doing it always, and the strangeness wears off. I asked Noel if he felt safe, and he said "absolutely," adding:—

"Many people witnessing a looping exhibition think surely the pilot is risking his life; nothing of the kind! On a suitable machine it is quite safe, and a competent pilot will find that he will accomplish his first 'loop' far more easily than his first straight flight, and I agree with Hucks that every well-trained, good pilot can do it easily.

"Again, people say that it serves no useful purpose, but I think otherwise; it is well to know *how* to do everything it is possible *to* do, and at the present stage of aviation I feel safer on a 'looping' machine than on a machine on which it is dangerous to do it."

"Well," he said, "those are my impressions: but why not loop the loop yourself, and see if you agree with me?" And so, on Saturday last, I ascended with Noel on the rebuilt "G.-W." 80 h.p. Le Rhone-Morane-Saulnier monoplane, and "saw for myself." I might mention here that Noel took out the Morane-Saulnier for the first time in his life on Good Friday, and succeeded in executing two loops with a passenger. My own impressions of looping are much the same as Noel's, but there is one point that has struck me particularly, and that is the fact that I could not realise that I was upside down. I did not feel any tendency to fall out, and if I had shut my eyes I would not have known, for the greater part of the time, that we were not flying normally. Before I ascended I took the precaution of seeing that what little coin of the realm I had in my pocket would not fall out when in an inverted position, but, as I found later, quite unnecessarily, for, once in a way, my money remained quite securely in my pocket. As far as I can put it in words, my sensations from start to finish were as follows:—After climbing to a height of about 600 ft., Noel turned and inquired if I was ready, and then we dived slightly, the feeling in this case being similar to that during a *vol plané*; the ground stretched out before us, then suddenly "rolled" out of sight as the nose of the machine was turned upwards, and there was nothing but the clouded sky all round. The rush of wind, which had been intense, then seemed to die out altogether for a second or so, and now one felt that wonderful feeling Noel spoke of, of being absolutely alone and extraordinarily happy. The next sensation was exceptionally weird, for suddenly there was a terrific rush of air and the earth came into view from behind and above, and passed with startling rapidity in front of the machine, just as if someone had thrown a roll of green cloth over one's head from behind so that it unrolled as it went. As the ground passed from overhead to the front of the machine, the sky again came into view overhead, coming up from behind as did the earth, and I realised then that we were diving and that we had been upside down. All this time I felt absolutely comfortable in my seat and it was only when we were recovering our normal position that I felt any rough movement. Each time we made the loop we came out of the top of it slightly sideways, so that when the horizon line appeared above our heads it was not absolutely horizontal. As I said before, although I saw, for the space of two or three seconds, the ground stretched out above my head, I had no feeling of being upside down, owing, no doubt, to the fact that centrifugal force made my position feel quite normal. Yes! looping the loop is a really magnificent experience—but I do not propose this time to say that I will not forget it until someone takes me up in an aeroplane and does something or other remarkable, for I cannot think of anything impossible enough now for an aviator or pilot to do.

"Vee Jay."

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FLYING AT HENDON.

THE SEVENTH LONDON AVIATION MEETING.

The wonderful progress made in aviation could not have been indicated to better advantage than by the Seventh London Aviation Meeting, which opened on Thursday afternoon of last week and closed on Monday last. The only blank day was the Thursday, when the weather was so bad that hardly anyone ventured either to fly or come out to see flying. The remaining four days, however, more than made up for the disappointing Thursday both as regards the flying and the attendance of visitors. The latter was estimated to be in the neighbourhood of 120,000 for the four days, and there were quite as many, if not more, packed all round the surrounding country. Many celebrities also visited the aerodrome, amongst whom may be mentioned Queen Amelie, Queen Augusta Victoria, Lady Eileen Vivian, the Baron and Baroness De Meyer, Baron de Gunsburg, Lord Dalrymple, &c. The band also made its first appearance on this occasion, whilst an innovation consisted of a vocalist in the person of Miss Rose Murray, who rendered several songs at the piano outside the tea pavilion in the paddock. So far as the flying itself was concerned, it is difficult to say which day was the best or most wonderful. Looping the loop was, of course, the principal feature, but whereas at previous looping demonstrations the air was cleared of all aeroplanes whilst looping was in progress, this time the other machines not only went up as usual, but on one occasion four machines looped at one and the same time. Gustav Hamel also put up a record by making 22 successive loops, and many others besides, in addition to tail slides and turn-overs.

Good Friday.

A strong gusty wind prevailed on the Friday, which necessitated the racing event down on the programme being abandoned, otherwise the weather was bright and sunny. The proceedings were opened at 2.45 p.m. with a fine 13 minute flight by R. H. Carr on the 50 h.p. G.-W. tractor biplane "Lizzie," on which he executed

Miss Kitty Kent, who is appearing in "The Girl from Utah" at the Adelphi Theatre, is taking up flying at Hendon. Our photograph shows Mr. Noel just about to give her some practical experience in the air.

three loops. Philippe Marty was the next out on the 80 h.p. Blériot with a passenger, after which Goodden gave another looping demonstration on the Caudron, making three loops at 1,500 ft. Hamel then ascended and put up a wonderful display of looping, lasting some 15 minutes, on his 80 h.p. Morane - Saulnier. Some more looping was then given by Carr on "Lizzie," after which Goodden ascended once more on the Caudron, and from a height of 1,800 ft. executed six successive loops. Later on Henri Salmet made a flight on a Blériot, and E. Baumann came out on the Wright biplane and made a 23 minute flight at 800 ft. A new looper then made his appearance in Marty, who ascended on the 60 h.p. Morane-Saulnier which had been re-built at the Grahame-White works, and made three loops from a height of 1,800 ft. Louis Noel then came out on the re-built 80 h.p. G.-W. Morane-Saulnier, and, accompanied by a passenger, looped the loop twice at 900 ft.

Saturday.

Saturday was also bright and sunny, though still windy, and fully 20,000 spectators turned up. The first events consisted of combined looping displays by Carr on the G.-W. tractor "Lizzie," and Marty on the 60 h.p. Morane-Saulnier, W. Birchenough and J. M. Cripps giving exhibitions the meanwhile on G.-W. 'buses. L. A. Strange then gave a display on "Lizzie," Noel following immediately after on the 80 h.p. Morane-Saulnier with a passenger, and making a loop at 500 ft. Goodden then ascended on the 60 h.p. Caudron, and climbing to an altitude of 2,000 ft., where he disappeared behind the clouds, he executed eight successive loops, two of which were made behind the clouds. Marty then took up a passenger on the Blériot, after which a start was made for the cross-country handicap to Bittacy Hill and back four times, for the Barclay Walker Cup. There were five starters in this race, as follows: W. Birchenough, on the G.-W. bi-rudder 'bus (9 mins. 43 secs.); F. W. Goodden, on the 60 h.p. Caudron (4 mins. 6 secs.); R. H. Carr, on "Lizzie" (2 mins. 4 secs.); P. Marty, on the 60 h.p. Morane-Saulnier (54 secs.); and Louis Noel, with E. G. Dunn as passenger, on the 80 h.p. Morane-Saulnier (scratch). Birchenough maintained the lead throughout, and Goodden also retained his original position, Noel and Marty following close behind, third and fourth respectively, whilst Carr gave up at the end of the last lap. At the close of the race, Carr, Marty and Noel, without landing, proceeded to give a combined looping display, whilst Goodden put up all manner of contortions on the Caudron. Then followed a series of exhibition and passenger flights by Cripps, Birchenough, Lillywhite and Strange on Grahame-White biplanes, E. Baumann on the 40 h.p. Wright (Wright engine), Goodden (passenger) on the Caudron, and Carr, with a passenger, on "Lizzie." A private speed match round six laps of the aerodrome was then arranged between Noel and Marty. The former, flying the 80 h.p. Morane-Saulnier with a passenger, was at scratch, and gave Marty, on the 60 h.p. Morane-Saulnier, a start of 26 secs. This match resulted in a very close finish, Noel failing to obtain first place by 3 secs. Before landing, both Noel and Marty put up some more looping and tail slides. Carr then took up another passenger on "Lizzie," and A. E. Barrs made a fine high flight on the little 35 h.p. Deperdussin monoplane, E. F. Norris following on the G.-W. 'bus 109. Baumann, Birchenough, Goodden, and Marty each took a passenger on the Wright, G.-W. 'bus, Caudron, and Blériot respectively. Strange then had a turn at looping on "Lizzie," whilst Carr made a short flight on the Blériot. Crawshay, accompanied by a passenger, made a cross-country flight on a 70 h.p. Blériot, and R. T. Gates put up some flying on the bi-rudder 'bus before the proceedings were brought to a close with a looping display by Noel on the 80 h.p. Morane-Saulnier, our representative, Mr. Vernon Jones, being the passenger on this occasion, which is, we think, the first time a member of the Press has looped the loop in this country.

Sunday.

Another glorious day brought up a greater attendance than ever, about 30,000, in fact. Just after 3, Cripps, Birchenough and Howarth went up on the three G.-W. 'buses, and Strange and Baumann flew the 80 h.p. Blériot and the 40 h.p. Wright respectively. Carr on "Lizzie," Goodden on the 60 h.p. Caudron, Marty on the 60 h.p., and Noel on the 80 h.p. Morane-Saulnier all "went mad" and churned up the air in an alarming manner. It was then that Hamel put up his wonderful record of 22 successive loops. He ascended on his 80 h.p. Morane-Saulnier to about 5,000 ft., and from this height he descended making the aforementioned loops. After this series he made six side loops and tail slides, one of the latter being very sensational, for he not only dropped a considerable distance tail first, but when the machine nose dived, it did so very suddenly, so much so that as the nose swung earthwards it appeared to swing upwards again the other way, so that the machine was on its back. Then followed a rapid succession of exhibition flights and looping displays. Space will not permit us to refer to these in detail, but they can be summarised as follows: Birchenough, Gates, and Howarth, flights on G.-W. 'buses, Carr and Marty passengers on the 80 h.p. Blériot, Crawshay with a passenger on the 70 h.p. Blériot, Baumann with a passenger on the Wright, Barrs on the 35 h.p. Deperdussin, M. Zubiaga on a 60 h.p. Caudron, and Noel with passengers on the 80 h.p. Morane-Saulnier. Looping was put up by Goodden on the Caudron, Marty on the Morane-Saulnier, and Strange and Carr on "Lizzie." Goodden ascended to over 6,000 ft. above the clouds, and from this height executed 17 loops in succession, the last loop being made at 1,000 ft.; before landing he made two very perfectly formed loops at about 600 ft. Strange, in addition to making two loops, executed a tail slide. Hamel next took up Robert Loraine and looped the loop twice, and later he took up R. T. Gates and also looped. Baumann, Birchenough, and Cripps then made some further flights, whilst Noel and Marty put up some very low loops. Grahame-White then did some very fast flying on the 60 h.p. Morane-Saulnier, and Marcus D. Manton made a welcome reappearance on his old friend the bi-rudder 'bus, on which he put up some of his magnificent spirals. The final flights of the day were made by Goodden on the Caudron.

Monday.

Easter Monday was undoubtedly a record one for Hendon, and was a greater one, even, than Aerial Derby Day. Large numbers of spectators arrived long before noon, and remained until late in the evening, showing that there is plenty of interest in flying on the part of the public. By the afternoon the "gate" had grown to 50,000 strong, and the enclosures were packed with people and motor cars. The one and only accident occurred on this day, but it was only of a very slight character, nothing more, in fact, than a brief argument between the ground and the G.-W. 'bus No. 107, piloted by Mr. Howarth, with but little damage. Numerous exhibition and passenger flights were made before the luncheon hour by the various Hendon pilots, but the principal event was a private speed race between Claude Grahame-White on the 60 h.p. Morane-Saulnier and R. H. Carr on the tractor biplane "Lizzie." Both pilots flew a magnificent course, Carr winning by a bare second. At 3 o'clock Goodden on the 60 h.p. Caudron executed several loops at a great height. Immediately after, the first heat of the speed handicap for the Barclay Walker Trophy was made. The first heat of four laps produced five starters:—J. M. Cripps on G.-W. 'bus 109 (2 mins. 51 secs.); W. Birchenough on the bi-rudder 'bus (2 mins. 23 secs.); F. W. Goodden on the 60 h.p. Caudron (1 min. 20 secs.); L. A. Strange with a passenger on the 80 h.p. Blériot (15 secs.); and P. Marty on the 60 h.p. Morane-Saulnier (scratch). Marty made a magnificent effort from scratch, and came in first by 7⅖ secs., Cripps and Goodden being second and third respectively by 3 secs. each. Strange, who was flying his first race on the Blériot, was unable to overtake Birchenough, and therefore came in last. Immediately after the race, Noel on the 80 h.p. Morane-Saulnier and Carr on "Lizzie" each did three loops at heights varying from 500 to 800 feet, Carr in addition doing a couple of tail slides. Noel introduced a new stunt into his loops, consisting of a corkscrew twist just before the machine flattens out. Four started in the second heat, which was also of four laps; these were: R. J. Lillywhite on the bi-rudder 'bus (2 mins. 49 secs.), E. Baumann on the 40 h.p. Wright (2 mins. 41 secs.), R. H. Carr on "Lizzie" (58 secs.), and Louis Noel, with a passenger, on the 80 h.p. Morane-Saulnier (scratch). This heat resulted in a magnificent finish, the first three coming in within 1 sec. Lillywhite was first, with Carr ⅖ sec. behind, and Noel was third, ⅗ sec. behind Carr. Both Noel and Carr flew in fine style, but Baumann unfortunately flew inside at No. 1 pylon and so was not placed. After this heat Hamel gave a looping display, during which he made three single loops at from 200 ft. to 400 ft., five successive ones at 900 ft., and nine successive ones at a similar height, in addition to several side loops and tail dives. Passenger flights were then made by Baumann on the Wright, Carr on the 80 h.p. Blériot, Crawshay on the 70 h.p. Blériot, Goodden on the Caudron, Noel on the 80 h.p. Morane-Saulnier, and Strange on "Lizzie." The final heat (8 laps) of the speed handicap was then flown, but when about six laps had been completed it was discovered that owing to an error the scratch man had been started one minute too soon, so the heat had to be flown over again. The order of starting and handicaps were as follows:—Cripps (6 mins. 2 secs.); Lillywhite (5 mins. 11 secs.); Carr (1 min. 46 secs.); and Marty (scratch). Cripps and Lillywhite on the two 'buses had an easy victory, the former crossing the line 4 secs. in front of the latter, whilst Marty came in third 24 secs. after Lillywhite and 16 secs. in front of Carr. Before landing after the race, Marty proceeded to put up some more looping, Hamel ascending on his Morane-Saulnier and keeping him company at the same game. After this Hamel took up three passengers, and gave one loop and one side loop to each. The proceedings were brought to a close with a few more flights by Baumann, Barrs, Marty and Goodden.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Monday last week very windy. Lieut. Davis made a short flight on the 80 h.p. Sopwith in the afternoon.

Tuesday very windy. Short 50 h.p. was the only machine up.

Wednesday rather windy. A much better day for flying, the Navy taking advantage of it, having the following machines up: 80 h.p. Sopwiths 27 and 33, Bristol tractor 80 h.p., Shorts 50 h.p. and 80 h.p., Caudron 50 h.p.

Thursday, windy and showery. No. 2 Short 50 h.p. class under instruction. Friday, no flying, windy. Saturday, rather windy. No. 27, 33, 104 80 h.p. Sopwiths out, also Caudron 50 h.p. and Short 50 h.p.

Civilian Flying.—Sunday, The Hon. Mr. Egerton two flights on his 50 h.p. Short. Prof. Huntington one short flight.

Mr. Cyril F. Lan-Davis, who passed his pilot's tests at Brooklands on an Avro.

Brooklands Aerodrome.

On Monday and Tuesday last week there was no flying. Mr. R. B. Hunt arrived on his Blériot monoplane from Eastbourne.

Before breakfast, Wednesday, the conditions were almost perfect for school work and full advantage of them was taken by the Vickers and Bristol pupils. During the morning Lieut. Wilson arrived from Farnborough on a 50 h.p. Avro. In the afternoon Lieut. Collett was flying the D.F.W. biplane, and Mr. Manton Mr. Hucks' Blériot monoplane.

Thursday, Mr. Alcock made a number of flights on the Maurice Farman biplane, and the Vickers pupils were at work.

Mr. Hunt was out Friday morning on his Blériot, and in the afternoon Mr. Manton on Mr. Hucks' Blériot.

On Saturday a number of interesting flights were made respectively by Mr. Vincent Waterfall, now thoroughly at home on the new Martinsyde monoplane; Mr. Pixton on one of the new 80 h.p. single-seater "tabloids" ordered by the Army from the Sopwith Company for use as "scouts"; Mr. Pixton on the two-seater Sopwith biplane; Mr. Lan-Davis on his Avro biplane with and without passengers; whilst Mr. Mahl was "taxying" on the Sopwith biplane.

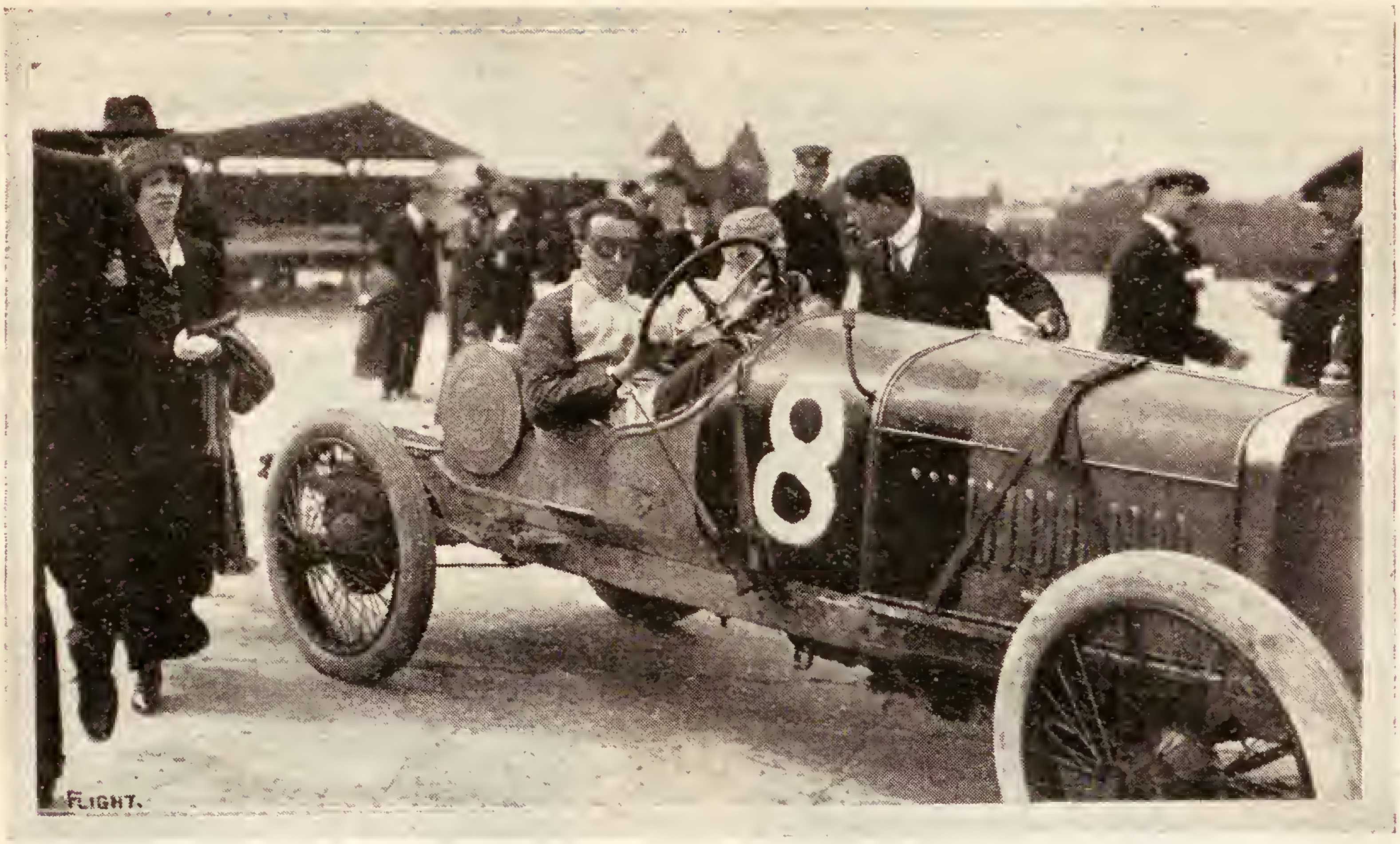
On Sunday a large number of people took advantage of the fine weather to visit the aerodrome, and were well rewarded for their trouble. Mr. Vincent Waterfall made a number of flights on the new Martinsyde monoplane, on which he took up the winners of the two free passenger flights—Mr. V. H. Jaques, of the Hurst, Hersham, and Miss Gruar, of the Balmoral Hotel, Southampton.

Mr. Alcock was out on the Maurice Farman biplane, Mr. Pixton on the "tabloid" Sopwith biplane; but *the* flights of the afternoon were by Mr. Barnwell on the Sopwith "tabloid" biplane, on which he achieved the distinction of being the first Brooklands airman to "loop the loop," after having quickly climbed to 4,000 ft. In the strong sunshine and at the height the evolution was carried out it was difficult to follow every detail of movement, but to most it seemed that the machine, after turning vertically upwards, fell to one side, and then, turning over, completed the loop prior to planing down. Mr. Tom Sopwith ran out to greet Mr. Barnwell and to ask him exactly what he had done, to which question the aviator called out: "That's just what I've come down to ask you!" His idea of his movements, however, coincided with the above opinion, so, apparently quite satisfied as to what he had to do the next time, he immediately restarted, and at his second attempt made three very good loops at a height of about 3,000 feet. On his return to *terra firma* he had a warm reception by the crowd near the "Blue Bird." It is worthy of note that nobody has previously attempted the feat on a machine approaching the speed of the Sopwith "tabloid." Mr. Barnwell seemed to think nothing of the feat he had accomplished, merely remarking after his second attempt: "I began rather to wonder where the world had got to that last time!"

Mr. D. G. Murray, who has just taken his *brevet* on a Caudron biplane at the W. H. Ewen School, Hendon.

Easter Monday at Brooklands.

During the progress of the motor racing a number of interesting flights were made by Mr. Alcock (Maurice Farman biplane), Herr Roempler and Lieut. Collett, R.N. (D.F.W. biplanes), Mr. Pixton (Sopwith "tabloid"), Mr. Merriam (Bristol biplane), Mr. Busteed (Bristol "scout"), who arrived from Salisbury, Mr. Hunt (Blériot monoplane), Mr. Barnwell (Blériot monoplane and Vickers biplane), Mr. Elsdon (Vickers monoplane), Mr. Knight (Vickers biplane). There were eight starters for the Easter Aeroplane Handicap, namely, Mr. Merriam (Bristol biplane), Mr. Knight (Vickers biplane), Mr. Barnwell (Blériot monoplane), Mr. Elsdon (Vickers monoplane), Herr Roempler (D.F.W. biplane), Mr. Alcock (Maurice Farman biplane), Mr. Waterfall (Martinsyde monoplane), and Mr. Pixton (Sopwith biplane), Mr. Merriam being on limit and Mr. Pixton on scratch. The race was a keenly contested and exciting one, Mr. Barnwell being first on the Blériot monoplane, Mr. Knight second on the Vickers biplane, and Mr. Pixton third on the Sopwith biplane. After the race, Mr. Barnwell again executed some "loops" on the Sopwith biplane, after which the crowd



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Mr. C. Gresswell, who is so well known in aeronautical work, in a new *rôle*. He appeared as a car racer for the first time at Brooklands on Easter Monday, when he piloted the Hispano-Suiza in the Easter Private Competitors' Handicap, securing third place.

simply stormed machine and pilot, and Mr. Barnwell had to run away and fly off in the Vickers biplane to escape the importunities of innumerable autograph hunters.

Bristol School.—No tuition was possible on Monday and Tuesday owing to the exceptionally strong wind. The school closed on Thursday for the Easter holidays.

Vickers School.—Wednesday, last week, Knight and Elsdon on biplane with Lieut. Underhill, Lieut. Acland solo. Thursday, Knight and Elsdon on biplane with Capt. Phillips and Lieut. Underhill. Lieut. Acland and Mr. Wilberforce solos.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Wednesday, last week, Prince Sapieha solo straights. Messrs. Parker and Kershaw solo circuits. Mr. Smiles and Major Piercy straights with Instructors Howarth and Strange in passenger seat.

Thursday, Messrs. Smiles and Moore, straights with Instructors Howarth and Strange in passenger seat, afterwards Mr. Smiles solo straights. Messrs. Parker, Kershaw and Prince Sapieha solo circuits.

Beatty School.—Instructor during last week M. Beauman. Pupils with Instructor on machine: Messrs. Ding, 48 mins., Watts, 20 mins., Stewart, 12 mins. Watts and Stewart taking extra practice.

Salisbury Plain.

Bristol School.—Wind and rain prevented any tuition on the first three days of this week, and the school closed on Thursday for the Easter holidays.

Shoreham Aerodrome.

Pashley School.—Friday, Saturday, Sunday last week, and Monday, Instructor C. L. Pashley up with Instructor Wright, Nicholl, Mortimer, Dawson and Willett. Straights alone: Nicholl, Mortimer, and Gray. Circuits: B. F. Hale.

Mr. C. L. Pashley took the Farman to Bognor on Saturday, but arrived too late for the race. A rough journey was experienced owing to the strong wind. The machine took 65 mins. to cover 18 miles.

* * *

ROYAL FLYING CORPS (MILITARY WING).

War Office summary of work for week ending April 11th, 1914:—

No. 2 Squadron. Montrose.—In spite of the uniformly bad weather throughout the week, the pilots of the squadron covered 2,814 miles in all. Practice in reconnaissance work was continued.

No. 3 Squadron. Netheravon.—A considerable amount of reconnaissance work was carried out, although the weather was unfavourable during most of the week. Experiments in photography were continued successfully.

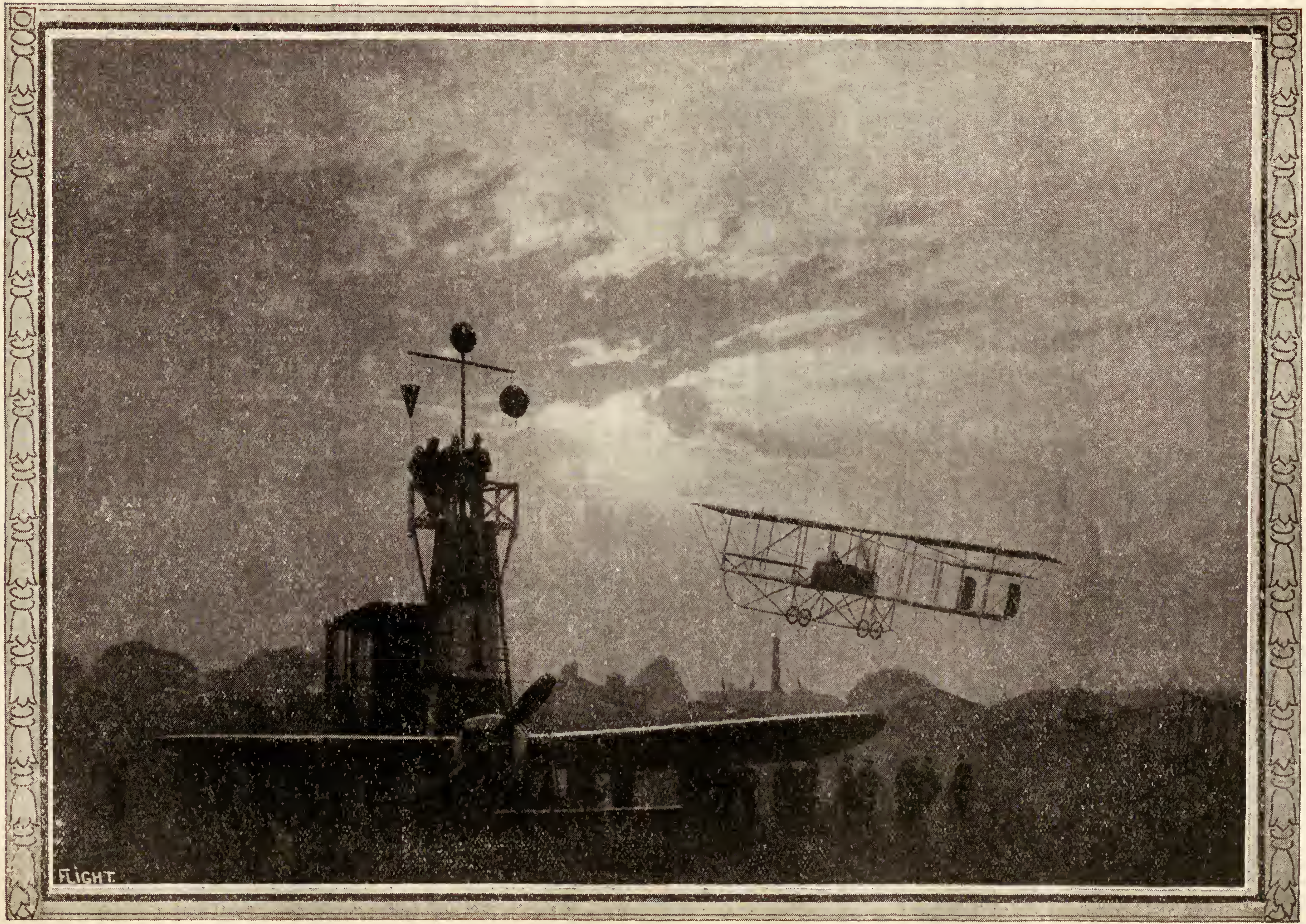
No. 4 Squadron. Netheravon.—The Officer and N.C.O. pilots of the squadron made numerous flights during the week, and some experimental work was carried out.

No. 5 Squadron. S. Farnborough.—The weather during the week was most unfavourable, but cross-country reconnaissances were carried out on Wednesday.

No. 6 Squadron. S. Farnborough.—The weather has been unsuitable for much flying, but cross-country reconnaissances were carried out on Wednesday.

Aircraft Park. S. Farnborough.—Repair work on aircraft and mechanical transport was carried out in the workshops, and the technical training of recruits was continued.

Capt. Barnby, R.F.C., N.W., flying one of the 100 h.p. Short seaplanes at 1,000 ft. at the Leven Air Station.



AT HENDON AERODROME.—Louis Noel on the Maurice Farman rounding No. 1 Pylon towards evening.

SOME IMPRESSIONS OF A CROSS-COUNTRY FLIGHT.

"I am taking the Albatros biplane to Farnboro' this afternoon. Would you care to accompany me?" This was the invitation I received the other day from Herr Thelen, the famous pilot of the Albatros biplane. Needless to say I accepted the invitation, and a few minutes afterwards we were on our way to the Hendon Aerodrome. Arrived there the mechanics were busy filling up tanks and going over everything to see that the machine was in order, while Herr Thelen and I sat down to study the map. I had, of course, been to Farnborough several times, but never by air, whilst Herr Thelen was perfectly unacquainted not only with the route but also with the place itself.

However, after consulting Mr. E. R. Whitehouse and obtaining some valuable information from him as to the best route to follow, we decided that, as it was a comparatively clear day, we ought to be able to find our way, and so we climbed on board and, after a preliminary run of the engine, Herr Thelen gave the order to let go and we were off. A couple of circuits of the Aerodrome gave us sufficient altitude to set out across country, and soon we were heading past the Welsh Harp, which glittered bright below.

According to the directions given us by Mr. Whitehouse we should leave Harrow on our right. I looked for it in vain for some moments, first through the windscreen and later, as Harrow-on-the-Hill refused to reveal itself through the mica screen, I craned my neck in order to look over it; my efforts were rewarded, for there, on the right, I could discern the church. From this height, however, it was a little difficult to understand how Harrow has derived its appellation, for of the Hill, on which I knew the church to be built, I could see no signs; it looked, in fact, as flat as all the surrounding country. This is one of the difficulties of cross-country flying, you may be coming down in a field which looks flat from above, but which, on closer examination, turns out to be the side of a hill.

The weather had been beautifully calm when we left Hendon, the pen on the wind gauge dragging itself lazily along the O line, but clouds were gathering and it looked for some time as though the element in which we were flying was going to be semi-aquatic. Shortly after passing Harrow we ran into a *remous* which caused us to drop a considerable distance. The sensation, when the "solid" air was met again, was exactly similar to that experienced on a ship in a rough sea.

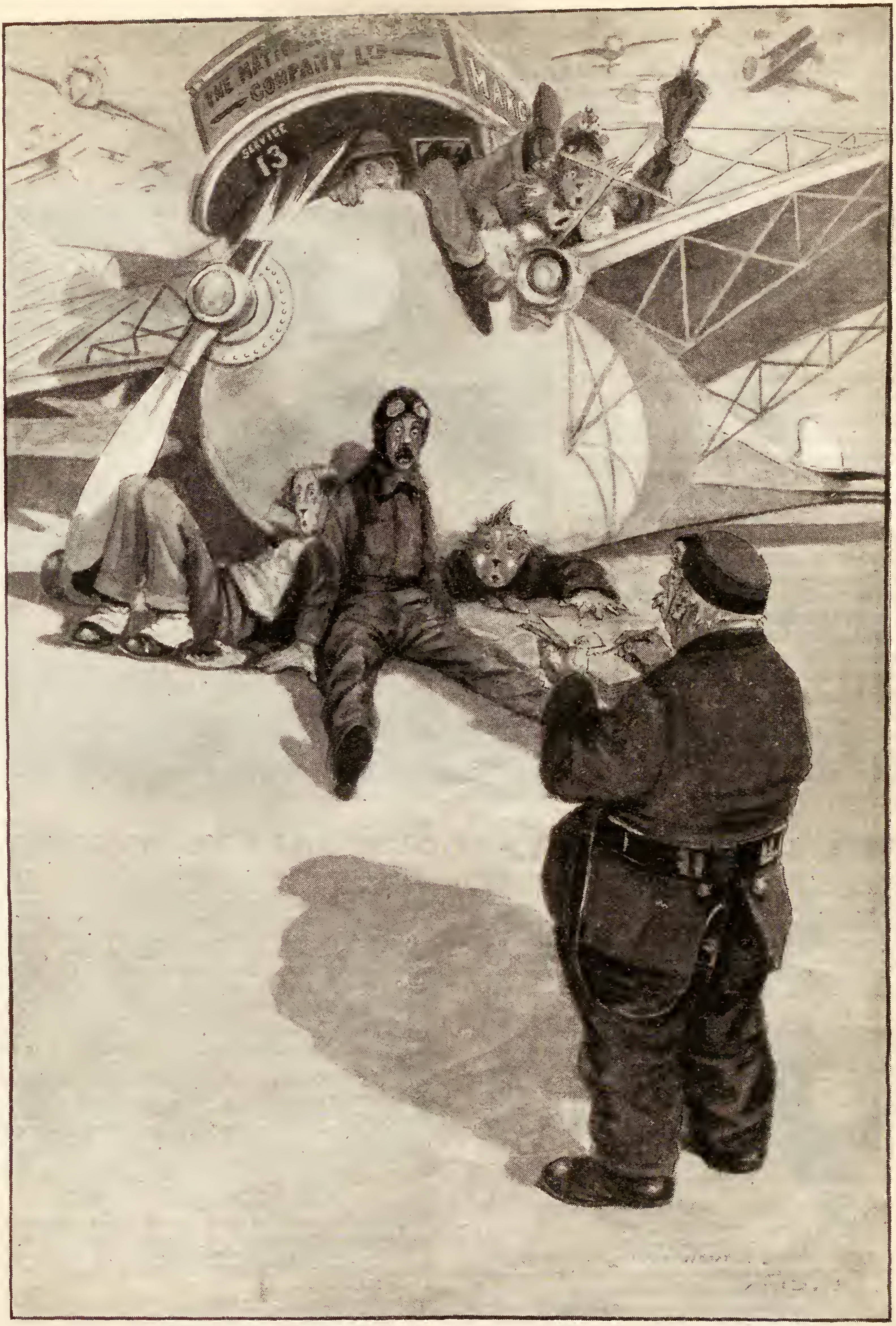
In a few minutes we could see the reservoir at Staines approaching rapidly, and as this was one of the landmarks we had to pass, I began to feel that it would probably be easier to find our way than I had anticipated, in spite of the mist which hung over the Thames Valley and prevented us from seeing more than a couple of miles in any direction. Near the Staines reservoir a balloon flying very low passed immediately underneath us, and was soon out of sight again.

After indicating to Herr Thelen, by means of a sort of deaf and dumb system decided on before the start, to lay the course a little more to the South, I fell to experimenting with locating various places on my map. The numerous bends in the river around Staines afforded excellent opportunities for doing so, and I was thinking that I was doing rather well, when it suddenly dawned upon me that I was holding my map the right way up—that is to say with the North arrow pointing away from me—whilst we were flying in a South-Westerly direction and that, therefore, the bends in the river, which I saw on the right, were to the left of our course as I was looking at it on the map. By the time I had got the map turned round we had left the river behind, and I was suddenly disturbed in my geographical studies by a yell from the pilot. Looking back I saw him pointing to the South, where, after a few moments, I picked out the race track at Brooklands.

I now began to look out for the sheds at Farnborough, which I had been told one could see—in clear weather of course—shortly after passing the reservoir at Staines. I soon picked out the London and South-Western Railway, which was, however, far less conspicuous than were the roads, which, as they were dry, were plainly visible from above. In front and on the right I saw a white sheet which at first I took to be Virginia Water and, thinking that we had turned too far North I was just going to give directions to turn a little to the left, when an emerging train drew my attention to a tunnel which I located on the map, and according to this we should be very close to Farnborough, so that evidently the white sheet on the right could not be Virginia Water. Later I realised that it must have been one of the numerous commons around this part of the country. I looked in all directions but could see no signs of our destination until I happened to look straight down and there, vertically below us were the huge dirigible sheds. I pointed them out to Herr Thelen, and soon we were circling down in wide spirals in order to ascertain the best landing place, as I was not sufficiently well acquainted with the ground near the sheds to know exactly where to land. Skimming along a few feet above the ground we were rapidly approaching the sheds, when the pilot opened out the throttle fully and we shot up over the hangars and made another circle around the factory and sheds at a low altitude, and a few moments later alighted in front of the hangars, to be quickly surrounded by numerous members of the R.F.C., who immediately commenced an interested examination of the machine. From the comments overheard it was evident that the general impression of the machine was favourable. I must give a word of praise to the Mercedes engine, for throughout the whole trip she ran beautifully, and, as far as I was able to judge, never misfired once from the time we left Hendon until we reached Farnborough.

After filling up the tanks of the machine Herr Thelen proceeded to put her through the tests, the first of which was the climbing test. Accompanied by the official observer and with a full load of fuel the machine reached the required altitude of 3,000 feet in exactly eight minutes. Next to be passed were the speed tests, which were flown over a measured course, three times in each direction for the fast speed, and twice in each direction for the slow speed. The results of the speed tests were not available when we left Farnborough, so I am unable to give them here.

After going through the speed tests the machine was taken out on the rather rough ground at the upper end of Laffan's Plain in order to go through the rolling tests, which were, I understand, passed satisfactorily. The last remaining test consisted in landing inside a circle marked on the ground with white. The machines must touch the ground inside the periphery of the circle and come to a stop before reaching the opposite periphery. Herr Thelen manœuvred the machine so skillfully, that the wheels touched just a few inches inside the line, and by vigorous application of the brake, which sent the turf flying in all directions, he succeeded in



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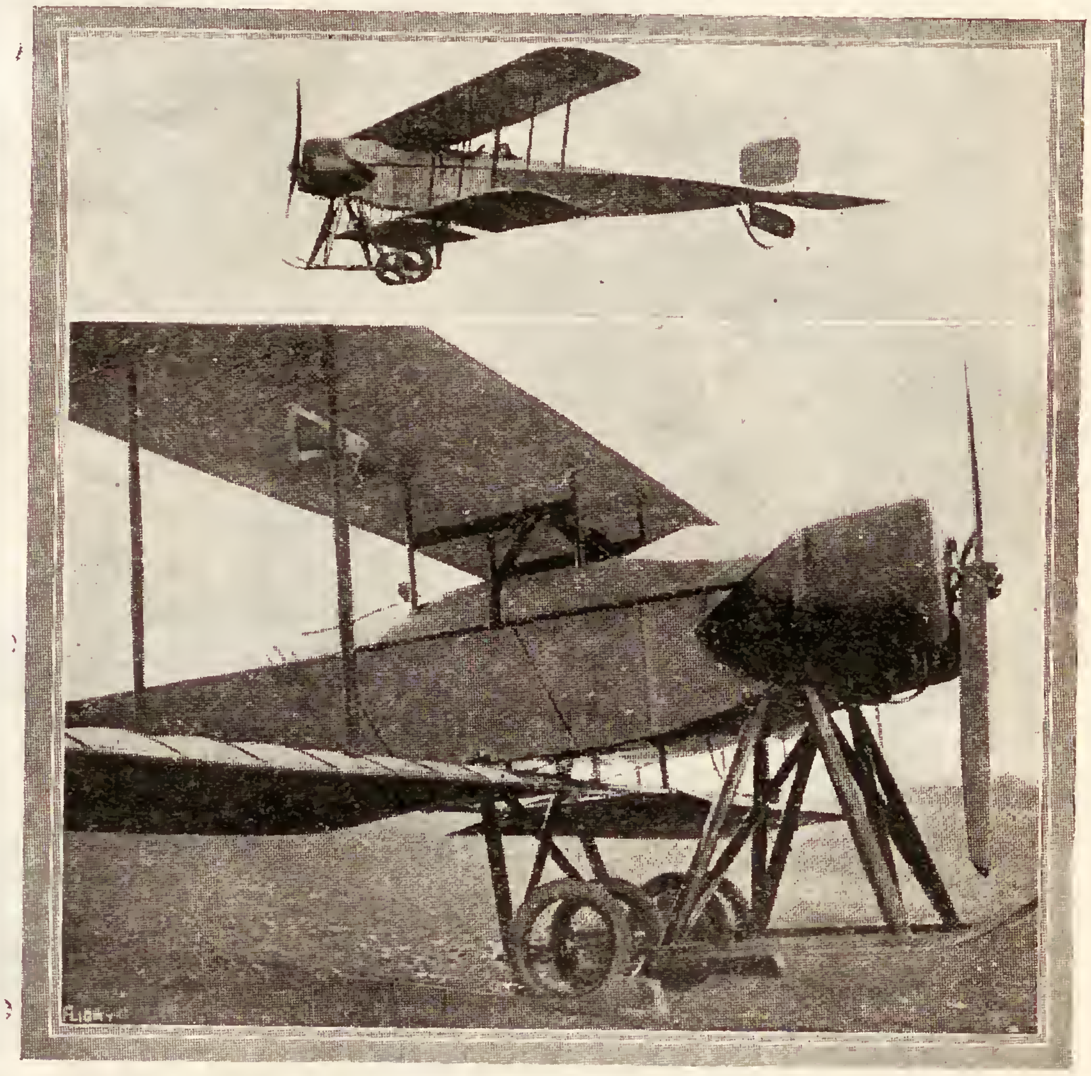
THE EASTER TRIP—RUBBING IT IN.—The usual official "Yer name and address—landing ain't allowed 'ere."

bringing the machine to a standstill in the *centre* of the circle. This concluded the tests, and after giving the mechanics orders to put the machine into the hangar we returned to London by train. On thinking over my experiences after getting home, the thought occurred to me that I had travelled by a goodly number of different conveyances during the day, firstly, tube to Golder's Green, thence by tram to Edgware Road, from where I proceeded by bus to Collindale Avenue. From Hendon to Farnborough by air thence by motor to Farnborough Station, and the final stage home by train. Truly we live in a wonderful age. C.M.P.

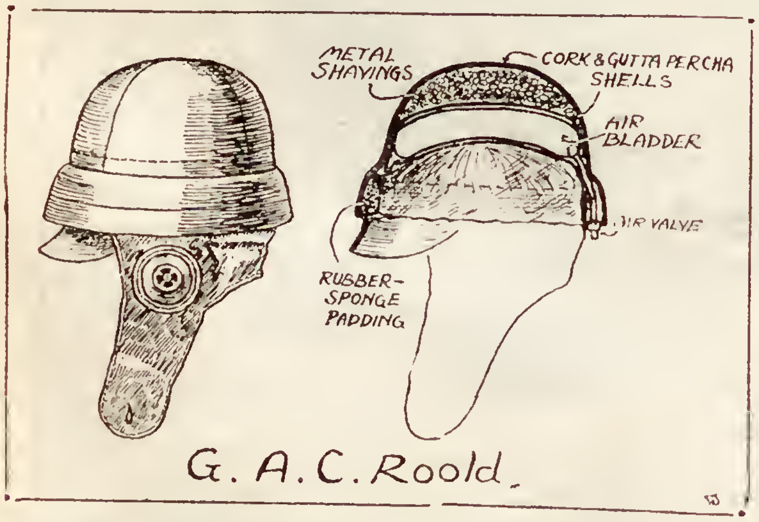
THE PAUL SCHMITT BIPLANE.

At the time of the Paris Show we gave a full description of the Paul Schmitt biplane, with an illustration of the method whereby the angle of incidence may be altered during the flight. The recent excellent performances of this machine in the hands of M. Garaix, who, it will be remembered, has beaten the world's height record with six, seven, eight and nine passengers, seem to prove the advantage of the variable angle of incidence in conjunction with its complement, the variable power. It will be noticed that when the angle of incidence is maximum the inter-plane struts slope backwards in relation to the *fuselage*, thus providing a rearward stagger of the planes. It might appear at first sight that the alteration of the angle of incidence by pivoting the planes round the transverse horizontal axis would lead to displacement of the centre of gravity, but this possibility has been guarded against by so calculating the position of the transverse axis around which the planes are pivoted that the resultant centre of pressure for both planes remains the same, with regard to the centre of gravity, throughout the entire series of alterations of the angle of incidence which ranges from 0° to 12°. The machine is fitted with a 14-cyl. 160 h.p. Gnome engine driving an Integral propeller.



THE LATEST G.A.C.-ROOLD SAFETY HELMET.

Some considerable improvement will be found in the latest pattern G.A.C.-Roold safety helmet, which Messrs. The General Aviation Contractors, Ltd., of 30, Regent Street, London, S.W., received from Paris during the recent Olympia Aero Show. Referring to the accompanying illustration it will be seen that this new helmet still retains the original characteristics both in general appearance and construction, with the addition of a further shock-absorbing medium in the form of a pneumatic bladder. The outer shell of the helmet is made of a composition of cork and gutta percha, which in itself has remarkable shock-absorbing qualities. Fitting inside this outer shell is another one made of the same material, so fitted that a space is formed between the two shells. This space is filled with a quantity of metal shavings of special manufacture. Underneath the inner shell is a rubber bladder, against which the crown of the head abuts, whilst a leather lining comes between the head and the bladder. The latter is inflated in the ordinary way with a tyre pump, the valve being situated in the base of and at the back of the helmet. The base of the helmet forming the brim is also padded, with a rubber sponge-like material, and projects so as to form a protection for the face. The combined action of the bladder, the metal shavings, and the cork compo. shells renders the helmet proof against heavy blows and shocks to a remarkable degree, whilst the complete helmet is exceptionally light and strong. The wide leather chin straps are provided with ear pieces, and the helmet is covered with a washable fabric called "Loreid" either in black or khaki.



Protection for the eyes is provided by means of a peak projecting from under the brim, whilst a model is also made having an extension for protecting the neck. Compared with some safety helmets, the G.A.C.-Roold is decidedly handsome in appearance, looking not at all unlike a Colonial sun helmet.

THE ROYAL FLYING CORPS.

The following promotion was announced in the *London Gazette* of the 14 inst.:—

R.F.C.—Military Wing.—Capt. Andrew G. Board, the South Wales Borderers, from a Flying Officer to be a Flight Commander. Dated March 1st, 1914.

British Headquarters of Blériots.

After May 1st, the general offices of "Blériot Aeronautics" will be transferred to the new works of the company at the Brooklands Aerodrome, Weybridge, Surrey, where all communications should be addressed.

THE VALUE OF BALLOONING AS A TRAINING FOR FLYING.*

By GRIFFITH BREWER, A.F.Ae.S., and Lieut. J. N. FLETCHER, R.F.C.

Mr. Brewer's Paper.

Members of this Society may be forgiven if, in view of the glorious progress of aviation, they regard the balloon as an extinct species of aeronautical apparatus. The object of this paper is to show that, in spite of the strides aviation has made, the balloon still has its part to play in the navigation and study of the air, and that those who go to the trouble of making balloon ascents not only reap considerable pleasure by employing that means of transit, but they also learn facts about the atmosphere which may be of service to them in becoming more than mere chauffeurs of aeroplanes.

The Knowledge of the Atmosphere.—The best sailors who navigate our steamships have served their apprenticeship on sailing vessels, where they learn the true force and effects of winds and gain a knowledge of the sea not so readily acquired under steam power. In the same way, I venture to suggest that the much-despised balloon is a means for acquiring a knowledge of the atmosphere which cannot be gained when tearing through the air at fifty miles an hour. A balloon floating freely in the air moves at the exact speed of the wind, and by observing the apparent movement of the ground immediately below, the speed of travel of the air may be accurately measured, and thus the true direction and speed of the wind at various altitudes may be noted.

The Balloon is a Good Observatory.—Complete silence and freedom from vibration enable the aeronaut to make accurate observations, whilst a sense of security due to the car being in constant stable equilibrium facilitates calm thought and appreciation of atmospheric phenomena, which cannot be so readily experienced when flying on an aeroplane.

Getting Used to the Air.—One advantage to be gained by practising ballooning before adopting aviation is that the balloonist may acquire familiarity with dangling his toes in space and steady his head in proportion to his altitude. A nervous man can, by being lifted calmly into space, become accustomed to looking down from considerable heights without that sense of nervousness which is a considerable handicap and strain to some aviators; and, having once acquired this familiarity with height, he may then undertake the lessons in control of a machine, without the added handicap of being unaccustomed to high altitudes. Becoming accustomed to looking down from a great height is of great assistance to a pupil commencing aviation, but the main benefits derived from a ballooning training are those which give the aviator who has acquired sufficient skill to take his "ticket" the additional knowledge which will carry him beyond that standard of mental efficiency at which many aviators are content to rest. Perhaps the chief knowledge gained by the practice of ballooning, which may be of service in training a man for pioneer work in aviation, is the knowledge gained of the atmosphere in respect to the speed and direction of gusts. The probable development of weather conditions, with their bearing on the voyage to be made, and the ability or practice of keeping a position on a map without following a railway or other landmark in order not to lose his way, are also lessons learnt best in balloons.

The Aeroplane is a Bad Observatory.—The reason the air cannot be studied properly from an aeroplane is that an aeroplane must, in order to remain in the air, be travelling at a high rate of speed. Can you imagine anyone wishing to find out all about the movements of the wind confining his study to the bridge of the "Lusitania" during her passage to New York? To get any results at all he would have to make complicated calculations involving the subtraction of the vessel's speed of twenty-five knots from the result obtained by other tests, and all sorts of other errors would be obtained, including whirls and eddies set up by the passage of the vessel through the atmosphere. Compare with this the advantage the same individual would obtain if, instead of choosing the bridge of the "Lusitania" from which to take his observations, he obtained permission to sit on the top of the Eddystone Lighthouse. There every puff of wind that blew could be registered correctly in the direction from which it came, and although allowance might possibly have to be made in some conditions for the presence of the lighthouse itself, and even for the presence of the observer, yet the errors which would creep into such calculations would be infinitely smaller than those which would bustle in from all quarters on the bridge of the "Lusitania."

Piloting by Sound.—Mr. Horace Darwin has described a most interesting theory of the way migrating birds guide their flight by the sound of distant breakers on the sea shore. In support of the theory, he kindly referred to my having heard the breakers of the sea shore on the North of France when in a balloon still over England. The hearing of those breakers is impressed vividly on my mind, because it was the only confirmation Mrs. Assheton Harbord and I had that the wind we had trusted to carry us to France was worthy of the confidence we had placed in it.

From the experience I have had of aeroplanes in flights with Mr. Orville Wright and with Mr. Alec Ogilvie, I have not been able to hear them speak to me at a distance of two feet, much less hear the breakers on the sea shore twenty or more miles away. In a balloon, the absolute stillness enables the slightest sound to be heard, and, as Mr. Horace Darwin points out, "The intensity of the sound from a single source, such as a dog barking, will vary inversely with the square of the distance, but if the sound comes from a line instead of from a point, its intensity will only vary inversely as the distance." Mr. Mervyn O'Gorman points out that this is one of the reasons why the sea breaking on the shore can be heard at such a distance. When aeroplane engines are fitted with efficient silencers, those who fly will be able to check their course and position by sound, in the way Mr. Darwin now suggests migrating birds are in the habit of doing.

An Explanation of the Ground Calm of a Summer Night.—On several occasions the practice of ballooning has suggested explanations to my mind of the cause of atmospheric movements, which, if true, must be of value to all who navigate the air. One example of this is an explanation of what happens in the atmosphere in the summer time, when, after a stiff breeze all day, the night falls with the air dead calm, the stars come out brightly, and the smoke goes straight up from the chimneys, and yet the wind continues to travel fast above. The conclusion I came to was that the air split at nightfall into upper and lower layers, the upper one continuing to travel, while the lower layer comes to rest, and in the morning the two join again.

To support this theory, one must prove three things. First, that the wind does continue to travel above; second, that two layers can sharply separate; and, third, why they should separate and afterwards reunite.

On a clear night in the summer time, when the wind falls calm on the ground at sunset, the continued movement of the upper air cannot be observed by movement of clouds, although occasionally, when there are separated clouds, they can be observed to be travelling in the original direction. Such optical observation does not indicate the shallowness of the ground calm, which I have found on many occasions to be less than 200 ft. deep.

In proof of this, I will cite two instances. Once, when making a balloon ascent at Battersea Park, the balloon was standing perfectly straight on the ground before we left. No sooner had we cleared the gasometer than we travelled eastward down the Thames at about twenty miles an hour. An hour and twenty minutes later we made a temporary descent at East Horndon, Essex, and we were still travelling fast when the trail rope, which was 300 ft. long, had a considerable portion on the ground. When, however, the car was perhaps 50 ft. from the ground, the balloon entered the calm, and we came to a dead stop. We remained in the field for the rest of the night, and when the sun came out in the morning the breeze sprang up on the ground, and we continued our excursion for another half-hour or so, when we made a landing near Rayleigh, in Essex, in a wind of not less than thirty miles an hour. The landing was a rough one, which makes it all the easier to remember. On another occasion, going up from Wolverhampton with a hydrogen balloon just before sunset, we travelled westward at about twenty-five miles an hour, and then we came down in a field into an absolute calm. On this occasion also the calm was not reached until most of the trail rope was on the ground. We left the next morning before sunrise, and before the trail rope was completely off the ground we resumed our journey at the original speed of twenty-five miles an hour.

I could give many other instances of similar night calms on the ground and continuation of wind above, such, for instance, as most of the Gordon-Bennett Balloon Race days in September or October. From Paris, in 1906, St. Louis, 1907, Berlin, 1908, were all similar days, when we started in the evening calm, and yet travelled as fast by night as we did on the following day.

Now to prove my second point—namely, that two layers can sharply separate. Every balloonist of any experience must have observed that winds travel in definite layers. A wind up to perhaps 2,000 ft., blowing from the South-West, may change to West or even North-West immediately above that altitude. The-two layers of air travel smoothly, with only the smallest area of disturbance between the two layers; and when it is remembered that there are thousands of square miles over England alone of contact surface between the two layers, one must at once realise that the friction between the two layers must be infinitesimal in order to preserve their distinct directions.

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* Papers read before the Aeronautical Society of Great Britain at the Royal United Service Institution, Whitehall, S.W., on April 15th, 1914.

I now come to the third point—namely, why the wind should fall calm on the ground whilst remaining in swift motion above. It is obvious that wind travelling in contact with the ground must meet with considerable resistance. This is proved by the comparatively slow travel of air when measured close to the ground, and its increase in speed at higher altitudes. Consequently, the air under the influence of friction drag caused by proximity to the earth's surface, tends to arrest the progress of the air above, and if the tenacity of the large bulk of air be sufficient to move the ground layer, the latter travels with it; if it be insufficient, then the air splits, leaving the lower portion stagnant, and the upper portion travelling at the original pace.

This would explain why they separate, but it does not explain why they join again when the sun rises. I assume that a constant mixing or interchange between the travelling atmosphere and the ground layer is necessary in order that the ground layer may be moved under the influence of the upper layer. At night there is nothing to cause disturbance in calm air on the ground, but when the sun comes out in the morning, objects on the ground become slightly heated, and cause bubbles of air to rise from the stagnant portion below into the portion which is moving above. A bubble of warmed air rising soon becomes a twisting column, and when you think that the proportion of thickness between the two layers of air may be likened to two table-cloths spread over a table, it will be readily realised that when some thousands or millions of these columns or bubbles are rising from one layer to the other layer, and similar quantities of cooler air are descending to take the place of the rising air, then the effect is similar to the effect of the upper table-cloth becoming pinned to the stationary under table-cloth, with the result that the two layers again move along together.

In order to show that I have not digressed too far away from my subject, I will endeavour to illustrate how an understanding of these wind conditions might have saved the lives of perhaps more than one flyer. Imagine an aeroplane coming down from a great height, head on to a wind blowing twenty miles an hour. On arriving, say, 100 ft. from the ground, the machine runs suddenly into the stagnant ground layer of air, and the flying speed through the air is immediately reduced by twenty miles per hour. The machine naturally stalls and dives, and the altitude being insufficient to recover control, the machine strikes the ground before control can be recovered. Many accidents have occurred owing to the diving of machines just prior to landing when perhaps 100 ft. in the air, and I cannot help thinking that wider knowledge gained in ballooning may add to the understanding of the air, and thus increase the safety of pilots when flying and prove beneficial in their training.

Lieutenant Fletcher's Paper.

Mr. Griffith Brewer has raised a large number of interesting questions in his share of this lecture, and has covered the ground very completely. It is left to me to remark on special features of the subject in their application to military aviation, and perhaps to amplify somewhat further some of the original problems.

The Pioneer Work of Ballooning.—It will probably never be recognised how much the science of aviation owes to ballooning. Ballooning at the present day is in danger of sinking into complete obscurity, at least in this country, and I think also in France. Its use becomes less apparent every day, and I am very glad to have the opportunity to plead for it, though I cannot but regret that you should have been robbed of the pleasure of hearing Major Maitland speak on a subject on which his experience gives him the first claim to address you to-night. He has, however, very kindly allowed me to draw on his experiences and ideas.

Ballooning must be given credit for the work it has done in the past. Many of the most elementary bits of knowledge stored away in the experience of aeroplanists of to-day owe their entire conception to ballooning. The whole branch of lighter-than-air flying owes its being to ballooning. And the ground has not yet all been broken. There is a great deal of work to be done; and many lines of study are daily opened to balloonists, and can, indeed, only be carried out by balloonists. The subject falls into two headings, viz., the value of ballooning as a preparation for flying and the value as actual training. I wish to make it clear that the first heading is a fair sub-division of the lecture. It is to my mind of the utmost importance from a Service point of view. Experience of the air we fly in is necessary. Accurate knowledge cannot be gained from mobile aircraft; it is our object to show that it may, in part, at any rate, be gained from a proper development of the science of ballooning.

Wind Charts.—How many aeroplanists are aware of the interesting phenomenon mentioned by Mr. Brewer that the wind direction varies at different altitudes? And of those who know that the wind's direction alters how many have tried to make use of their knowledge?

On July 13th, 1912, a long-distance balloon race was held. The day was hot and thundery and the ground wind fickle. Pilot balloons sent up before the race drifted eastwards down the Thames. Those who watched the clouds saw the lower ones travelling South, but the mackerel sky above travelling North. Seven balloons went up from Hurlingham, of which four went South to Brighton at an average height of not more than 5,000 feet. The other three, choosing various altitudes, according to their ballast capacities, made Southampton, Bath and Market Harborough respectively. The last-named must have travelled at an average height of 12,000 feet. The balloon I was in described a very marked "S," the northerly inclined limb, from south of Godalming to Fleet, being at 10,000 feet.

An aeroplane flying on that day from London to York, 200 miles approximately, could, by flying at 10,000 ft. instead of 3,000, have saved about two hours on the journey. The two opposing currents were, I should say, about 20 m.p.h. at each level. The condition can be predicted by meteorologists, and it is of no small importance to aeroplanes to know and make use of it. Their endurance is limited to say five or six hours at war load. If, then, they can find favourable currents in all directions, they can save much petrol and oil, and add a considerable percentage (in the case we have considered about 50 per cent.) to the number of miles they can travel in the air. On the chance of effecting such a saving it is worth while to climb to various heights and observe progress over the ground at those heights. This can now be done very easily by means of a little camera-obscura apparatus, in which the time taken for the image of a ground object to pass between two lines can be read off directly (as a function of the height) as speed over the ground.

It might well be remarked here to those who object that too much is being demanded from the aeroplane pilot, that war is a scientific game, and must be waged scientifically. If by application of scientific methods we can increase the aeroplane's radius of action ever so little, then those methods are worth adopting; and the pilot must be trained accordingly.

Sea breezes.—Sea breezes provide another important field of research for balloonists. On one occasion Major Maitland left London in his balloon in a flat calm. After hanging motionless for an hour or so he decided to go up higher, and went to 9,000 ft. through the clouds. There he remained 1½ hours out of sight of land. I have his permission to point the moral which follows. For he then heard the hoot of a steamer, and on coming down to investigate, found the Newhaven boat just arriving, as it were, at his feet. Moral: Do not remain in balloons for more than half-an-hour anywhere in England out of sight of the ground. This is made an order for military balloons, and should never be forgotten by anyone. A record descent was made, but at about 800 ft. a strong sea breeze was met, which carried him Londonwards at 25 m.p.h. Unfortunately, lack of ballast prevented him from saving railway fares to any appreciable extent, and he had to land. It would have been interesting to know where and why that breeze would have failed. Many countries in this world have nothing but sea and land breezes for six months in the year. Use could be made of them in much the same way that the barge and the steamer alike use tides to help them up and down the Thames.

These matters can only be properly investigated by balloonists, for, as Mr. Brewer points out, you cannot investigate wind strengths and directions from the deck of an ocean liner.

Suggested Scientific Organisation of Ballooning.—I should like here to plead for some kind of organisation among balloonists in this country. A few individuals make weekly ascents from London. They store up for themselves a vast deal of experience and weather wisdom, but little of this gets any further. On the other hand, most German aeronautical papers give a page or two to ballooning. A synopsis of balloon ascents for the month chronicles always some two or three hundred ascents. Another page is given to the more interesting ascents; and altogether, it is clear that an organisation exists to provide a common fund of experience from which all can draw. I would go further. I would suggest that the Meteorological Office amplify its wind chart system, and publish daily information of the upper currents, so far as they can be ascertained or predicted, and that ultimately a probability chart be got out showing upper wind directions and forces for all systems of weather. These charts would be liable to daily revision by telegraph, but they would be a great guide to pilots flying high. It is a formidable task. But if more people ballooned from more centres, and if they sent in their reports to a central registry, and if they would assist in the pilot balloon ascents made under the auspices of the I.M.A., we should, in five years, have an invaluable fund of knowledge. Night flying, fog flying, flying above clouds, would be as safe and certain as navigation by dead reckoning is at sea to-day. In five years' time aeroplanes will be so safe, and so free from engine trouble, that to "bet on one's engine running" will be to bet on a certainty. That is to say, it will be possible to do all these things, which at the present time are regarded as too dangerous. But we shall then find that navigation is the difficulty. Here is, however, a little "ever ready" drift indicator, very simple and very quick to use, and involving no calculation and no drawing. From it you can read at a glance what course to steer to make good a certain course; and where you will be at any moment. But first we must have our wind chart. I believe such a thing is possible. The lack of these charts is at the present time the great gap in airship work. We still depend on seeing either ground, or sun, or stars. Dead reckoning, so often necessary, is not possible. May I be excused here for digressing from my subject? At the present day, I think more might be done than is done by the Meteorological Office. I am told on fairly reliable information that the commander of a German naval airship which met with disaster at sea was warned by wireless from the nearest Meteorological Office of the approach of a bad disturbance, the nature of which was not quite known, and was advised not to send the ship out. The exigencies of the situation decided him to send out the ship, however, which four hours later ran into the Line-squall which overwhelmed it. No such warning is possible in England except at stated hours. The Meteorological Office issues two reports only, early morning and late evening, so that the disturbance may actually arrive before the warning of it. I suggest that warnings of unusual disturbances be sent out at once to all aeronautical centres, so that aircraft may be stopped from going out in fine weather into certain bad weather. Further, the difficulty in plotting out wind forces and directions at any part of a cyclonic disturbance, is that the Meteorological Office does not issue any definite statement of the movement of the centre of the system. Its speed and direction should always be given, and any change in either speed or direction should be sent to aeronautical centres for distribution to aircraft carrying wireless. Again, as most systems work up from S.W., warnings of actual weather conditions sent from Plymouth or Bantry would give aircraft at least six hours' warning of the weather ahead. These warnings should be sent out every three hours.

The Training of Pilots and Observers.—I must now turn my attention to the second sub-division, *i.e.*, to training pilots and observers. Ballooning might, I think, be more used for training observers. It produces quicker results in the elementary stages. A man will learn far more in three or four balloon ascents than he will in double that number of aeroplane flights. He will probably, too, reach greater heights in the balloon. The process is also attended with less actual risk and discomfort. Several ascents in aeroplanes are quite wasted, as the passenger is fully occupied in drinking in the new sensations. In the balloon, however, there are no new sensations except that of unusual calm. An instructor is always at the pupil's elbow to help him to learn, and there is no noise to prevent talking.

Aeroplanists among the audience know that cross-country flying is really very easy until trouble comes. How many pilots leave the aerodrome for the first time full of confidence? Never before have they had occasion to watch the country for possible landing places. How many of these same pilots have landed in green corn or standing hay and smashed up simply because they could not distinguish between these features and pasture land from 3,000 ft. up? How many aeroplane pilots can recognise the useless pasture that slopes like the roof of a house? The remedy I suggest is to take each would-be cross-country pilot for two balloon runs before sending him off on his own. Point out that cattle or sheep are the only safe indications of pasture; that, failing cattle or sheep, one should look out for the scar in the gateway used by animals that is not present in standing hay or green corn fields. That when cattle or sheep are feeding with heads in the same direction, it indicates either a slope or a strong ground wind; that streams or woods at the edges of fields often indicate steep slopes. These can be learnt very quickly. Five or six pounds spent on ballooning is worth far more for the experience gained, and is an excellent insurance for the preliminary risks of cross-country flying.

While on this subject, I would like to suggest that a few balloons on the strength of the Staff College would provide all Staff officers with an invaluable grounding in aerial observations and would enable them to appreciate the situation from the flyer's point of view far more sympathetically than they are likely to if they have never flown.

Finally, I cannot leave the subject of training without pointing out that the balloon training is an essential part of every airship pilot's education. He must learn to read local conditions of temperature and wind. He must be skilful in the management of his gas and envelope. He must understand, inside out, the theory of ballooning. The bigger the airship the more he must know. Changes of temperature, up and down currents, affect airships in a way in which no aeroplane is affected, and without a thorough appreciation of the situation the airship pilot would soon be utterly fogged, and at a loss to understand the vagaries of his charge. If night flying is to be a principal *rôle* of airships, the pilot must be trained first in night ballooning. When real flying, away from illuminated aerodromes, becomes a possibility for aeroplanes, some regulation should be adopted to make each pilot do at least two night balloon runs before he attempts to cross unknown country by night.

Thunderstorms and Local Cloud Effects.—All aircraft avoid thunderstorms, as well they may; not a few nasty aeroplane accidents have been attributed to them, notably Capt. Reynold's smash at Bletchley, where he was upset by a thundercloud at 1,500 ft. Nearly every balloonist of repute has, however, been right through more than one storm. Can nothing be done to plot out the air disturbances by means of parachutes and pilot balloons set free from the car? The danger involved is, I believe, infinitesimal, though it is not a pleasant experience. Every cloud has its own peculiar air disturbances. The up currents in cumulus clouds are a distinct menace to unwary flyers, and measurement of their force would provide a balloonist with many hours of fascinating study.

Experiments.—Balloons provide the kick-off platform for many important experiments. Many books have been written on the subject. Perhaps one of the most interesting was Bacon's description of his sound experiments. Others are, photography, bomb-dropping, intercommunication, wireless, &c., &c., with the details of which it is not within the scope of this lecture to deal.

The atmospherical conditions over big towns and in mountainous regions require investigating. Those who have flown airships over London alone know what colossal bumps are to be met with there. It would be interesting to trace the smells of Soho to their ultimate destination!

The conclusion I hope this Society will come to is that there is a great scope for ballooning, and many problems to be worked out by its aid. There is a very serious necessity for more information about the air. The Society can assist by organising investigations, by interesting scientists and meteorologists in the problems that present themselves, perhaps even by finding money for the work.

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The New "Wight" Seaplane on Trial.

The "Wight" Seaplane, with 200 Canton-Unné motor, was out for the first test on the 7th inst.; there was a wind blowing at about 20 to 25 m.p.h., and the sea was very rough.

The machine left the water very easily at 35 m.p.h., and after flying for a short time, owing to the motor stopping a descent had to be made on very rough water. Owing to the state of the tide, it was some ten hours before the machine could be taken back to the shed, but she stood the buffetting of the sea without any mechanical breakdown at all. The flight was considered very satisfactory.

Easter at Shoreham.

Although there was no definite meeting arranged for Shoreham, some really excellent flying was seen during the Easter vacation, and quite a small crowd of onlookers attended. Cecil Pashley was out on the H. Farman and made several flights with passengers on Saturday, and also treated the spectators to some neat banks and spirals. The Cedric Lee circular monoplane, with Gordon Bell at the wheel, made a flight during the afternoon.

On Sunday, both Elliott and Pashley were out on their respective Farmans, and put up some good work.

The Pashleys' new Farman will be completed ere long, difficulty in obtaining material causing the delay. It is probable that more people would have been present during Easter, but for the difficulty in gaining access to the 'drome. It is rumoured that a new approach may be instituted shortly.

Mr. Salmet's Paris–London Non-stop Flight.

Accompanied by Count FitzJames, Mr. Salmet made a fine non-stop trip between Paris and London on the 9th inst., on the Blériot two-seater monoplane which he will use during his tour of the country on behalf of the *Daily Mail* this season. Buc was left at 9.50 a.m., and good progress made in fine weather over France and across the Channel, but on reaching Folkestone, wind and rain were met. The machine was, however, headed for Hendon, but on reaching the Southern outskirts of London, as it was found that the petrol supply was getting very low, a descent was made safely at Addington, near Croydon. The journey of 210 miles had been covered in 3 hours 25 mins. The remainder of the journey to Hendon was made the following morning.

English Prince Loops the Loop.

Among the passengers taken up by Mr. Hamel at Bournemouth on Saturday was Prince Leopold of Battenberg, who enjoyed the sensation of looping the loop twice.

FOREIGN AIRCRAFT NEWS.

More R.E.P. Machines for French Army.

BEFORE a commission of French military officers, Molla on the 10th inst. at Buc, put half a dozen new Rhone-engined R.E.P. machines for the French Army through their official tests. Each machine, carrying a passenger and four hours' supply of fuel, climbed 1,000 metres in times which only varied between 8 and 8½ min.

Night Flying on a Blériot.

ON the 9th inst. Lieut. Quillien started from Buc at 10.55 p.m. on a Blériot machine fitted with a powerful searchlight, and for over half an hour flew above Buc, Versailles, and Chateaufort, &c., eventually landing at Buc without incident.

Flying After Dark Over the Sea.

NAVAL LIEUT. JANVIER on a Voisin hydro-aeroplane on the 7th inst. made a long flight after dark over the sea at St. Raphael, in the South of France, and he intends shortly to make a night flight from the French Naval Aviation centre at Frejus to Monte Carlo and back.

Testing a New Morane.

ON the 9th inst. some tests were carried out at Villacoublay with a new Morane-Saulnier monoplane of the parasol type, specially built for scouting purposes. The assembling and dismantling tests stipulated by the French Army were carried out in 3 mins. With Pequet in charge, and with an ordinary load, the machine climbed 1,000 metres in 6 mins. 40 secs., and on landing was pulled up in 35 metres. The speed of the machine was given as 120 kiloms. an hour.

12-Hour Flight by Poulet.

BY way of training for a projected attack on the twenty-four hour record, Poulet on his Caudron biplane, fitted with Rhone engine and Integral propeller, on the 8th inst. made a flight lasting 12 hours. Eight times he flew from Etampes to Gidy and back, and then made a circuit of 91 kiloms., the total distance covered being about 860 kiloms.

Some New Loopers.

ON the 8th inst. at the Morane-Saulnier school at Villacoublay, the Russian aviator, Gaber-Vlinsky, looped, while two days later another Morane pupil, Rose, also carried out the manœuvre. Another Russian, Pitzberg, looped at the Morane school on the 11th, while a Roumanian, Savoff, made similar flights at the Blériot school at Buc. At Crotoy on the 11th inst. Simon looped the loop on a Caudron biplane fitted with 50-60 h.p. Anzani motor.

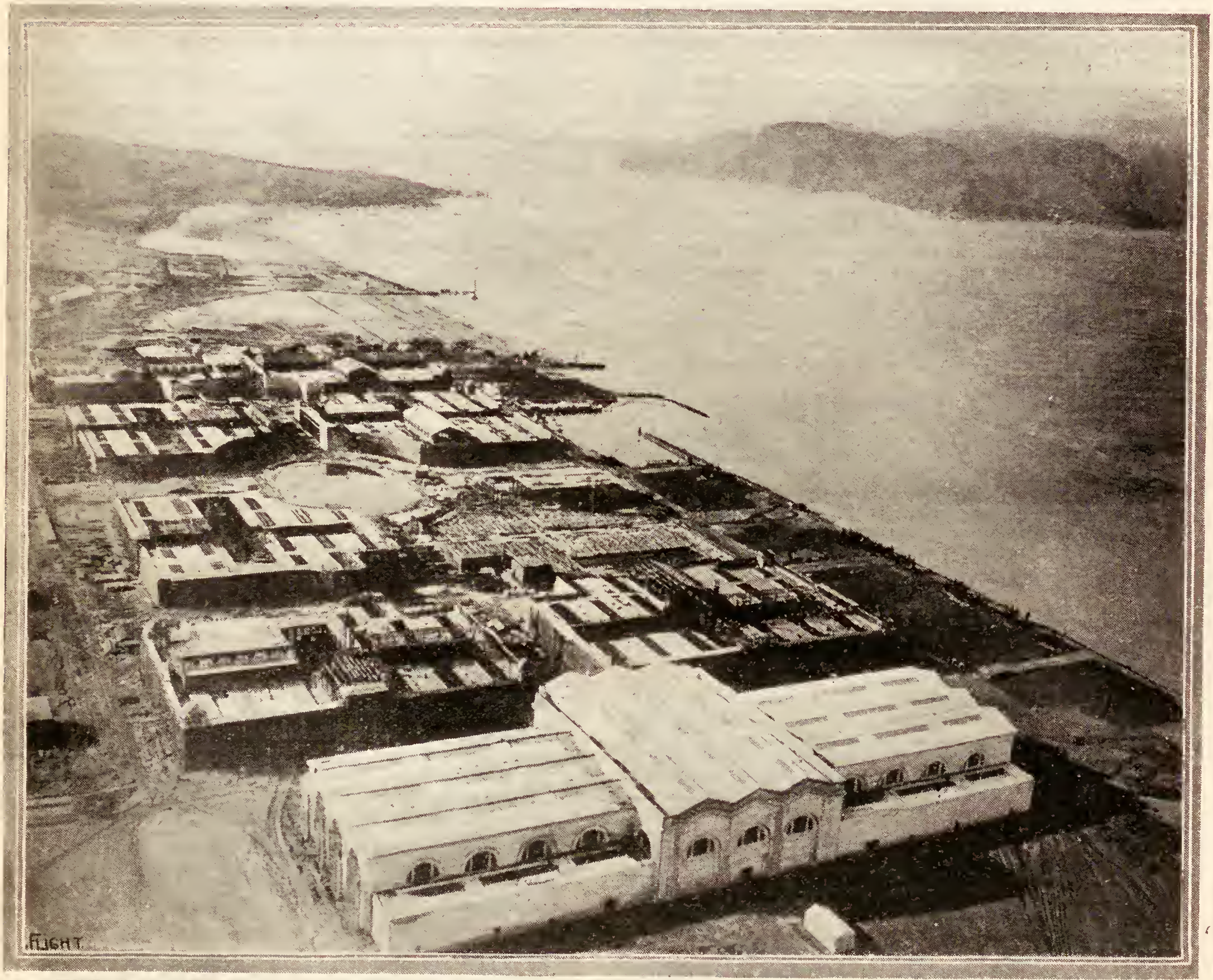
Gustave Tweer, whose machine has landing chassis arranged on each side of the planes, as illustrated in last week's FLIGHT, looped the loop at Johannisthal on the 1st inst.

Rheims to Paris and Back.

ON his Nieuport-Gnome monoplane, Capt. Guillabert on the 7th inst. flew from Rheims to Villacoublay in 1 hr. 55 mins., but the return journey, which was made later in the day, only occupied 1 hr. 5 mins.

Good Flight by Audemars.

ON his Morane-Saulnier monoplane, Audemars on the 9th inst., started from Lille and flew to Villacoublay, his time for the distance of 280 kiloms. being 2 hrs. 20 mins.



THE PANAMA PACIFIC INTERNATIONAL EXPOSITION.—A remarkable photograph of the buildings, &c., of the exposition in their present stage of construction, as seen from an aeroplane recently.

Long Flight in Company.

FOUR biplanes landed at the Ouges military aerodrome at Dijon on the 9th inst. The machines were piloted by Capt. Voisin, Sapper Bloch, and Sergeants Pelletier and Clement, and they had flown over from Mailly Camp.

By the Aerial Way.

HAVING received delivery at Buc of a new Blériot machine, Sergeant Pinsard on the 8th inst. flew it back to his station at Epinal, taking 2¾ hours for the trip. On the same day, Sergeant Clamadieu, also on a Blériot, flew from Buc to Mailly Camp.

A Belgian Fatality.

WHILE making a first trial flight on a new biplane at the St. Jo aerodrome, near Antwerp, on the 8th inst., the Belgian pilot, Francois Verschacve, fell from a height of about 1,000 metres, and was instantly killed. It is believed that a part of the warping gear broke.

Double Fatality in Germany.

WHILE flying at the Kaditz aerodrome at Dresden, on the 10th inst., something went wrong with one of the wings of a machine piloted by Hermann Reichelt, and it fell from a height of 500 metres. The passenger, Fraulein Steglitsch, was thrown from the machine and killed instantly, while the pilot was so severely injured that he died in hospital a few hours later. It may be recalled that last autumn Reichelt made a flight from Berlin to Paris.

Mishap With Parachute.

AMONG the attractions arranged at the Aspern Aerodrome, Vienna, for Sunday last, was a descent with a Bonnet parachute by Bourhis, from a Deperdussin machine piloted by Lemoine. When Bourhis jumped from the aeroplane, however, some parts of his parachute got caught in the steering gear, with the result that the pilot lost control. The aeroplane fell to the ground from a height of 500 metres, and Lemoine was severely injured. Although the damaged parachute failed to open properly, Bourhis escaped with little worse than a shaking.

A Long Flight in Italy.

ON a Blériot-Gnome on the 9th inst. Lieut. Bolaguesi flew from Piacenza to Padua, Milan, and Turin, landing at the Mirafiori aerodrome. The distance of 525 kiloms. occupied seven hours.

An Italian Fatality.

WHILE Lieut. V. Griffa was flying over the Mirafiori Aerodrome at Turin on the 31st ult., the machine side-slipped, and fell from a height of 40 metres. The unfortunate pilot was killed instantaneously.

Dr. Amundsen in the Air.

AT Christiania, on the 8th inst., Dr. Amundsen was taken for an aerial trip by the Norwegian aviator Capt. Sem-Jacobsen, being up for 2½ hours and flying over Lillehammer, Randtfford, &c.

German Flyer Sentenced in Russia.

AFTER awaiting trial since he landed at Warsaw, while attempting to make a record non-stop flight, on February 8th, the German pilot Mishewsky was last week sentenced to three months' imprisonment in a fortress for flying over fortified places without permission. The charge of espionage against him was dismissed.

Climbing Tests with Farmans.

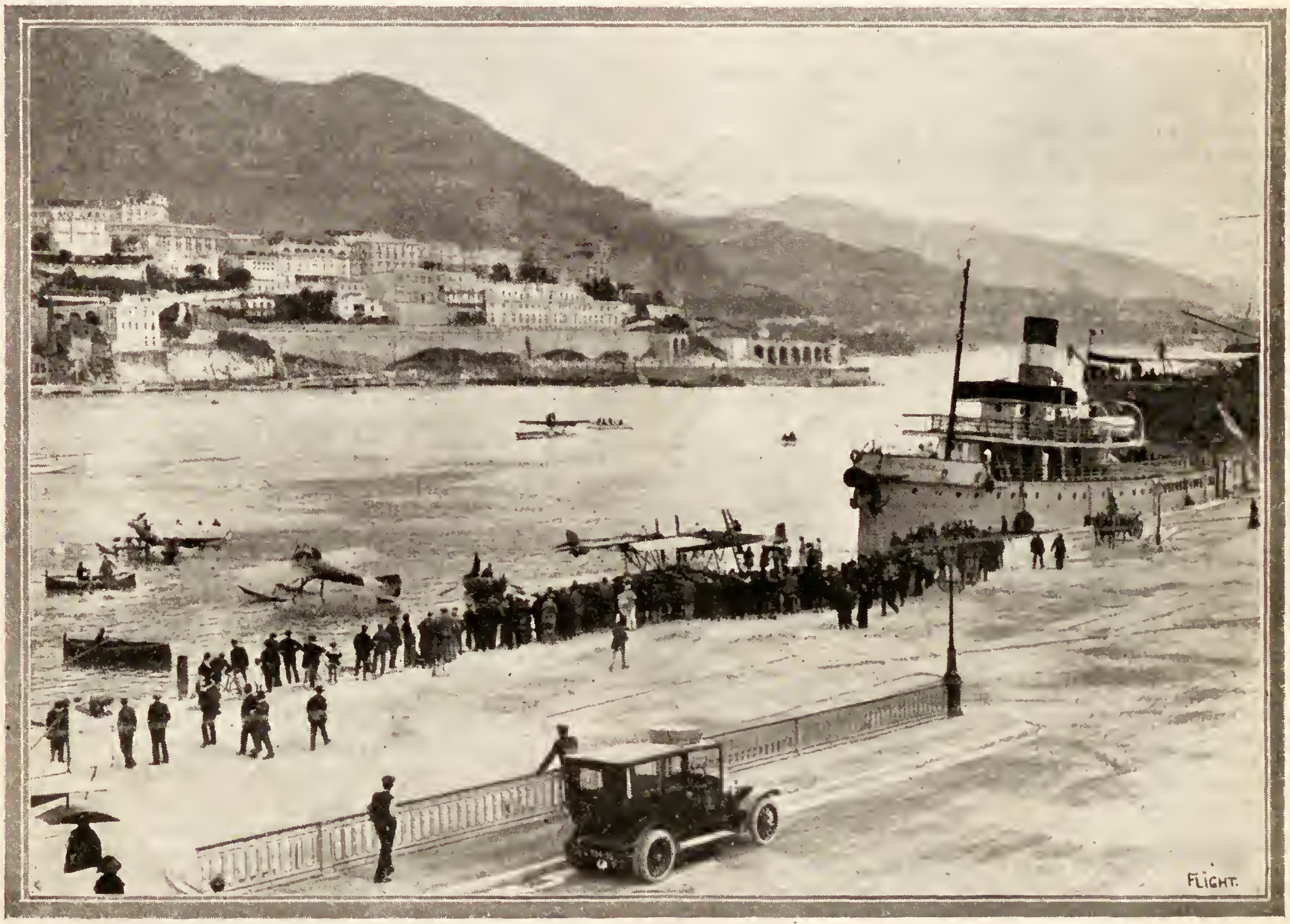
SOME very good results have been obtained recently with some H. Farman biplanes of the latest type during tests by the Russian Government at St. Petersburg. Carrying a load and fitted with a 100 h.p. Gnome motor, one of the machines climbed 500 metres in 3 mins., 1,000 metres in 7 mins., 2,000 metres in 18 mins., and 2,800 metres in 25 mins.

Another Record by the Sikorsky Biplane.

IT is reported from St. Petersburg that on the 6th inst. the giant Sikorsky biplane "Ilya Mourametz" carried ten passengers to a height of 1,560 metres.

Fast Flying in Germany.

IN a steel Jeannin monoplane Lieut. Hesse and Capt. Fiegel are said to have flown from Hanover to Johannisthal, a distance of 300 kiloms., in one hour on the 6th inst. The following day Capt. Hahnelt and Lieut. Geyer on an Aviatik biplane went from Dresden to Johannisthal, a distance of 200 kiloms., in an hour and a half.



MONACO HYDRO-AEROPLANE MEETING.—A general view of the bay. On the landing stage are seen the two Morane-Saulniers of MM. Garros and Brindejonc de Moulinais, and on the water are a couple of other competitors, whilst the Foudre is seen at the quay on the right.

THE MONACO RALLY.

In our last issue the progress of the various competitors in the Monaco Rally were chronicled up to Monday of last week. On the following morning Moineau started on his Breguet from Marseilles to complete the trip to Monaco, but in coming down at Tamaris his machine struck a buoy and had to be towed ashore by a torpedo boat. Fortunately the pilot and passenger escaped with nothing worse than a wetting. After being delayed by the weather at Albi, near Bordeaux for five days, Mallard attempted to complete his journey and reached Marseilles. On the 8th inst. Brindejonc des Moulinais, who had returned from Genoa by rail the previous evening, set out to make a fresh attempt, this time over the Vienna route. On reaching Antibes, however, the machine capsized and was smashed, but the pilot escaped uninjured.

The French Eliminating trials for the Schneider Cup were held during the day and Dr. Espanet on his Nieuport, who was the only one to complete the four laps of the 10 kilom. course, which he did in 23 mins. 50⅘ secs., was awarded the first place. Levasseur on a Nieuport who completed two rounds was given the second place, while Garros on a Morane who did one lap was placed third. Prevost on a Deperdussin, Janoir, also on a Deperdussin and Brindejonc on a Morane did not complete the course, but were classed as reserves.

On the following morning Verrier made a fresh start over the Buc–Monaco course while Renaux, likewise on a Farman, also started from Buc. After flying for about 80 kiloms., however, both pilots found the wind too strong for their liking and decided to return. Mallard started from Marseilles but had only completed about 20 kiloms. when he was in trouble with his motor and was towed into Cassis by a torpedo boat. Friday was a blank day but there was a good deal of activity on Saturday. Garros went on from Orange, where he had been delayed since the 2nd inst., and reached Marseilles. E. Stoeffler on an Aviatik started from Gotha and although his progress was retarded by a contrary wind he completed the stages to Frankfort and Dijon. Later he was in trouble with his motor and had to come down at Villeneuve-les-Avignon. Legagneux started from Brussels but after flying for an hour returned on account of the wind. Lord Carbery and Molla set out from Buc, but deemed it wise to go back owing to fog. Sunday morning saw Garros complete his trip from Brussels, and on reaching Monaco he immediately set out to make another attempt, this time over the Monaco–Buc course. Verrier on an H. Farman, Renaux on a M. Farman and Molla on an R.E.P. left Buc followed by Lord Carbery on a Morane and all four reached Angers safely. Verrier went on to Bordeaux and then had to stop at Albi for petrol, while, when making an enforced landing on the Arnet Plain near Pezenas, the machine collided with a tree and was damaged. Renaux had to stop at Gemozac owing to ignition troubles. Molla reached Bordeaux but Lord Carbery gave up at Angers. Legagneux started from Brussels but had to come down at Ypres owing to motor trouble. On Monday, Garros made a splendid flight from Marseilles and as his official flying time for the full course from Monaco to Buc—12 hrs. 11 mins. 34⅕ secs. was nearly 3½ hours better than Brindejonc's time he secured the leading place in the competition. Moineau made a fresh start from Buc and reached Bordeaux safely after the regulation stops at Angers. Bertin also started from Buc but was soon in trouble. Renaux went on from Gemozac to Bordeaux.

Tuesday saw another fine effort by Garros which eventually secured him the second prize. Starting from Brussels again he made his way by Calais and Dijon to Marseilles. Renaux went on to Marseilles and afterwards to Monaco. Mallard, having had his machine repaired also reached Monaco, while Verrier got as far as Marseilles. On Wednesday morning Garros finished at Monaco, as also did Verrier. It was announced later in the day that provisionally Garros had been awarded the prizes for the best and second best times, followed by Brindejonc des Moulinais, Renaux, Verrier and Mallard. The best aggregate times were:—Garros (Monaco to Buc) 12 hrs. 14 mins. 21 secs., Garros (Brussels to Monaco) 12 hrs. 27 mins. 13 secs., Brindejonc des Moulinais (Madrid to Monaco) 16 hrs. 2 mins. 31⅗ secs.

* * *

CORRESPONDENCE.

Wood in Aircraft.

[1852] A careful observation of all the aeroplanes at the Aero Show at the Olympia, and conversation with some of the practical men responsible for the building of them, has suggested to me one or two points which I think aeroplane builders might do well to consider, both for the better security of life, and also for economy.

The first is: Has it ever occurred to the aeroplane builder that the timber in one of these craft may possibly become "dead," *i.e.*, lose its life and strength in a very much shorter period—indeed, in a period which has never been considered possible previously—as the result of exposure to climatic change, and the intense speed at which it is driven through the air?

There is a great similarity between the physical conditions of animal life and vegetable life. Timber, like the human being, is affected by climatic conditions, and is capable of being worn out even as human nature is. Scientists have told us that the edge of a razor becomes tired—the temper of the steel is worn out. I am inclined to think that the explanation of a great many breakages to timber in aeroplanes may be attributed to this cause. If fresh timber be stowed in a confined place, as for instance, the hold of a hot ship, fermentation takes place and fungus or disease may be started. After being sawn up, if it is not well protected, decay readily sets in. Thoroughly seasoned timber placed in a damp atmosphere will absorb the damp around it and expand. Timber placed in the heat of the sun will crack sometimes with a report like the firing of a gun, and exposed to extreme frost somewhat similar results may be expected.

All these points go to show how easily timber is affected by climatic conditions.

The human being suffers from fatigue after driving through the air at tremendous speed, and I am inclined to think that the timber suffers from exactly the same fatigue without the recuperative power which the human being possesses.

If my theory is correct, therefore, the timber in aeroplanes ought to be changed much more frequently than has been thought necessary up to the present.

I should suggest the following rules to be observed with the object of making the aeroplane as safe as it may be possible:—

1. After three months' use, a careful inspection should be made of every part of the timber which is used in the construction of the machine, and if it be found that any portion shows any sign of loss of strength, that portion to be replaced.

2. That a committee should be formed of a few leading men engaged in the supply of the material used in the building of the machines, who should have before them a report from every flyer who has experienced the breakage of any particular part where timber is used.

3. The kind of timber and the conditions under which it was used, and the way in which it broke should be registered, so that a careful scientific record could be kept from which the future building might be controlled, and so that this might not be only theory but also practice, I shall be glad to offer myself to serve upon any such committee in case it may be formed.

Alexander L. Howard.

40, Trinity Square, E.C.

The "Britannia," not the "I.C.S."

[1853] Knowing the reputation FLIGHT has for accuracy, will you kindly permit me to make a correction in the paragraph on page 368 of April 4th? I see it is stated that Mr. J. J. Hammond writes from New Zealand that he is flying the Government I.C.S. Blériot. If by the initials I.C.S. the International Correspondence School is indicated, I have no knowledge of any aeroplane being sent out by that body to New Zealand, and feel sure that Mr. J. J. Hammond means the aeroplane which was presented to the New Zealand Government by the Imperial Air Fleet Committee. The idea originated from our Chairman, Mr. Alfred Docker, and the Chairman of the Executive Committee was our Managing Director, Mr. William Coward, F.R.G.S., and this firm, in conjunction with the *Standard*, guaranteed the purchase money for the "Britannia." We have just received from Mr. T. W. Wilson, Town Clerk, Auckland, an illustration from the New Zealand *Herald*, wherein Mr. J. J. Hammond is shown flying the aeroplane "Britannia," which was christened by Lady Desborough, and presented to the New Zealand Government at Hendon last May.

pro William Coward and Co., Ltd.,
A. M. Scott, Secretary.

100, Bishopsgate, E.C., April 4th.

* * * *

Memorial to Major Hewetson.

General Sir Horace Smith-Dorrien, Commander-in-Chief Southern Command, on Tuesday unveiled a Celtic cross which has been erected at the south-east corner of Fargo Wood on Salisbury Plain, as a memorial to Major A. W. Hewetson, R.F.A., who was killed while flying on July 17th, 1913. In the course of a short address, General Smith-Dorrien said that the R.F.C. was a branch of the Services which differed from any other, as its members were constantly on active service.

Models

Edited by V. E. JOHNSON, M.A.

Some Suggestions for this Season's Competitions.

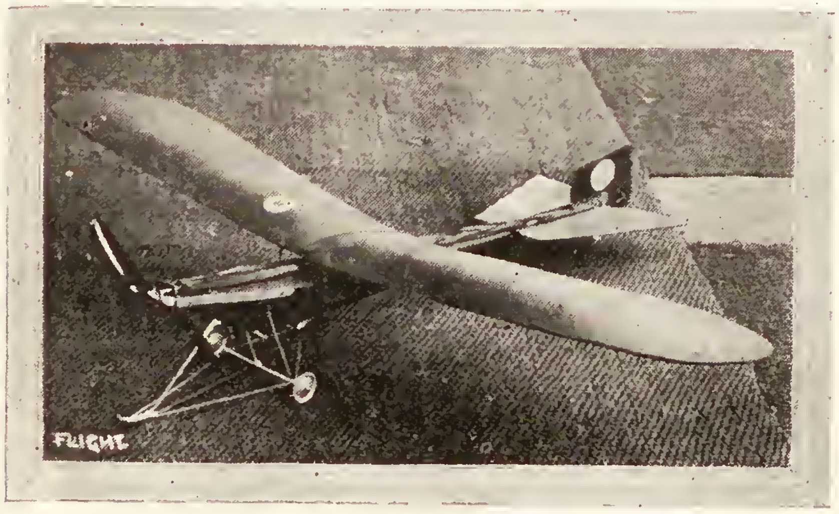
Having been asked from several quarters to publish some suggested competitions for the consideration of our readers, we have much pleasure in submitting the following. We shall also be very pleased to publish any proposed by our readers, more especially if they are on novel lines and likely to give results of practical value:—

1. For all competitions all r.o.g. models should really rise off the *ground* and not off a board, strip of linoleum, &c. The ground could of course be prepared, *i.e.*, if grass, cut and rolled, and if bare earth it could, if uneven, be rolled.

2. In all first-class competitions, but excluding those of a purely sporting character such as inter-club competitions, the length of the model should not exceed the span.

3. In the case of tractors, the *fuselage* should contain at least three longitudinals.

4. That the minimum weight for hydro-aeroplanes be one pound if with twin propellers, and 8 ozs. if with one propeller only. Models with twin propellers under a pound in weight don't hydroplane at all in the true sense of the word. Against anything in the nature of a breeze they, practically speaking, just jump off the water.



"Flight" Copyright.

Mr. H. R. Weston's weight-carrying model.

5. That some competitions be arranged with canard-type models (preferably large), fitted with covered-in *fuselages*, in order to test practically the effect of such on the stability factors of this type of model.

6. That competitions be held for variable speed machines. The winner to be the machine showing the greatest range of speed. It does not of course follow that the *slowest* or the *fastest* machine would win.

7. That a competition be arranged for machines of the ⁀‿ type; possessing no separate tail or elevator like the Dunne.

8. That in all the above, or in any other suggested competitions, every model be first examined by the judges, and so many marks allotted for design and construction; that in every case a qualifying duration be made; and that in certain cases so many marks be allotted for the climbing abilities exhibited by the model. That whenever possible all models be submitted to a steering test.

9. In the case of hydro-aeroplanes, the models should demonstrate their ability to run along the water without rising, minimum run 50 yds., all planes, &c., attached. Taxi-ing test: The lifting surfaces to be removed, and the model to make a run along the surface as a hydroplane only; the rubber motor to be fully wound up. Hydroplaning test: All the models to be immersed (totally) so far as their floats are concerned for a certain period to test the watertightness of the floats.

10. That the present system so much in vogue of running through all competitions in a single day could in certain cases be abandoned with benefit.

11. That, if the matter can be arranged, a prize be offered for a model aeroplane controlled or even steered laterally in the first instance by "wireless." The prize will not probably be won this year, but it might; in any case, it is only a question of time. There are many more suggestions that could be given, but enough has been said to open up the subject for discussion.

"The Moonlight Suicides at Littlestone."

Mr. L. F. Hutcheon sends us the following experience of moonlight flights:—

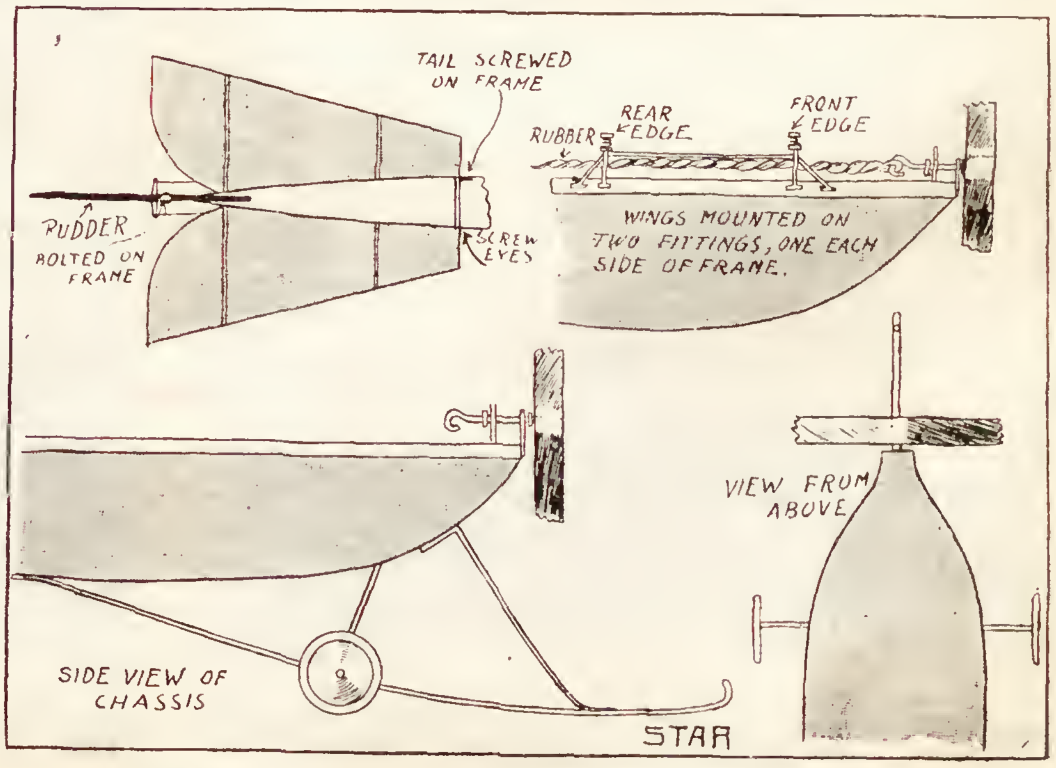
"I was much interested in your communication from Mr. Bruce Herd, of the Littlestone Model Aero Club, on 'Extraordinary Moonlight Flights.' Several times recently, between 9 and 10 p.m., I have watched the flights of a large tractor monoplane built by L. G. Tucker and A. G. Boniface, of the Wimbledon and District Aero Club. They took place in a large flat field bounded by trees, and the results obtained have been better in many respects than those of the same machine in daytime on Wimbledon Common, this being due, in our opinion, to the air being more still. A tractor is a much more sensitive machine than the twin-screw canards used by the Littlestone members, so that we should not have failed to detect any variations in the performance due to abnormal atmospheric conditions. Tucker and I have many times during the past three years flown models (both tractors and canards) fitted with flares and 'sparklers' on Wimbledon Common at night, but we have never noticed any appreciable difference in the results. Mr. A. F. Houlberg told me some time ago that his models made better durations in sunshine than on a dull day, but I know no reason of either sunshine or moonshine that would account for four models committing suicide in one evening."

Personally, the writer has never flown a model by moonlight or, indeed, at night at all, but he has always been given to understand that they did not fly so well at night. *Re* sunshine and dull weather, we should certainly corroborate Mr. Houlberg's statement.

Mr. H. R. Weston's Weight-Carrying Tractor.

The following description and drawings have been kindly supplied us by Mr. Weston, of the Star Aeroplane Co:—

"The machine was built for the weight-lifting competition, and is of the 'tractor' monoplane type. Weight complete, 20¾ oz., and with the loading on 26¼ oz. The main plane is of 'Blériot' design, only cambered after the manner of the 'Handley Page'; that is, a gradually lessening camber towards the tips and very high in the centre. It is double-surfaced, and on the underside is a slight inverted camber on the leading edge, after the manner of full-size design. The span is 5 ft. by 10 ins. chord. A particular feature is that the main plane is upraised a little from the frame, and the rubber is allowed to run under it. The *fuselage* is 3 ft. 6 ins. long, and is of the three-spar streamlined type, only this has also a length of strong magnalium tubing running the length of frame to take



the twist of the rubber motor. The tail plane is 14 ins. span and 12 ins. long, and is covered in two pieces, with a gap in the centre the shape of the body, so that the tail does not lie on top of plane, but gives the appearance of being built on to the body. The rudder is of 'Blériot' design, only with an exaggerated length, viz. 9 ins. by 5 ins. The rudder is made of 18 g. and 20 g. piano wire, and is movable either to right or left. The chassis is made of umbrella ribbing and 18 g. wire, and is absolutely unbreakable, fitted with a cane skid, and at the extreme end a piece of rubber joins it, and curls up with it, making the strength very great. This chassis is of very novel design, and quite original. The model is covered both sides throughout (also the body being covered in) with 'Star' red silk fabric. It is fitted with a very strong bevel gear, and a 14-in. Star curved tractor, driven by 28 strands ¼-in. rubber, *i.e.*, 14 strands to each gear wheel. This model has a really wonderful gliding angle, and tested from a height of 12 ft. from ground, we found her gliding angle to be roughly 1 in 29, and its powers of recovery are very great, it being held sometimes at a very steep angle to the ground, always recovering and landing gracefully."

The Broadstairs Model Construction Co.

We have received from the above firm one of their 8*s.* 6*d.* "Tractor planes." The firm state that it has been their endeavour to place upon the market a machine which might safely be called "fool proof." Whether any model tractor could be really made fool proof we rather doubt; but the machine in question goes a very long way in that direction. It is certainly very easy to fly. The machine is unquestionably good value for the money. It is of the r.o.g. type, and the chassis can be folded up, in a very simple manner, by slipping it out of the sockets on the body, when the skids can be detached and sprung flat; when erected it is quite strong. The makers state this to be their own idea, and we have certainly not seen a chassis on similar lines; at first we must confess we were not altogether favourably impressed by the wire, which scarcely appeared strong enough to protect the propeller. This opinion was wrong, however; because after having submitted the model to some quite severe tests without breaking it in any way, we handed it over to a juvenile member of the family, who promptly took to flying it in a garden, enclosed by two stout and high fences and numerous trees. The collisions were frequent, and the tumbles and nose-dives terrible, owing to our young friend flying it without the tail fin, which had to be fished up from the adjoining garden. At present the model is absolutely unbroken, and it is certainly not for want of trying. The adjustment for elevation is by moving the main plane along the *fuselage*, from which it can be instantly removed or replaced when desired. The length of the machine is 2 ft. 6 ins., the span 2 ft. and the propeller diameter 8 ins. The wheels, disc and rubber tyred, are 2 ins. in diameter. A small improvement we should suggest is a little wheel instead of the rear skid, which would considerably facilitate rising off ordinary ground.

Anglo-American Exhibition at Shepherd's Bush.

Efforts are being made to arrange a section for aeronautical models and model motor boats at the above exhibition, which will be open from May until October. It is also proposed to run competitions in connection with the same, on one of the lakes and in the Stadium.

Aeromodellists or motor boat runners who have any thoughts of exhibiting should at once communicate with the Aviation Secretary of the Anglo-American Exposition, Administration Buildings, Shepherd's Bush, W. Further particulars will be given later.

Replies in Brief.

F. Cooper.—Try moving your main plane further back; if this does not do it, try decreasing its angle of incidence. You could probably use a 12-inch propeller with advantage.

The Model Editor desires to thank the following for particulars, drawings, photos, &c., of their models exhibited at Olympia, which will appear in due course, viz., Messrs. F. G. Carter, P. G. Cox, J. J. Holt, F. W. Jannaway, S. Kitchenham, W. Jones, W. Key, W. H. Norton, C. L. Pratt, D. Stanger, L. S. Wyatt.

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AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, Leyspring Road).

April 19th, flying on Wanstead Flats at 6.30 and 10 a.m.

Paddington and Districts (77, Swinderby Road, Wembley).

April 18th, flying at Sudbury. Twin-screw handicap, 6-oz. weight, 4-oz. loading, average of three flights. Two prizes.

UNAFFILIATED CLUBS.

Finsbury Park and District (52, Lambton Rd., Stroud Green).

April 18th, flying at Finsbury Park (Kite Ground), 3 p.m. till 6 p.m.

S. Eastern Model Ae.C. (1, Railway Approach, Brockley).

Week-end flying at Blackheath and Lee as usual.

"Flight" Copyright.

Messrs. D. Hiscox's and C. Desoutter's Olympia model climbing at Hendon.

"Flight" Copyright.

Mr. D. Stanger's Olympia petrol-driven tractor flying at Hendon.

INTERNATIONAL AERO EXHIBITION MODEL TRIALS.

The Model Flying Trials in connection with the Olympia Exhibition took place at the London Aerodrome by permission of the Grahame-White Aviation Co., Ltd., on April 3rd and April 4th, the hydro-aeroplanes being tested on the afternoon of April 4th on the Welsh Harp water. A sum of £50 in prizes had been provided by the Royal Aero Club, and the trials were carried out by the Kite and Model Aeroplane Association.

The thanks of the Association are due to the following gentlemen who kindly acted as judges, viz.: Sir John Shelley, Bt., Sir Bryan Leighton, Dr. A. P. Thurston, A.F.Aë.S., Lieut. T. O'B. Hubbard, Prof. J. Morris, Major Baden-Powell, Messrs. R. M. Balston, B. C. Cooper, A.F.Aë.S., and J. H. Ledeboer, A.F.Aë.S.

The following are the results:—

Class 2a.—Twin-screw r.o.g. 8-oz. Models.

1st prize, £5; 2nd, £3; 3rd, £1.

Place.	No.	Name.	Marks.			
			Design and Construction.	Stability.	Duration.	Total.
1	52	G. Hayden	53	52	113	218
	169	A. F. Houlberg	63	65	90	
3	175	F. W. Powell	58	53	89	200
4	95	H. G. Bond	58	63	77	198
5	71	L. H. Slatter	63	60	71	194
6	1	C. Claffin	53	57	71	181
7	117	J. Louch	51	51	74	176
8	12	R. L. Rogers	54	45	67	166
9	111	W. Hersom	48	47	64	159
10	139	D. Driver	52	45	61	158
11	56	Howkins and Ingram	50	50	55	155
12	152	W. Key	66	45	42	153
13	137	T. Carter	53	46	52	151
14	48	H. Hervey	41	45	64	150
15	105	F. Hawthorn	49	50	51	150
16	107	G. Hawthorn	51	47	51	149
17	109	S. Hersom	52	33	59	144
18	136	R. Bird	45	50	49	144
19	125	F. Wood	50	45	44	139
20	183	E. Dowsett	47	35	53	135
21	166	T. D. C. Chown	48	40	45	133
22	171	D. Laing	56	45	31	132
23	158	M. H. Wilson	65	43	24	132
24	159	R. G. Wilson	64	40	28	132
25	7	J. McBirnie	66	25	33	124
26	100	F. Grattan	53	35	31	119
27	76	S. T. Smith	57	40	19	116
28	130	W. A. Dore	54	35	25	114
29	115	T. Kimpton	46	33	34	113
30	120	B. Ludlow	52	30	23	105
31	142	W. Evans	51	25	24	100
32	177	F. Wilkinson	49	25	26	100
33	11	A. Rogers	51	25	20	96
34	75	V. Smith	51	30	14	95
35	151	J. Hoyle	46	25	17	88
36	38	P. Cox	46	25	10	81
37	147	H. R. Weston	46	20	14	80
38	159	J. Sutton	54	10	6	70

This class resulted in a tie, with 218 marks for first place. Therefore 1st and 2nd prize is divided between Messrs. Hayden and Houlberg.

Class 2b.—6-oz. Single-screw r.o.g.

1st prize, £2; 2nd, £1.

Place.	No.	Name.	Design and Construction.	Stability.	Duration.	Total.
1	86	H. Weston	77	75	55	207
2	165	A. Boniface	66½	75	45	186½
3	140	D. Driver	68½	70	47	185½
4	101	F. Grattan	78	50	42	170
5	167	T. D. C. Chown	68	57½	32	157½
6	53	A. Houlberg	84	59	20	153
7	146	M. Levy	57½	47	44	148½
8	14	O. Root	54½	57	29	140½
9	72	L. Slatter	80	35½	22	137½
10	143	W. Evans	73	20	10	103
11	3	J. W. Dann	56	26½	15½	98

Class 3.—Hydro-aeroplanes.

1st prize, £4; 2nd £3; 3rd, £1.

Two trials off water, one off land.

Place.	No.	Name.	Design and Construction.	Stability.	Duration.	Total.
1	73	L. H. Slatter	80	74	51	206
2	28	J. Akers	73	70	44	187
3	57	F. Jannaway	78	71	31	180
4	118	J. Louch	72	70	37	179
5	13	R. Rogers	72	65	34	171
6	23	D. Paveley	71	70	28	169
7	94	H. Bedford	70	66	30½	166½
8	216	A. Houlberg	83	65	17	165
9	33	G. Brookes	74	63	28	165
10	25	—	75	68	21	164
11	108	G. Hawthorn	76	60	18	154
12*	85	W. Williams	52	65	36	153
13	134	B. Longstaffe	60	60	18	138
14*	31	G. Bragg-Smith	65	61	11½	137½
15	112	W. Hersom	71	50	14	136

* Messrs. Williams and Bragg-Smith having no wheels lost their land trial as well as 25 design marks.

Class 5.—6-oz. Single-screw r.o.g. Tractors.

1st prize, £3; 2nd, £2; 3rd, £1.

Place.	No.	Name.	Design and Construction.	Stability.	Duration.	Total.
1	5	F. Hindsley	35	45	58	138
2	173	D. Laing	35½	43	34	112½
3	22	D. Paveley	37	40	33½	110½
4	128	F. H. Burton	34½	40	27	101½
5	54	A. Houlberg	42½	39	19½	101
6	180	S. Camm	40	35½	25	100½

Class 6.—Weight-carrying Models. Each carrying a deadweight of a quarter of its own weight; minimum unloaded, 16 ozs.

1st prize, £4; 2nd, £2.

Place.	No.	Name.	Design and Construction.	Stability.	Duration.	Total.
1	42	D. Easdale	66	81½	31	178½
2	74	L. Slatter	72	70	34	176
3	55	A. Houlberg	75	63	27	165
4	58	F. Jannaway	70	46½	19	135½
5	39	P. Cox	60	30	15	105

Class 7.—Models embodying New Design applicable to Full-size Machines.

Prize £3 awarded at the discretion of the judges for the model embodying the most original and practical idea.

This has been awarded to Exhibit No. 207 (W. H. Nosworthy), which, in the opinion of the judges, was the most original idea, viz., variable angle wings, independently operated with tail for lateral stability.

Team Competition in Class 2a. For Teams of Six Members from Affiliated Clubs.

Prizes presented by F. K. McClean, Esq., viz., silver medals to winners, bronze medals to runners up. The Association did not, in fairness to the clubs, compete.

Results of first five clubs:—

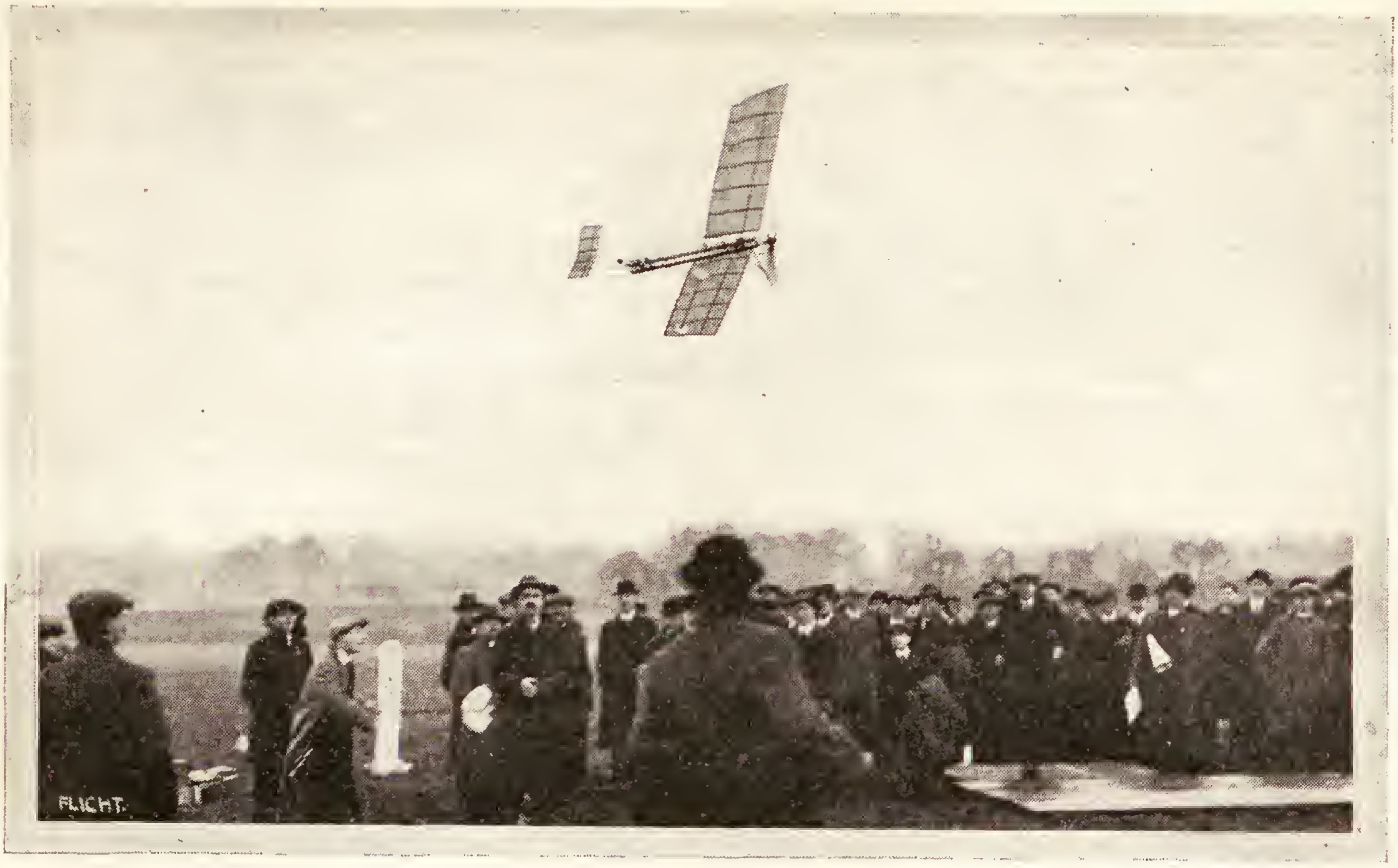
Wimbledon Team.—G. Hayden, 218 marks; A. Houlberg, 218; F. Powell, 200; L. H. Slatter, 194; T. D. C. Chown, 133; D. Laing, 132. Total, 1,095 marks.

Leytonstone Team.—H. Bond, 198 marks; J. Louch, 176; W. Hersom, 158; F. Hawthorn, 150; G. Hawthorn, 149; S. Hersom, 144. Total, 975 marks.

Paddington Team.—D. Driver, 158 marks; T. Carter, 151; R. Bird, 144; W. Evans, 100; H. R. Weston, 80. Total, 633 marks.

Reigate and Redhill Team.—W. Key, 153 marks; M. H. Wilson, 132; R. G. Wilson, 132; J. Hoyle, 88; W. H. Norton, 70. Total, 575 marks.

Aero Models Association Team.—C. Claffin, 181 marks; R. L. Rogers, 166; J. McBirnie, 124; A. Rogers, 95. Total, 566 marks.



"Flight" Copyright.

Messrs. T. W. K. Clarke and Co.'s compressed-air-driven Olympia model in flight at Hendon.

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

1. **Elections.**—Members: Christian H. Gray and Lieut. Baron Trevenen James, R.E. Student: Harold Grinsted.

2. **Meeting.**—The twelfth meeting of the present session will be held on Wednesday, May 6th, at 8.30 p.m., when Dr. A. P. Thurston will read a paper, to be followed by a discussion, on "The Measurement of Air Speed."

B. G. COOPER, Secretary.

⊛ ⊛ ⊛ ⊛

THE BRISTOL IN PARIS.

Following the great interest felt in aviation circles at the recent announcement that the licence for the construction of the Bristol aeroplanes, at the instigation of the French Government, had been granted to the well-known firm of French constructors, Messrs. Breguet, it will be still more interesting to record what was achieved by one of these British machines when it was put into actual commission. It has frequently been stated recently that British constructors have little or nothing to learn from their one time masters the French, and the summary given below of the actual achievements made by this machine in Paris during the past week or two go to confirm this. Under the pilotage of Mr. Sidney V. Sippe, the Bristol made flights which have not been approached by any machine either in France or anywhere else, whether biplane or monoplane, when the tests have been made with the same horse-power and loads. For example, we give the following official tests made with a Standard Bristol tractor biplane, fitted with an 80 h.p. Rhône motor:—

Climbing—3,280 ft. with useful load of 385 lbs.... 5 mins. 10 secs.
also 3,280 ,, ,, 605 ,, ... 6 ,, 30 ,,
,, 3,280 ,, ,, 715 ,, ... 7 ,, 35 ,,

Speed—Fast, 74½ miles per hour. Slow, 35 miles per hour.

All these tests were made under severe weather conditions and strictest official criticism, and it is a matter for congratulation to British construction generally that it performed everything not only satisfactorily but in such an emphatic manner. Not only did the machine in its tests show itself to be fit for any company except machines designed for one or two purposes alone, such as climbing machines of the freak nature, or machines designed to carry enormous loads only, but it has proved its exceptional all-round efficiency as a military machine. In view of the excellent construction of this particular machine, it is extraordinary that after these demonstrations of their aerodynamical qualities these machines are not in more general use in our own services.

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⊛ ⊛ ⊛ ⊛

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⊛ ⊛ ⊛ ⊛

IMPORTS AND EXPORTS, 1913-1914.

Aeroplanes, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see Flight, January 25th, 1912, and for 1912 and 1913, see Flight for January 17th, 1914:—

	Imports.		Exports.		Re-Exportation.	
	1913.	1914.	1913.	1914.	1913.	1914.
	£	£	£	£	£	£
January	12,097	5,945	4,005	210	1,510	879
February	17,361	28,132	3,447	106	690	441
March ...	20,425	27,731	1,924	1,934	1,042	1,440
	49,883	61,808	9,376	2,250	3,242	2,760

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OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 278. (No. 17, Vol. VI.) APRIL 25, 1914. [Registered at the G.P.O. as a Newspaper.] [Weekly, Price 3d. Post Free, 3½d.]

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CONTENTS.

Editorial Comment: PAGE

An Unnoticed British Triumph ... 429
The Aeroplane and the Apparently Impossible ... 430
Men of Moment in the World of Flight: H. P. Martin and G. H. Handasyde 431
Over the Royal Yacht in Mid Channel. By B. C. Hucks ... 432
The Royal Visit to France ... 433
The 80 h.p. Bristol "Scout" (with scale drawings) ... 434
Royal Aero Club Official Notices ... 437
From the British Flying Grounds ... 437
Flying at Hendon ... 438
Eddies. By "Will-o'-the-Wisp" ... 440
The Schneider Cup Competition ... 441
Naval and Military Aeroplane Competition ... 442
Foreign Aircraft News ... 449
British Notes of the Week ... 450
Correspondence... 451
Models. Edited by V. E. Johnson, M.A. ... 452

EDITORIAL COMMENT.

An Unnoticed British Triumph.

It is passing strange that so little attention has been given by the Press at large to the winning of the Jacques Schneider Trophy at Monte Carlo by a British seaplane—the Sopwith, piloted by Mr. Howard Pixton, which was the only one to complete the oversea course of 150 nautical miles without trouble. The Press has done so much for the cause of British aviation that it might reasonably have been expected that something more than an average of half-a-dozen lines would have been devoted to so notable an achievement, which means, if it means anything at all, that the British seaplane is now the best machine of its kind produced. We are not finding fault, for to do so would be to manifest ingratitude for all that the Press has done for the development of the science, but it is impossible to allow the matter to pass without remark, since we should have expected that so notable a performance as that of the British Sopwith would have been thought worthy of at least a little more than merely passing mention. Surely, there is more in the beating of the best machines of the seaplane type produced abroad, and flown by the best men of their respective countries than in an advertising "stunt" engineered by an enterprising daily journal, which is sending an aeroplane round the coast resorts, and over which it spreads itself daily. Not that we deny the usefulness of the aforesaid "stunt" to the industry, nor that we grudge the advertisement that the journal in question is getting out of it, particularly as it has done a vast amount for the popularization of aviation. And yet that same journal is content to confine its description of this notable British victory to the bald facts as detailed by Reuter—not a word of comment or commendation. Nor do we find in any of the cuttings from contemporaries that have reached us anything more than the Reuter report of the race, which is, to say the least, disappointing.

Ever since aviation came into being we have been accustomed to regard ourselves as lagging behind others in development—at any rate, until quite recently. With the exception of the win of the Cody machine in the Military Trials of 1912, the British-built machine has almost invariably in the big events had to be content with a record of "also ran," and the Press has not been slow to point it out. Now that we have really made substantial progress, so substantial that the tables have actually been turned, the fact apparently escapes all notice save that contained in the bare reports of results. However, so far as we are ourselves able to supply the deficiency, we will do so by tendering to the builders of the Sopwith and to Mr. Pixton our heartiest congratulations upon the splendid manner in which the combination has demonstrated the lead that the British industry has obtained in this particular branch of aerial science. May the triumph be oft repeated.

In striking contrast to the attitude of the British Press may be cited the following translation of an article in *Le Temps*:—

> AFTER GERMANY, ENGLAND!
>
> We were able yesterday to mention in our "latest news" the victory gained by England at Monaco in the race for the Jacques Schneider Hydro-Aeroplane Cup.
>
> This classical trial, founded by the gentleman whose name it bears, at the last meeting, was run this year over a distance of 150 nautical miles, *i.e.*, 280 kilometres.
>
> In the course of this trial competitors were required to touch water with the floats, first at the start, which had to be made from the water, and secondly twice again in the course of the first 10 miles. After that the competitors, after having passed the finishing line, had again to touch the water on the course.
>
> We know that our French representatives, Levasseur and Espanet, have, by bad luck, not been able to finish the course. These two excellent aviators, who piloted Nieuport monoplanes, were stopped by engine trouble, but in any case their machines were not as fast as the Sopwith.

> As to Garros, who is not afraid of 280 kilometres, he doubtless preferred not to start, rather than put up a performance which in his opinion could not possibly beat that of the Englishman, Howard Pixton, who had covered, complying with all the regulations of the race, the 280 kilometres, for the Schneider Cup, in 2 hours 13 seconds, which represents, taking into account the three compulsory descents on the waves, a speed of more than 150 miles per hour.
>
> This absolutely remarkable performance had, up to the present, never been accomplished on an hydro aeroplane; that is why this English victory is particularly meritorious, all the more so because it was gained on a biplane specially constructed by the Sopwith Company.
>
> We have had our part of the success because the machine was fitted with a 9-cylinder Gnome Monosoupape engine of 100 h.p. the name of which may be associated with the British victory, but that is no more than half a consolation.
>
> In the interests of our industry we must consider the importance of this victory, which will arouse great enthusiasm on the other side of the Channel. In a country where the Navy is in great honour, the triumph of an English hydro-aeroplane will be much noted.
>
> The lessons we have learnt yesterday are that all too little encouragement has been given to maritime aviation, and that therefore our constructors have not been able to contest foreign rivalry.
>
> The English supremacy which showed itself at Monaco yesterday is quite as important as that shown by the Germans in capturing the world's duration and height records.
>
> It *is* possible for us to regain and keep all these trophies, but not if official encouragement is not lavishly given to our constructors.

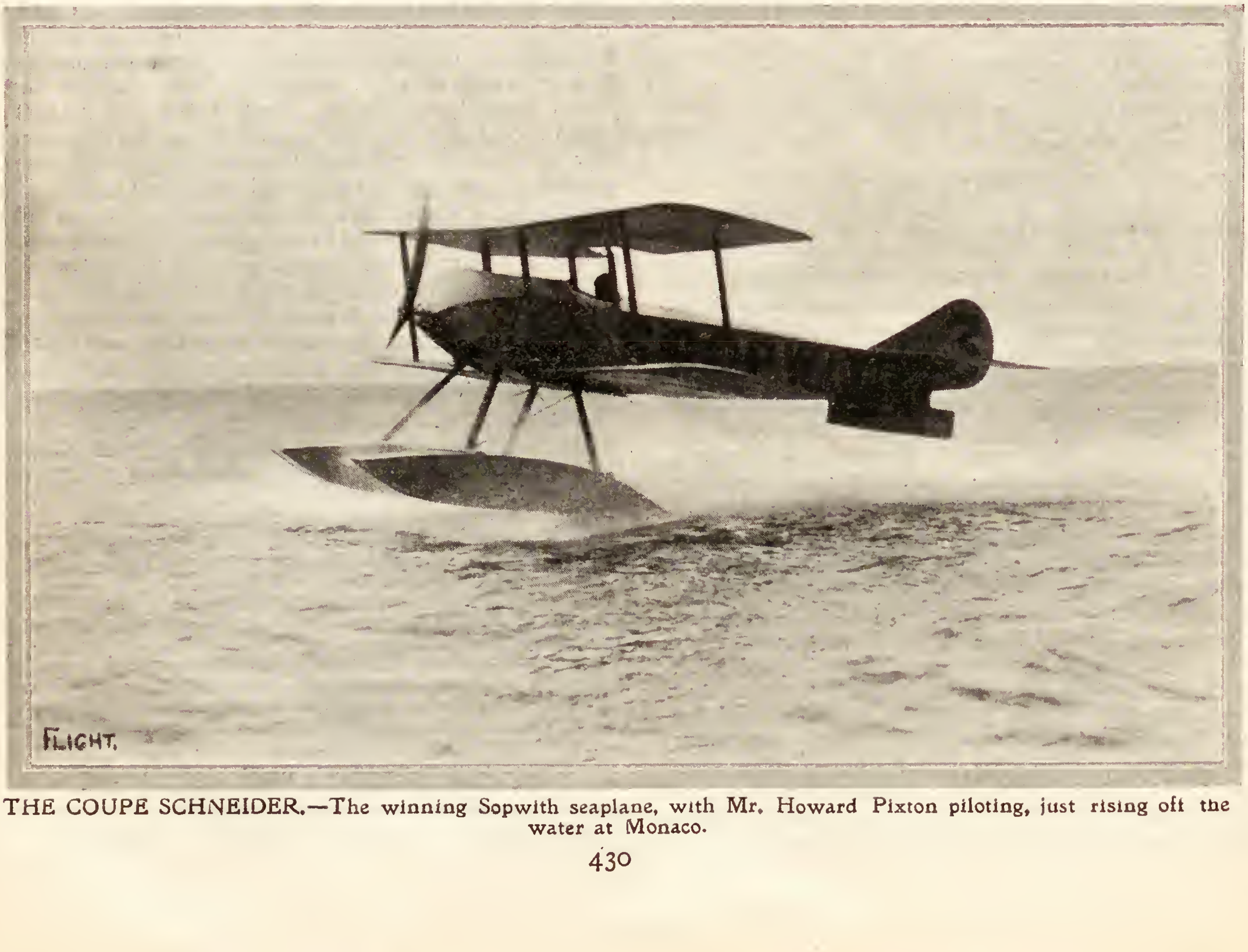
The paragraph against which we have set side rules is particularly suggestive.

* * *

The Aeroplane and the Apparently Impossible.

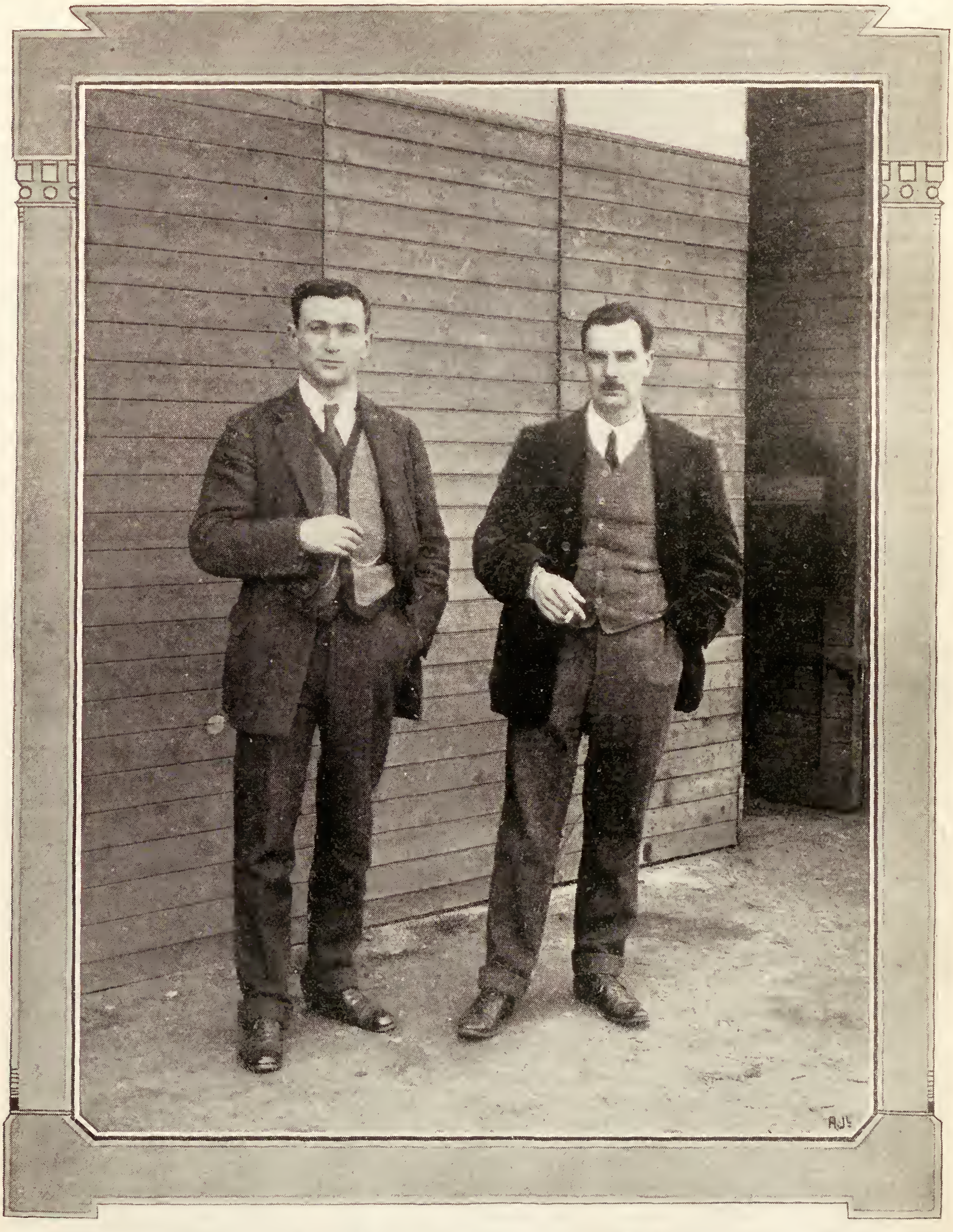
What the future effect of aviation on news service is likely to be was brilliantly demonstrated by Mr. Hucks on Tuesday last in connection with the visit of their Majesties the King and Queen to France. With commendable enterprise it had been arranged by the *Sphere* newspaper and the proprietors of the Coliseum that Mr. Hucks, with a cinematograph operator as passenger, should follow by aeroplane the passage of the Royal yacht to Calais. Elsewhere we give details of the flight in Mr. Hucks' own words, which briefly relates how leaving Folkestone half an hour after the King's departure, Mr. Hucks soon overtook the "Alexandra" and her escort of cruisers, circled about the squadron for long enough to enable the operator to secure his pictures, and then flew on to Calais where he ultimately descended and was received by the Mayor. Leaving Calais at 1.45 he was back at Hendon by 2.35 o'clock, the films being at once developed and ready for showing at the Coliseum by 4.45, enabling the pictures of the King's Channel crossing to be shown on the screen shortly after five o'clock.

The achievement was brilliantly illustrative of the methods of modern science, and was in particular a veritable triumph for the internal-combustion motor, which has made these marvels possible. Further than that, it was an eloquent object lesson in the use of the aeroplane for securing and rapidly transmitting information, pictorial or verbal, for the use of the Press, or, for that matter, for any purpose for which quick information is necessary. By no other means than by the employment of the aeroplane could the pictorial records of the crossing have been secured, nor could they have been transmitted with the same rapidity and certainty in any other way than through the air. It is, possibly, this last reflection which is the more important, inasmuch as speed counts for nothing without certainty. That is why this last achievement of Mr. Hucks is so enormously important, affording, as it does, eloquent witness to the fact that the aeroplane has now come to be reckoned among the methods of transit to be depended upon with at least the reasonable certainty that it will do what is intended and do it well and to time.



THE COUPE SCHNEIDER.—The winning Sopwith seaplane, with Mr. Howard Pixton piloting, just rising off the water at Monaco.

MEN OF MOMENT IN THE WORLD OF FLIGHT



MESSRS. H. P. MARTIN (left) AND G. H. HANDASYDE (right).
"The Martinsyde."

OVER THE ROYAL YACHT IN MID-CHANNEL.

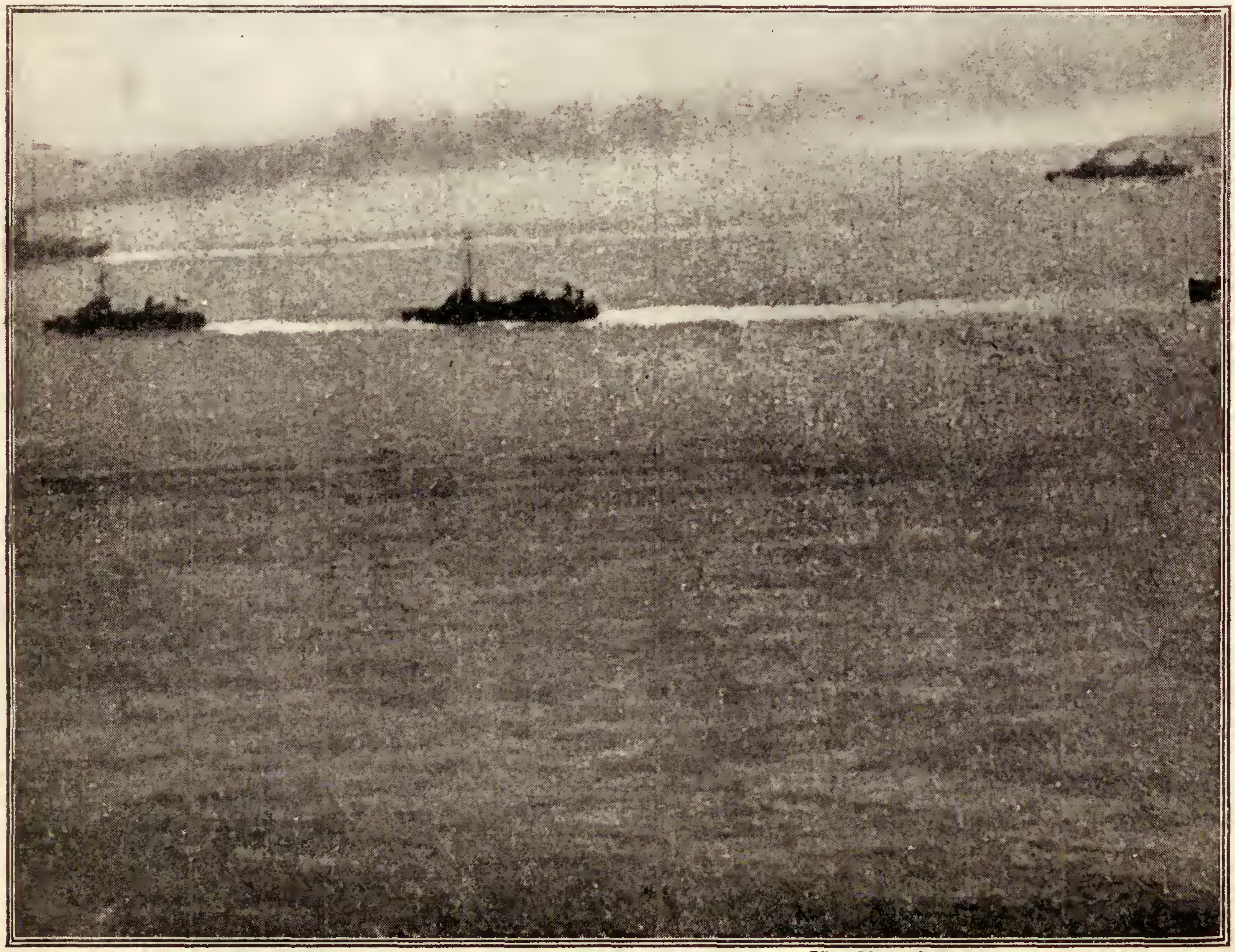
By B. C. HUCKS.

Mr. B. C. Hucks at Folkestone waiting for the departure of the Royal Yacht before starting on his Channel trip.

One of the jolliest trips I have ever made. That's how I feel about my flight last Tuesday, when I was successful in bringing to London the first pictures of Their Majesties' Channel crossing and arrival at Calais.

I first heard of the project on Friday last at 2 p.m., when Mr. Harold Perrin took my manager, Mr. J. C. Savage, and myself along to the Savoy to meet Mr. Hugh Spottiswoode of *The Sphere* and Mr. Croxton of the London Coliseum, the two gentlemen who were working the "stunt." Final details were settled on Saturday mid-day, a float procured in case the machine dropped in the Channel and my 80 Blériot two-seater packed up at Coventry where I looped on Easter Monday and trained to Folkestone, the point decided on for the start of the flight, owing to Dover being within prohibited area.

On Sunday a landing ground at Calais was chosen and a starting ground at Folkestone. The latter was a field at Capel, right on the top of the cliffs and about three miles from Folkestone. My machine arrived at Folkestone on Monday mid-day, was conveyed by motor to the ground and was erected and ready for flight by 5 p.m. I made a trial trip over the sea front at Folkestone about six o'clock the same evening, with Mr. Harold Pontefract in the passenger seat, and found everything in order. On Tuesday morning after a trial flight with the operator to get him used to his peculiar position—he faced towards the tail—I started off across the Channel at exactly 11 a.m. in brilliant sunshine and very little wind, exactly half an hour after the departure of the Royal Yacht from Dover. It took me some time to pick up the Royal Yacht as there was a considerable mist on the



Their Majesties' escort across the Channel as seen from Mr. Hucks' Blériot.

surface of the sea, but after about fifteen minutes' flying, I noticed a haze of smoke and as this was the only sign of activity in the neighbourhood I made for it and discovered my quarry. The French cruisers had already joined the escort, and to give my operator every facility I dived down to about 400 ft. and enabled him to get a fine picture of the mid-Channel scene.

I circled the fleet completely on three occasions, being then right out of sight of land. As we were nearing Calais I hovered about and flew over Calais Harbour at the precise moment of the entry of Their Majesties' Yacht, when my photographer obtained what turned out to be a most magnificent and novel film. I then made direct for the Calais Aerodrome, flying over the town at 800 ft. I landed at 12 noon, when I was presented with a bouquet from the Mayor of Calais and also learnt that I was the first English airman to land at Calais.

The operator then extracted the exposed film which I fixed in the passenger seat of my machine together with the bouquet, and at 1.45 I started off for Hendon. I struck the English coast at the exact point of my departure, followed the railway line to Ashford, and on reaching the outskirts of London, I took last year's Aerial Derby course to Hendon, where I arrived at 2.35. I had covered the 125 miles in 110 minutes. The journey overland was a very bumpy one, there being a terrible lot of *remous* owing to the extreme heat of the sun.

On landing, the film was handed to a representative of the Warwick Bioscope Chronicle Film, and rushed off to Charing Cross Road, where it was developed, a print made, and a complete record of the King's journey from London to Calais was shown at the matinée performance at the Coliseum at 5.20. Actually, the film was delivered to the Coliseum at 4.45.

* * * *

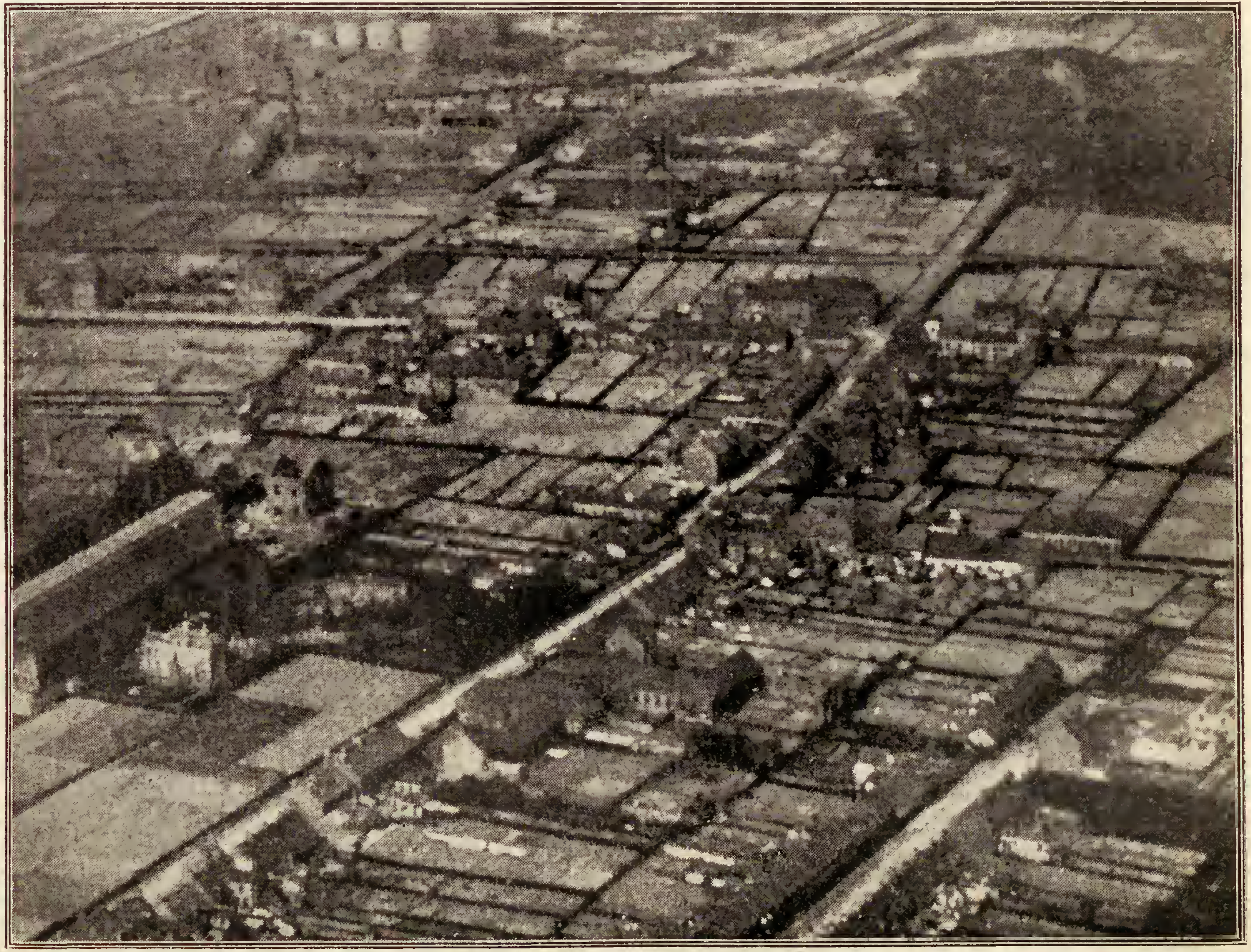
Mr. B. C. Hucks at Bristol and Coventry.

On Wednesday, April 8th, Mr. Hucks demonstrated at Horfield, Bristol, first on his two-seater, the "Tornado," when his complicated evolutions led many spectators to imagine he was looping. Mr. Hucks' "get-off" with this machine is extraordinary. After a short run, and an almost imperceptible rise of a few feet, the nose suddenly rears up, and the machine literally takes a flying leap into the air for about 50 ft. before it is flattened out. On his second trip with this machine, Mr. Hucks circled Bristol at 4,000 ft. On the "looper" seven loops were accomplished as well as an upside-down flight of half a mile.

On Good Friday Mr. Hucks again flew at Bristol before a huge and enthusiastic crowd. On the two-seater two fine flights were made, once reaching an altitude of over 7,000 ft., and being lost to view in the driving clouds. On the looper he added 10 loops to his total, and flew inverted for nearly two minutes.

On the following day, Saturday, twelve more loops were made, bringing his total of loops up to 299. Several thrilling flights were made on the Tornado, but owing to the blustery conditions, and the confined nature of the ground, no passengers could be carried, although there were many eager applicants.

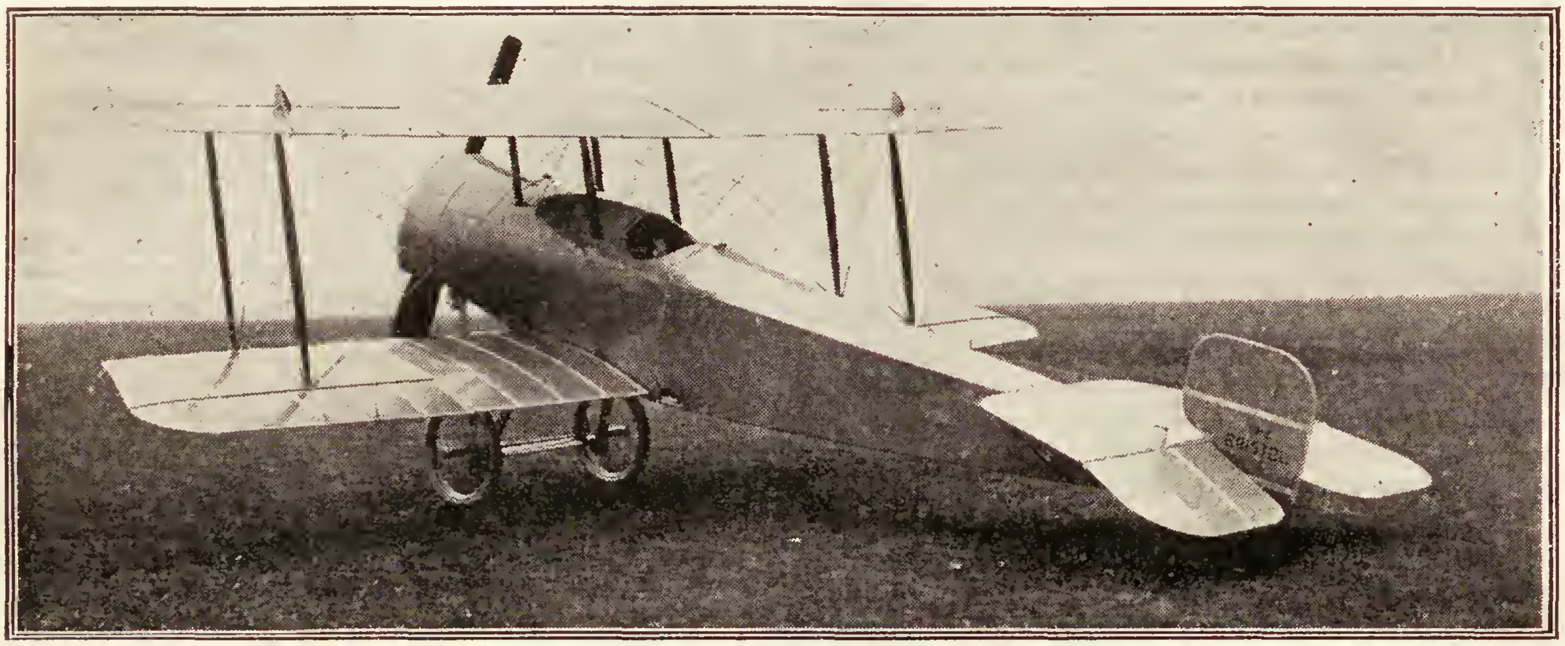
After the flights both machines were dismantled and packed off to Coventry, where, on Easter Monday, in the grounds of Whitley Abbey, Mr. Hucks gave wonderful displays before a crowd numbering fully 50,000. The feature of the afternoon was an upside-down flight of exactly 2 mins. This was against a 40-mile wind, so that at times the monoplane appeared to hover motionless in its inverted position. In the morning Mr. Hucks flew all round Coventry on the passenger-carrying machine in order to dispel a rumour that he was ill and unable to fly. Nine loops were made during the afternoon, so that Mr. Hucks has now reached and passed his three hundredth loop since he first looped at Buc last November.



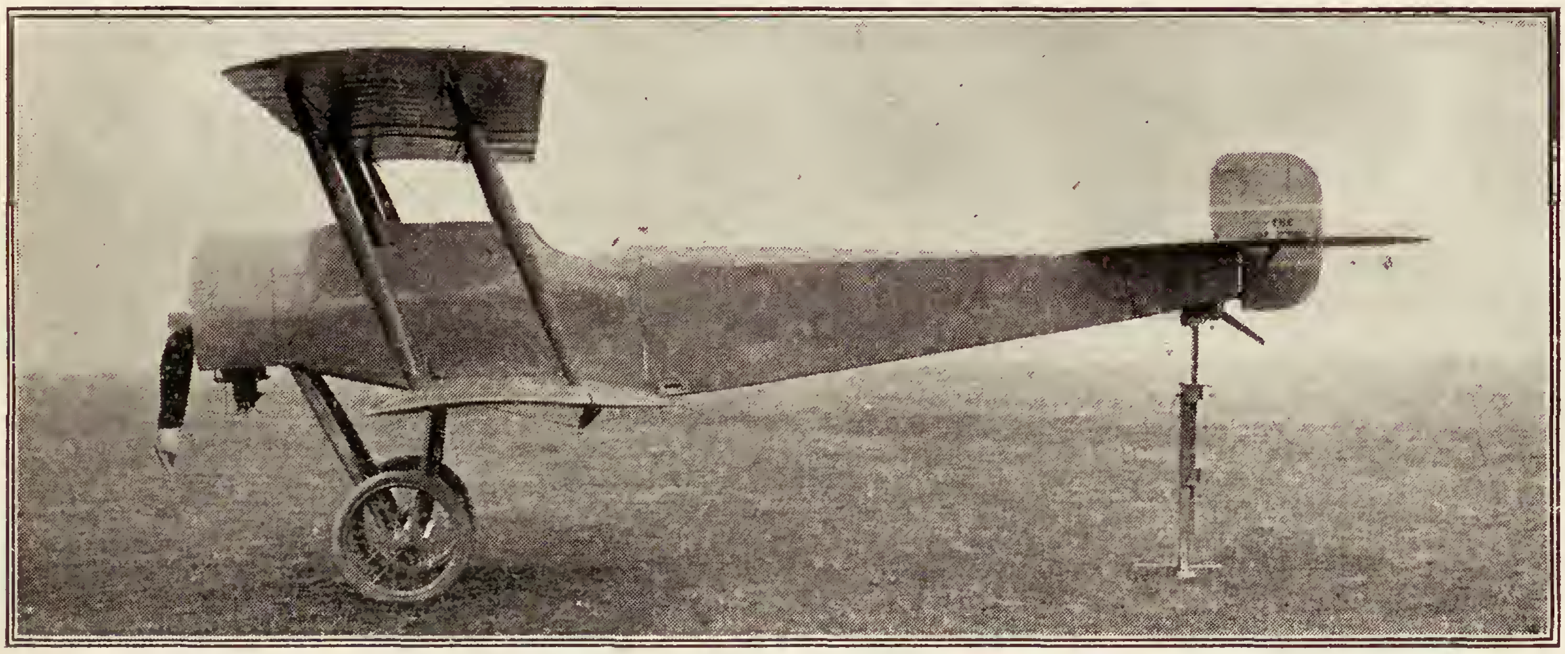
VIEW OF CALAIS FROM MR. HUCKS' BLÉRIOT, APRIL 21.—This and the photograph on the preceding page were secured by Mr. B. C. Hucks on behalf of *The Sphere* and the Coliseum, the actual films being taken by an operator of the Warwick Bioscope Chronicle Film.

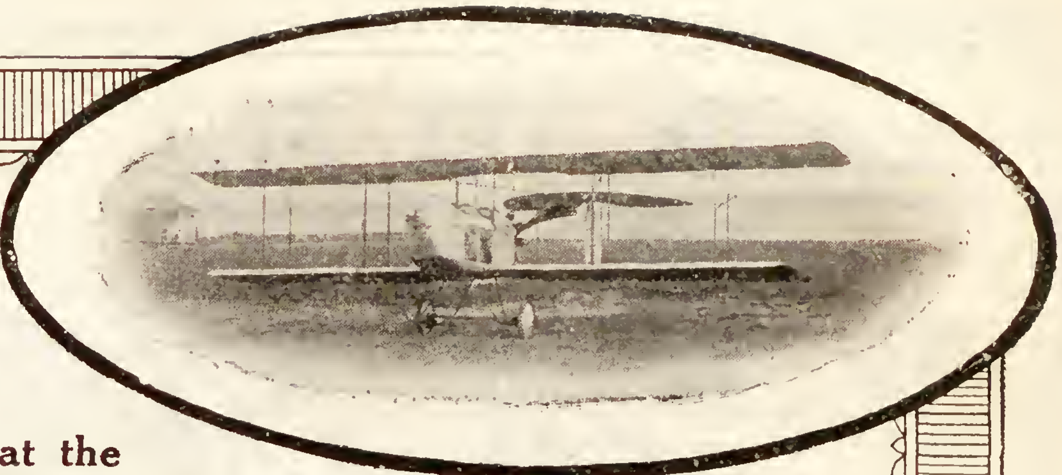
THE 80 H.P. BRISTOL "SCOUT."

IT is a matter of gratification that the best of British-built machines are now generally acknowledged to be at least equal to those produced in other countries, in spite of the scant encouragement which the British industry has received in the past. It appears that Great Britain is in a fair way to take the leadership, at least as regards a certain type of machine originated in this country, a type possessing great possibilities, which has not up to the present received much attention abroad. We refer to the small, fast, single-seater, tractor-type biplane. In France, when high speeds are desired, designers almost invariably turn to the monoplane type of machine, whilst German constructors do not appear to pay any considerable attention to really fast machines. There is little doubt, however, that the small span tractor biplane has great possibilities where, in addition to a very high maximum speed, a low minimum speed is desired, for the biplane construction allows of a considerable amount of saving in weight, whilst still retaining a reasonably high factor of safety. Evidently British constructors are realising the possibilities of this type, as, at the recent Olympia Show, three well-known English firms exhibited machines of this type. Of these machines, the one exhibited by the British and Colonial Aeroplane Co. has already proved its capabilities in actual flight. Since the closing of the Show, Mr. Harry Busteed, the well-known Bristol pilot, has done a considerable amount of flying on the machine, most notable among these flights being one made during Easter, when he flew from Salisbury Plain to Brooklands in 27 mins. Of course this flight was accomplished with the aid of a following wind, but even so it was no mean performance.


Three-quarter rear view of the Bristol "Scout" single-seater.

In the general disposition of its component parts the machine follows standard practice, having a rectangular type *fuselage*, built up of four *longerons*, which are of ash in the front portion, and spruce at the rear. Vertical and transverse spruce struts separate the *longerons*, and the whole structure is made rigid by high-tension steel piano wires attached to steel plate joints. Mounted on overhung bearings in the nose of the *fuselage* is the 80 h.p. Gnome engine which drives directly a Bristol propeller of 8 ft. diameter. An aluminium cowl almost entirely encloses the engine. This cowl appears to present a comparatively large vertical surface, and it would seem that some form of hemispherical nose-piece, revolving with the propeller as in the large two-seater Bristol biplane exhibited at the Show, might add slightly to the speed. The front part of the *fuselage* up to a


Side view of the Bristol "Scout" single-seater.



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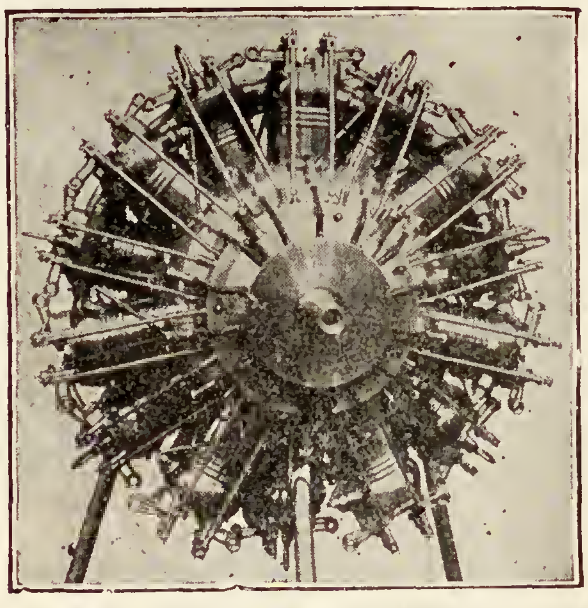
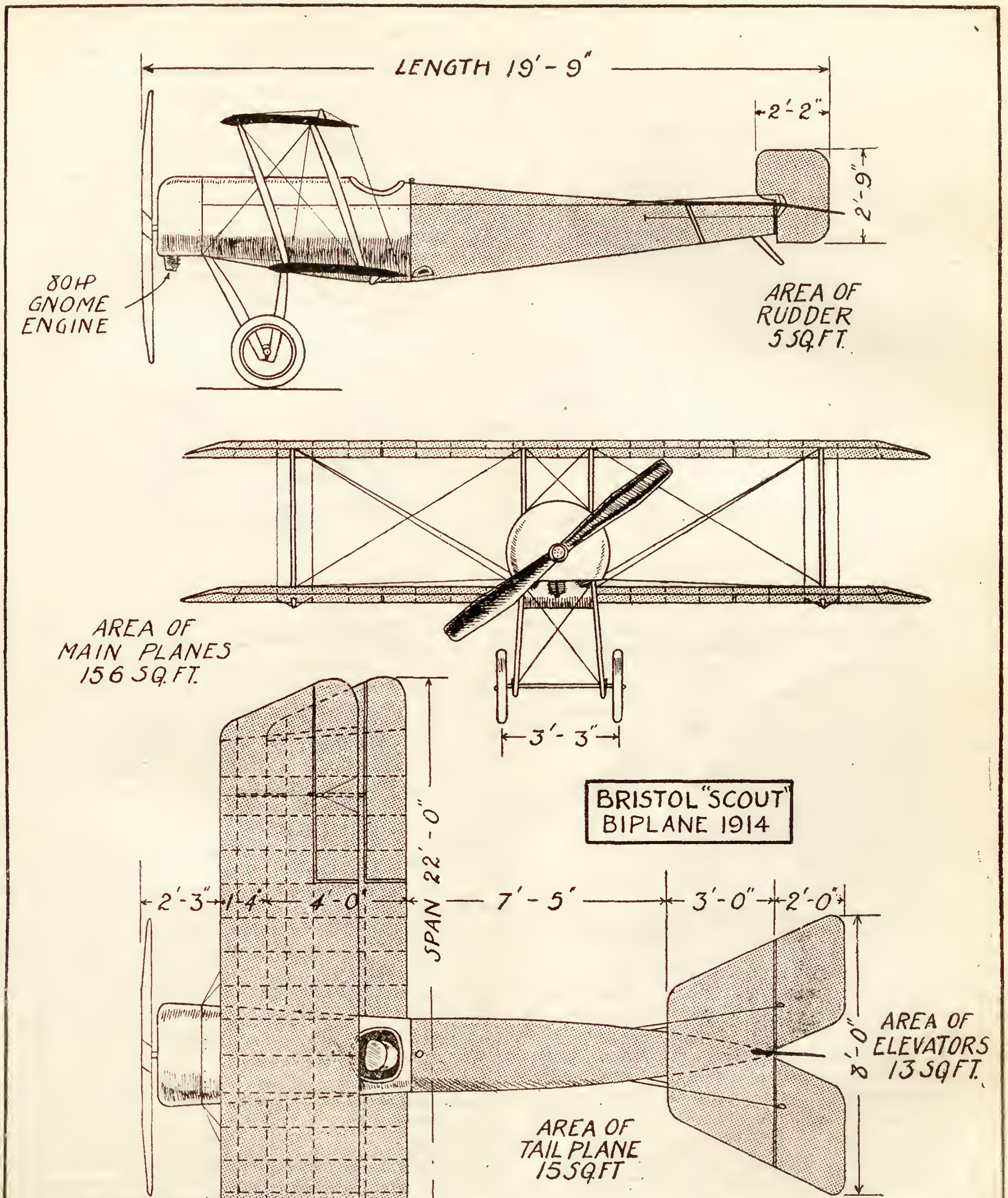


The Dudbridge Iron Works, Ltd.

(who are the sole concessionaires for these engines for the British Empire),

STROUD, ENGLAND.

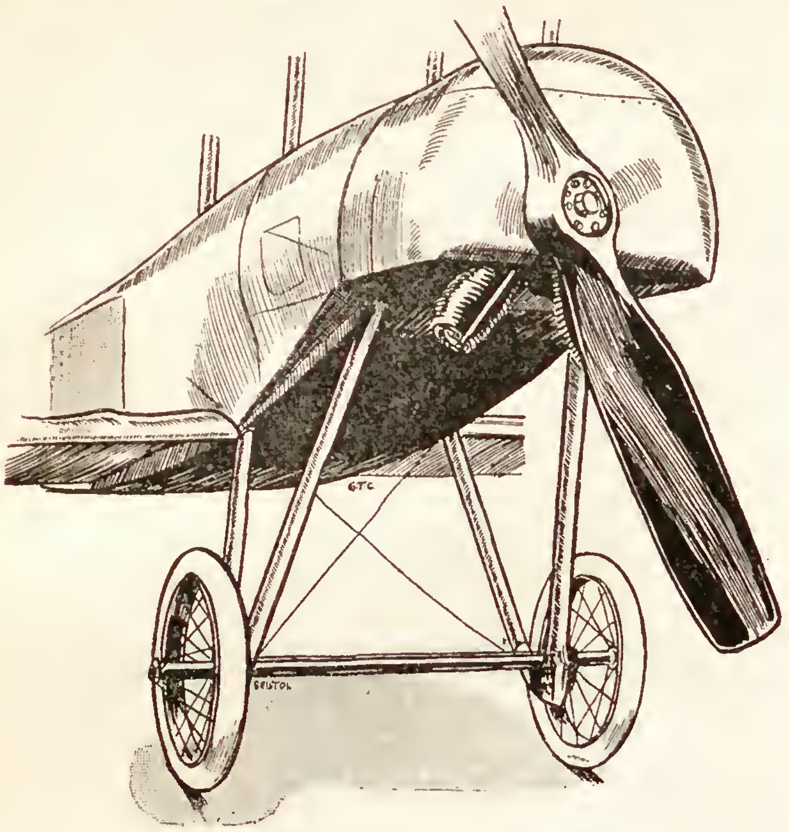
London Office:—
'Phone 7026 Victoria. 87, VICTORIA STREET, LONDON, S.W.
Telegraph: "Aeroflight Vic. London"
Telephone No.: 7 Stroud.
Telegraph: "Humpidge, Cainscross."



"Flight" Copyright.

THE BRISTOL "SCOUT" BIPLANE.—Plan, front and side elevation to scale.

point behind the pilot's seat is entirely closed in by an aluminium covering, whilst the rear portion is covered with fabric. Just behind the inner pair of rear struts is the pilot's cockpit, in which is accommodated the seat, slung from the *fuselage* on piano wires. By means of the wire strainers incorporated in the seat suspension, the position of the seat may be altered to suit the pilot. Control is by means of a single vertical lever, which operates the elevator and *ailerons*, and a pivoted foot-bar actuating the rudder. The vertical lever terminates in a form of handle similar to those known from the Prier type Bristol monoplanes, on which is mounted the switch. Between the pilot's seat and the engine are mounted the tanks, which have a capacity sufficient for a flight of three hours' duration.



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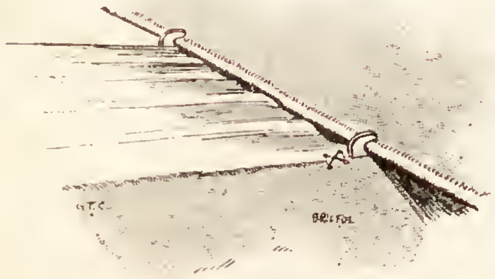
Chassis and engine housing on Bristol "Scout."



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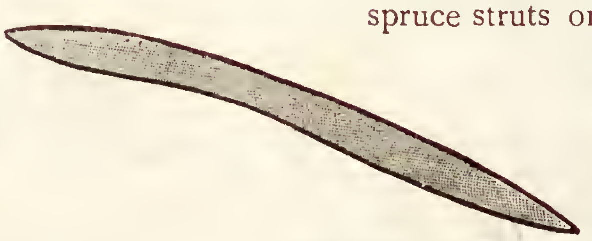
Attachment of tail plane on Bristol "Scout."

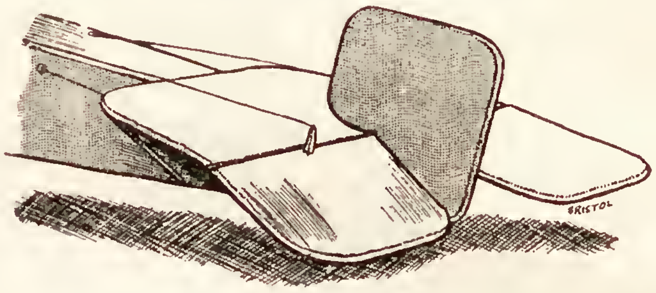


"Flight" Copyright.

Wing section of the Bristol "Scout."

Attached to the upper *longeron* at the rear end of the *fuselage*, is a flat, non-lifting stabilising plane, to the trailing edge of which is hinged the divided elevator. The rudder is pivoted round an extension of the sternpost of the *fuselage*, and is partly balanced by a small portion of it projecting forward from the rudderpost above the stabilising plane. All control cables are in duplicate and have a very high factor of safety.

The main planes are chiefly remarkable on account of their unusually short span, and on closer inspection the wing section proves to be highly interesting, as it does not resemble any of the standard sections employed by other well-known firms. As a matter of fact, the section is the same, of course to a reduced scale, as that on the two-seater Bristol machines, which has been found by the Eiffel laboratory to give an exceedingly good lift/drift ratio. This wing section was, as our readers are no doubt aware, designed by Mr. Coanda, and is probably one of the contributory causes to the high speed and good speed range of the machine. Double acting *ailerons* are fitted to both upper and lower planes, so that the machine must have ample lateral control. Internally the wings are braced by piano wire, whilst the external diagonal bracing is effected by stranded cables having a high factor of safety. Only a single pair of spruce struts on each side of the *fuselage* separate the main planes, so that there is very little head resistance.



"Flight" Copyright.

The tail of the Bristol "Scout" biplane.

The chassis has been reduced to an absolute minimum. Two pairs of V struts joined at their lower extremities by a transverse member constitute the rigid portion of the chassis. The tubular axle rests in the angle between the struts, from which it is sprung by means of rubber cord. The tail planes are protected against contact with the ground by means of a short skid projecting through the *fuselage* covering, and sprung inside the *fuselage* by means of rubber cord. The main characteristics of the machine are :—

Weight of machine empty	616 lbs.	Minimum speed	47 m.p.h.
Useful load carried ...	340 lbs.	Range of flight	3 hours.
Maximum speed... ...	95 m.p.h.		

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ROYAL FLYING CORPS (MILITARY WING).

War Office summary of work for week ending April 18th, 1914 :—

No. 2 Squadron. Montrose.—1,415 miles in all were covered by the pilots of this Squadron. Numerous reconnaissance flights were made from Montrose to Fraserburgh to the north, and Edinburgh to the south.

No. 3 Squadron. Netheravon.—All 3 "flights" were fully occupied with reconnaissances throughout the week. Experiments with signalling were continued.

No. 4 Squadron. Netheravon.—The Officer and N.C.O. pilots of this squadron carried out numerous cross-country reconnaissances, including flights to Gloucester, Portsmouth, Bristol and Barnstaple. 1,612 miles in all were flown.

No. 5 Squadron. S. Farnborough.—"A" and "B" flights covered 1,124 miles during the week almost entirely across country. Practice in landing in restricted areas was continued.

No. 6 Squadron. S. Farnborough.—Flying took place daily. The technical instruction of recruits who have recently joined the squadron was proceeded with.

Flying Depôt. S. Farnborough.—Besides a certain amount of flying, the squadron was fully occupied with repairs to aircraft and M.T., with the technical instruction of recruits and with assisting the A.I.D.

Headquarter Flight. S. Farnborough.—This "flight" has carried out a considerable amount of experimental work of various kinds, amongst others it has been busy with wireless, photography and kiting.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Jacques Schneider International Maritime Race.

THE Jacques Schneider Cup was contested at Monaco on Monday last, the 20th inst., when the following competitors took part :—

Espanet (Nieuport)	France.
Levasseur (Nieuport)	
C. Howard Pixton (Sopwith) ...	Great Britain.
John Carbery (Morane-Saulnier) ...	
Burri (Franco-British)	Switzerland.

The Race resulted in a splendid victory for Great Britain, the course of 150 nautical miles being completed by C. Howard Pixton on a Sopwith Biplane in 2 hours 13 secs. Of the other competitors, Burri (Switzerland) was the only one to complete the course.

Mr. G. Holt Thomas, Mr. Harry DelaCombe, Lieut. C. L. Courtney and Mr. Harold E. Perrin (Secretary) represented the Royal Aero Club of the United Kingdom at Monaco.

At the presentation of the Cup on the 21st inst., Mr. T. O. M. Sopwith, Mr. C. Howard Pixton and the Representatives of the Royal Aero Club were received by the Prince of Monaco.

166, Piccadilly. HAROLD E. PERRIN, Secretary.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

EASTER Monday was a beautiful day for flying, and was greatly appreciated by the holiday makers, fully 500 visiting the grounds during the day, quite a record for Eastchurch; they were amply repaid for their visit, as some very fine flying was seen. The machines up were :—50 h.p. Caudron, 50 and 80 h.p. Shorts, Nos. 3 and 64, 65 Short, 80 h.p.; Lieut. Davis as pilot had a cross-country flight to Kingsnorth; Lieuts. Marix and Fowler made a flight to Brooklands and back on No. 27 Sopwith, 80 h.p.; 33 Sopwith, 80 h.p.; 31 Henry Farman, 70 h.p.; 36 Deperdussin, 70 h.p.

Tuesday fine, rather windy. No. 27 Sopwith 80 h.p., 104 Sopwith 80 h.p., 36 Deperdussin Anzani 70 h.p., 3 and 65 Shorts 80 h.p.

Wednesday fine, windy midday. No. 27 Sopwith 80 h.p. to Isle of Grain; 66 Short 50 h.p., Lieuts. Davis and Ireland, cross-country wireless test.

Thursday, windy. No. 65 Short 80 h.p., 10 Short 140 h.p., 36 Deperdussin, 70 Anzani, 27 Sopwith 80 h.p., Lieut. Marix to Brooklands.

Saturday, rather windy. Morning: No. 27 Sopwith 80 h.p., Lieut. Marix returned from Brooklands, 31 Henry Farman 70 h.p., 65 Short 80 h.p., 10 Short 140 h.p., 50 B.E. Evening: 50 B.E., 16 Avro 100 h.p., and 3 Shorts.

Civilian Flying.—Monday, the Hon. M. Egerton had three fine flights on his 50 h.p. Short. Professor Huntington was also up on his machine.

Wednesday, Mr. Ogilvie made his first flight on his Wright since returning from Egypt. Mr. Sydney Pickles was also out testing his Blériot 50 Anzani, taxying the grounds.

Thursday, Mr. Ogilvie out again on Wright.

Saturday, Professor Huntington had one flight.

Sunday, windy during day. Mr. Sydney Pickles was out very early on his Blériot-Anzani 50 h.p., and had a couple of fine flights before the wind arose, and had his machine in again before 9 a.m. He was also out again in the evening, and made one good flight, but the second time had to come down just outside the aerodrome owing to engine trouble. Mr. F. McClean made his first flight since returning from Egypt, taking up a lady as passenger. Mr. Ogilvie and Professor Huntington also had a flight.

Brooklands Aerodrome.

MR. LAN-DAVIS, on Tuesday last week, flew to Hendon before breakfast on his 50 h.p. Avro biplane. Lieut. Noel Humphreys arrived from Farnborough on Maurice Farman No. 322, returning there after a short stay. The Vickers and Bristol schools were at work.

On Wednesday, the Bristol and Vickers pupils were out, one of the latter, Mr. Hinshelwood, making a nice flight on the 50 h.p. Vickers-Blériot monoplane. Lieut. Stoddart, of No. 5 Squadron, arrived on a Maurice Farman from Farnborough, and afterwards flew back there. The Sopwith "tabloid" biplane sent back to works at Kingston for some slight alterations. Lord Edward Grosvenor's 50 h.p. single-seater Blériot monoplane arrived at Blériot works. Mr. Jack Alcock was out on Mr. Coatalen's Maurice Farman biplane. In the afternoon Mr. Busteed flew to Farnborough on the Bristol "scout" biplane. Lieut. Robin Grey arrived from Farnborough on a 50 h.p. Avro, afterwards flying back there. Lieut. Collett was out on No. 2 D.F.W. biplane, Mr. Merriam on the Bristol biplane. Lieut. de Havilland arrived from Farnborough with a passenger. Messrs. Gaskell-Blackburn and Hunt each had a flight on the former's biplane.

On Thursday morning the following Vickers pupils passed their *brevet* tests in excellent style (each rising to 500 ft. and over in the altitude tests), namely, Messrs. Victor Wilberforce, Mark Dawson, and Comte James de FitzJames. Lieut. Collett (with Mr. Gaskell-Blackburn as a passenger) flew to Portsmouth on the D.F.W. biplane, returning in the afternoon, and afterwards making half-an-hour's flight solo. Mr. Harry Busteed arrived from Farnborough on the Bristol "Scout," the machine having been officially tested to do 94 miles (high) and 44 miles (slow) per hour respectively—a fine performance for both pilot and the Bristol Co.

On Friday, Lieut. P. B. Joubert de la Ferte, of No. 3 Squadron, arrived from Netheravon on an 80 Blériot.

The Vickers and Bristol Schools were busy Saturday morning. Mr. Alcock was out on the Sunbeam-engined Maurice Farman biplane. Lieut. P. B. Joubert de la Ferte returned to Netheravon on the 80 h.p. Blériot. In the afternoon, Mr. Waterfall was flying the Martinsyde monoplane, and Mr. Alcock the Maurice Farman biplane.

Prince Leon Sapieha, who passed the Royal Aero Club *brevet* tests at the Grahame-White School last week.

On Sunday, Mr. Barnwell was first out on the Vickers Blériot, flying well in a tricky wind, followed by Mr. Alcock on the Maurice Farman, Mr. Waterfall on the Martinsyde monoplane, Mr. Merriam on the Bristol biplane, and Messrs. Barnwell and Elsdon on Vickers biplanes. The winners of the two free passenger flights were Lieut. McDonald, of Darley Dene, Addlestone (who was so keen on a trip in the Martinsyde monoplane that he preferred to wait until next week), and Mr. T. Hill, of 3, Corbett Cottages, Mayford, Woking (who was taken up by Mr. Barnwell on the Vickers biplane).

Bristol School.—Monday, last week, Busteed arrived from Salisbury on the Bristol scout biplane, taking only 27 mins. for the journey. During the afternoon he gave some splendid exhibitions on this machine. Merriam also took part in the Brooklands Handicap, finishing fourth.

Merriam made a test, Tuesday, and then gave tuition to Lieut. Smithies (3) and Mr. Racine Jacques, when the wind prevented further tuition.

Wednesday, passenger tuition to Lieut. Smithies and Lieut. Britten. Busteed left for Farnborough on the Bristol scout.

Thursday, Merriam up behind Lieut. Smithies on two occasions, and this pupil then made his first solos, with excellent landings. Mr. Lucas was taken for his first trip, after which the wind was too strong for school work. Busteed returned from Farnborough on the Scout machine.

Friday and Saturday, no tuition possible owing to the bad weather.

Vickers School.—Tuesday, last week, Barnwell and Knight on biplanes with Comte FitzJames, Capt. Phillips, and Mr. Dawson. Comte FitzJames and Mr. Wilberforce solos.

Wednesday, Barnwell, Knight, Elsdon, and Webb tuition on biplanes to Messrs. Dawson and Murray and Capt. Phillips. Comte FitzJames and Mr. Dawson solos. Barnwell, Elsdon, and Mr. Hinshelwood on Blériot mono.

Knight on biplane, Thursday, with Mr. Murray. Comte FitzJames solo. Mr. Wilberforce, Comte FitzJames, and Mr. Dawson each went through their *brevet* tests in fine style.

Saturday, Barnwell and Knight on biplanes with Messrs. Murray, Underhill, and Liddell (new pupil). Lieut. Acland and Mr. Underhill solos on biplane.

Sunbeam Activity.—The 100 h.p. Sunbeam-engined Maurice Farman, piloted by J. Alcock, at Brooklands aerodrome on Monday last week was flying all day with and without passengers, also cross-country and exhibition flights.

Tuesday, there was cross-country flying and exhibition flying.

Wednesday, fine exhibition flights during the day.

Cross-country flights with Mr. J. Robins again Friday, also exhibition flights during the day.

Saturday, exhibition and cross-country flying during the day.

Two flights were made Sunday in the wind with Mr. J. C. Robins, when the magneto gave trouble, so flying was ended for the day.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Sunday, last week, Prince Sapieha solo circuits, and on Tuesday Prince Sapieha solo circuits, &c., again. Mr. Smiles straights with Instructor Cripps and alone. Mr. A. Boyesen (new pupil) rolling with Instructor Cripps.

Wednesday, Prince Sapieha solo circuits, &c., afterwards going in for *brevet* tests and gaining his certificate. Major Piercy and Mr. Smiles straights with Mr. Cripps. Mr. Parker solo circuits and figures of eight. Mr. A. Boyesen rolling alone.

Thursday, Messrs. Moore, Boyesen, Cowley, and Robinson straights with Instructor Birchenough. Mr. Smiles and Major Piercy solo straights. Mr. Parker circuits.

Beatty School.—During last week work done by pupils on dual control Wright biplane with Instructor M. Baumann was: Mr. Ding 13 mins., Monday; Tuesday, Messrs. Ding, 22 mins.; F. Ruffy (new pupil), 15 mins.; Messrs. Stewart and Watts each 15 mins. Wednesday, Messrs. Ding, 31 mins.; Bentley, 15 mins.; Ruffy, 15 mins.; Stewart and Watts, 15 mins. each. Thursday, Messrs. Ding, 10 mins.; Ruffy, 18 mins.; Bentley, 9 mins.; Stewart, 10 mins.; Watts, 12 mins. During the Wednesday morning training Mr. Ding was doing figures of eight in good style, and made some good landings. Mr. Bentley making good progress.

W. H. Ewen School.—On Monday, last week, school was out at 6 a.m. On 35 h.p. Caudron No. 1 Mr. Warren test flight, after which Messrs. G. Carruthers and F. Curtis did straights.

At 6 a.m. Tuesday Mr. F. W. Goodden test flight on *brevet* machine, followed by Mr. Curtis doing circuits. On 35 h.p. Caudron No. 1 Mr. Warren test flight, after which Mr. Carruthers did half circuits and circuits.

School out at 5 a.m. Wednesday. Mr. Curtis circuits and figure eights at 400 ft. on *brevet* machine. On 35 h.p. Caudron No. 1, Mr. Warren test flight, Mr. G. Carruthers circuits, Mr. Verney and M. Vittoz-Gallet rolling.

On Thursday school out at 6 a.m. Mr. Curtis on *brevet* machine doing circuits and figure eights to 500 ft., landing with *vol plané*.

Hall School.—Owing to the school being closed for Easter vacation there was very little practice last week. However, Messrs. Roy Gibson and Haines put in an appearance and executed several straights on Blériot Penguin. Haines, trying conclusions with No. 1 pylon, forgot to switch off, and successfully damaged both machine and pylon. J. L. Hall was flying the Avro repeatedly during the last few days of week, taking several passengers.

Salisbury Plain.

Bristol School.—Monday, last week, school closed for Easter.

Tuesday, solos were made during the day by Capt. Walcot, Lieut. Myburgh (2), Lieut. Rabagliati (2), and Lieut. Bolitho; passenger tuition was given to Capt. Walcot, Mr. Hay and Mr. Parker. School work was curtailed owing to the strong wind.

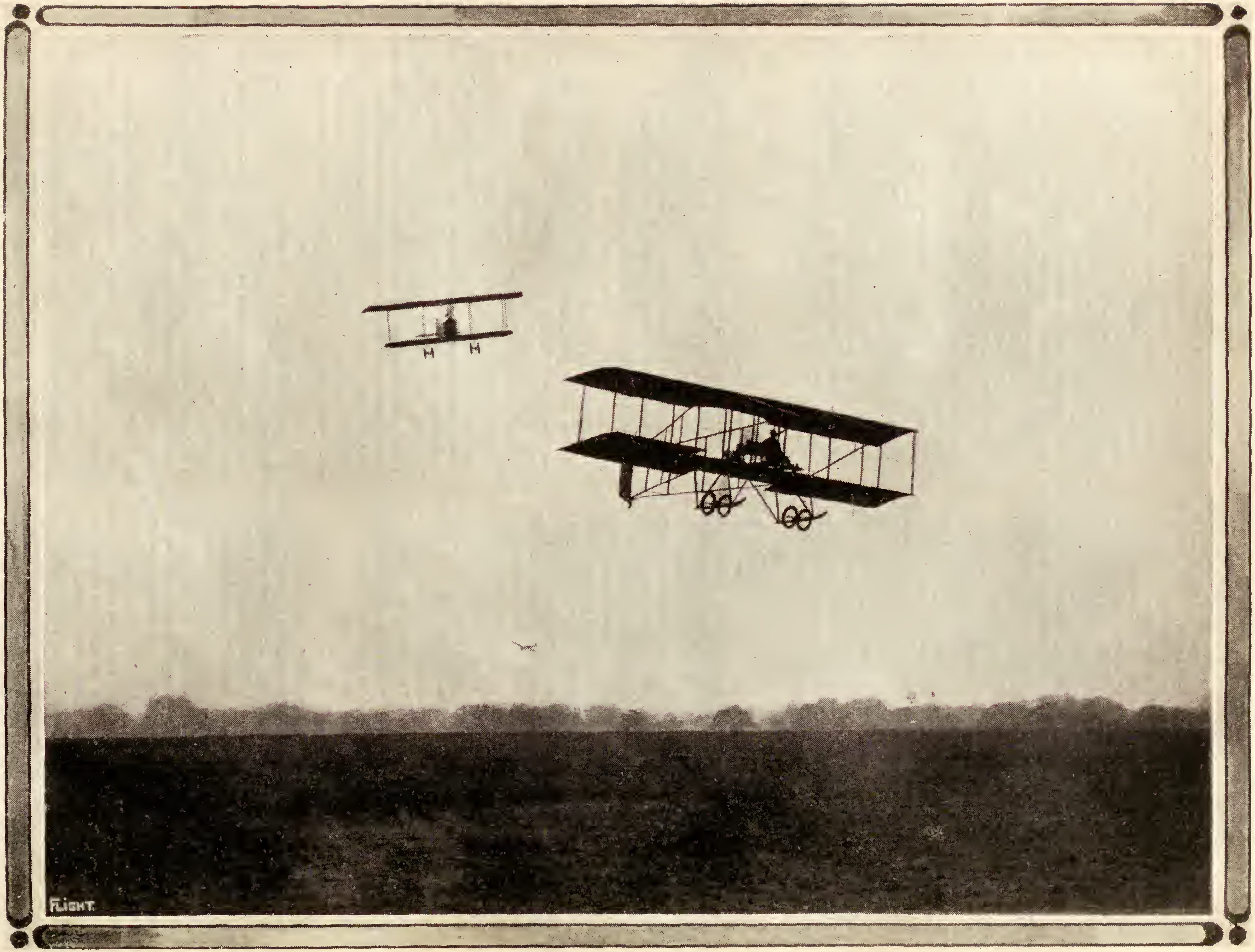
After tests had been made Wednesday by Jullerot and Voigt, Lieut. Bolitho and Lieut. Harman both flew for their certificates, which they succeeded in obtaining. Tuition was given to Mr. Parker (2), Mr. Hay (2), Lieut. Rabagliati, solos being made by Lieut. Rabagliati (3), Lieut. Myburgh (3), and Mr. Hay. No tuition was possible on Thursday, Friday and Saturday, owing to the weather being too bad.

Shoreham Aerodrome.

Pashley School.—A strong wind stopped pupils doing much work during past week. Up with instructor: Wright, Dawson, Gray, Mortimer. Straights: Wright, Gray and Mortimer. Circuits: Excellent circuits by Mr Hale at 1,000 ft. Instructor for week: C. L. Pashley. Mr. Pashley took a passenger to Brighton to see the hydroplane. He left at 2,000 ft. and landed on the Hove lawns. A great crowd collected, and with their help some railings were removed and the return journey accomplished.

FLYING AT HENDON.

Thursday of last week was the occasion of the first weekly meetings. A very good attendance resulted, including over 100 persons connected with the *Daily Sketch* scholarship scheme, who arrived in three large motor observation cars. Proceedings opened at about 3.30 p.m. with a demonstration of looping by R. H. Carr on the Grahame-White tractor biplane "Lizzie," and exhibitions by W. Birchenough on the 50 h.p. G.-W. 'bus, and J. L. Hall on his 50 h.p. Avro. Later, F. W. Goodden put up some looping on the 60 h.p. Caudron, whilst Carr, Louis Noel, and L. A. Strange each took up a passenger on the G.-W. tractor, the 80 h.p. Morane-Saulnier, and the bi-rudder 'bus respectively. Birchenough also took up a passenger on the latter machine, and R. J. Lillywhite made a flight on 'bus 109. More passengers were then taken up by Marty on the Blériot, Noel, Carr, Birchenough and Goodden, and flights were made by Hall on the Avro and N. Howarth on 'bus 109. A biplane speed handicap round six laps of the aerodrome was then flown, but as there were only two biplanes available, two monoplanes pretended to be biplanes for the occasion. Birchenough on the 'bus was limit man, Carr on "Lizzie" starting second, then Strange on the 80 h.p. Blériot, and Marty on the 60 h.p. Morane-Saulnier last. Noel was at scratch, but did not start owing to adjustments having to be made to the 80 h.p. Morane-Saulnier. Birchenough got home first with Marty and Carr second and third fairly close behind—Mr. Gates proving to be quite a successful handicapper. After the race Noel started off on the 80 h.p. Morane-Saulnier with the Prince Leon Sapieha as passenger. Noel made two successful loops at about 600 ft., and then started a spiral descent, but when approaching the ground it was noticed that the machine was banking over steeper than usual. Noel was apparently unable to flatten out, and the machine made a terrific side-slip to the ground close to No. 1 pylon. The left wing struck the ground first, crumpled up, then the machine bounced on to the right wing, and then on to the tail, and finally settled down right side up a crumpled mass of *débris* about 30 yards from where it first struck the ground. On reaching the wreck it was with some considerable surprise and relief we found that both pilot and passenger were alive and apparently but slightly injured. It was indeed a remarkable escape, which seemed all the more remarkable considering the difficulty that was experienced in extricating them from the wreckage. The only injuries received were cuts about the face, and in Noel's case the legs as well. Within an hour of the smash, both were walking about, shaken but happy! Unfortunately, the the one thing in connection with this accident that both pilot and passenger did not wish to occur, happened—that is, reports that they were seriously injured appeared in some of the evening papers. Such reports as these soon spread, especially abroad, when the victim happens to be a foreigner, resulting in much unnecessary grief to relatives and friends. No doubt the person or persons responsible for the sending out of this report witnessed the smash from afar, and as it certainly did look pretty hopeless, they jumped to the conclusion that it was more serious than it really was. Quite an hour was spent by the aerodrome Press representative in clearing up this matter, and informing the various agencies that it was only a matter of slight injuries, but still we cannot help thinking that much of this trouble could have been avoided if, immediately after the smash, announcement had been made to both the spectators and the Press how matters stood. As it was, many left the aerodrome under the impression that the victims were either killed or not likely to recover. However, all's well that ends well. As soon as it was found that the Prince and Noel were all right



RACING AT HENDON.—A G.-W. 'bus, and on left "Lizzie."

"Flight" Copyright.

several more exhibition and passenger flights were made before the proceedings were brought to a close.

On the next afternoon, Friday, a special aviation meeting was held in aid of Dr. Barnardo's Homes, and a summer-like day brought up a very good attendance. The principal event down on the programme was a 12-mile cross-country handicap for the *Daily Telegraph* Cup, but as the wind was blowing at about 45 m.p.h. this event had to be abandoned. Some very fine exhibition flights were made, nevertheless. Carr opened the proceedings with a looping demonstration on "Lizzie," in spite of the fact that at times he made but little headway against the wind. Marty then gave a wonderful demonstration on the 60 h.p. Morane-Saulnier, executing numerous loops, tail slides and steep bankings, finishing up with an exceedingly fine, and under the circumstances, difficult landing. Later, both Carr and Marty repeated their demonstrations of looping and trick flying. Prince Alexander of Teck, the Patron of Dr. Barnardo's Homes, was an interested spectator of the proceedings.

The Second Spring Meeting was held on Saturday afternoon last under very pleasant weather conditions, but unfortunately the wind was still rather troublesome, so much so that the principal event down on the programme, a 9-mile speed handicap for the Lord Charles Beresford Trophy, had to be abandoned, and a 12-mile cross-country handicap held in its place. The first to ascend was R. H. Carr on "Lizzie," who made three loops at heights of about 600 ft. He was followed by W. Birchenough on the G.-W. bi-rudder 'bus, P. Marty on the 60 h.p. Morane-Saulnier, and L. A. Strange on the 80 h.p. Blériot with a passenger. F. W. Goodden then ascended on the 60 h.p. Caudron and executed three separate loops, and exceedingly clean ones too, at heights of about 500 ft. He then climbed to a height of 1,000 ft. or so and made a triple loop to about 500 ft., after which he landed, having been aloft for 20 minutes. Marty next made a flight with a passenger on the Blériot, after which a start was made for the cross-county race. Four started in this event as follows: W. Birchenough on the bi-rudder 'bus (7 mins. 43 secs.); R. H. Carr on "Lizzie" (2 mins. 25 secs.); L. A. Strange with a passenger on the 80 h.p. Blériot (1 min. 40 secs.); P. Marty on the 60 h.p. Morane-Saulnier (scratch). Carr soon obtained the lead, only to lose it to Marty at the finish by $\frac{1}{5}$ sec., Birchenough coming in third some 35 secs. after Carr. After the race several more exhibition and passenger flights were made by Marty and Strange on the Blériot, Carr on "Lizzie," and Birchenough on the 'bus. Marty also gave another demonstration on the Morane, in which he executed three single loops, one double loop and three tail slides. Amongst the spectators were Prince Louis of Battenberg, Prince Leon Sapieha (none the worse for his mishap), Lord Portarlington, Lieut. Spencer Grey, &c.

Sunday brought another brilliant day and a large attendance of visitors, amongst whom were Lord Lascelles, Lady Alistair Innes-Kerr, Sir Mathew Wilson, M.P., the Baron and Baroness de Meyer, &c.

Fine looping displays were given by R. H. Carr on "Lizzie," F. W. Goodden on the 60 h.p. Caudron, P. Marty and Gustav Hamel on Morane-Saulniers. Hamel made nearly twenty loops during his demonstrations. Other exhibition flights were put up by J. M. Cripps and W. Birchenough on G.-W. 'buses, L. A. Strange on the Blériot, J. L. Hall on his 50 h.p. Avro, whilst Claude Grahame-White went up on the Morane-Saulnier. Louis Noel paid a visit to the aerodrome during the afternoon, feeling quite recovered from his spill of Thursday.

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EDDIES.

I UNDERSTAND that the Grahame-White school are adding yet another good pilot to their already strong list of flyers, in the person of Frank Goodden, late instructor to the W. H. Ewen school at Hendon. It is only during the last few weeks that Goodden has come into the eye of the public by reason of his looping feats on the Caudron biplane, but as reported in FLIGHT some weeks back when his portrait had the place of honour in our "Men of Moment" series, he is by no means young in aviation, although his retiring nature has not allowed him to appear in the limelight to any great extent. He is a first-rate pilot and the G.-W. school are to be congratulated on having secured his services. If there is a regret at the change at all, it is a very small one: he flies the Caudron with such remarkable skill that I am just a little sorry to see him change, although there is no doubt he will soon be equally at home on any horse in the stable. Perhaps I am wrong in sticking to that old theory of mine about "One man one machine," but looking back over the past two years I do not feel like changing it. Anyway, I wish him luck.

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It seems that the London Aerodrome must do nothing but think of the comfort of visitors to their flying ground, they are for ever devising some fresh method of adding to it. One would have thought that the pavilion as elaborated last year was the last word in comfort and decoration, but now it has again been improved almost out of all knowledge. Having for reasons beyond their control had to remove the grass (?) where the little tea-tables stood, and replace it by something more solid, they now stand the tables on squares of carpet in a style quite oriental. The interior of the pavilion also now reminds one of a lounge in the palace of an Eastern potentate, with its many palms and fern-baskets and its easy chairs. Being like the Lord Mayor's fool of old, fond of anything that is good, I wish I could go there every day to lunch. Will it ever become an aviation club in the true sense of the word, with a list of paying members? I rather think I shall move Hendon way if it does.

Whilst on the above subject, another pleasant innovation is the singing and playing of Miss Murray, during the time the cup that cheers is imbibed. Her installation was quite a happy thought, and it adds much to the pleasure of visitors to hear good music and singing during the intervals from watching the loop-loopers.

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Experiences, amusing and otherwise, naturally come to a man in the position of Mr. Hucks, travelling from end to end of the country in the execution of his engagements, and not the least of the amusing ones befel him at Bristol recently. Missing the car sent to meet him at the station, he took a taxi. On arrival at the ground he was not recognised by the local commissionaire, so the usual admission fee was demanded. When Mr. Hucks informed the man of his identity he was met with amused incredulity, and his scepticism was simply increased when Mr. Hucks ventured to suggest that they would not be able to have the show without him.

As a last resource a policeman was requisitioned to convey to the committee Mr. Hucks' request to be admitted, and after a short delay the way was cleared.

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Inverted flying in a wind evidently calls for more careful handling of the controls than most people would imagine, especially on a Blériot, which always has a tendency to right itself if left alone. The "automaticity" of the machine is constantly striving to assert itself, and should a gust cause it to bank even slightly, the monoplane will whip round to its normal attitude in spite of full use of the warp.

It appears to be a matter of sense of feeling in addition to delicacy of touch, as the corrections must be made very gently and at the moment when the irregularity first starts, and not left till later and then corrected suddenly. Mr. Hucks says that he has the greatest difficulty in keeping his machine on its back for any length of time, and that inverted flying is infinitely more difficult than looping.

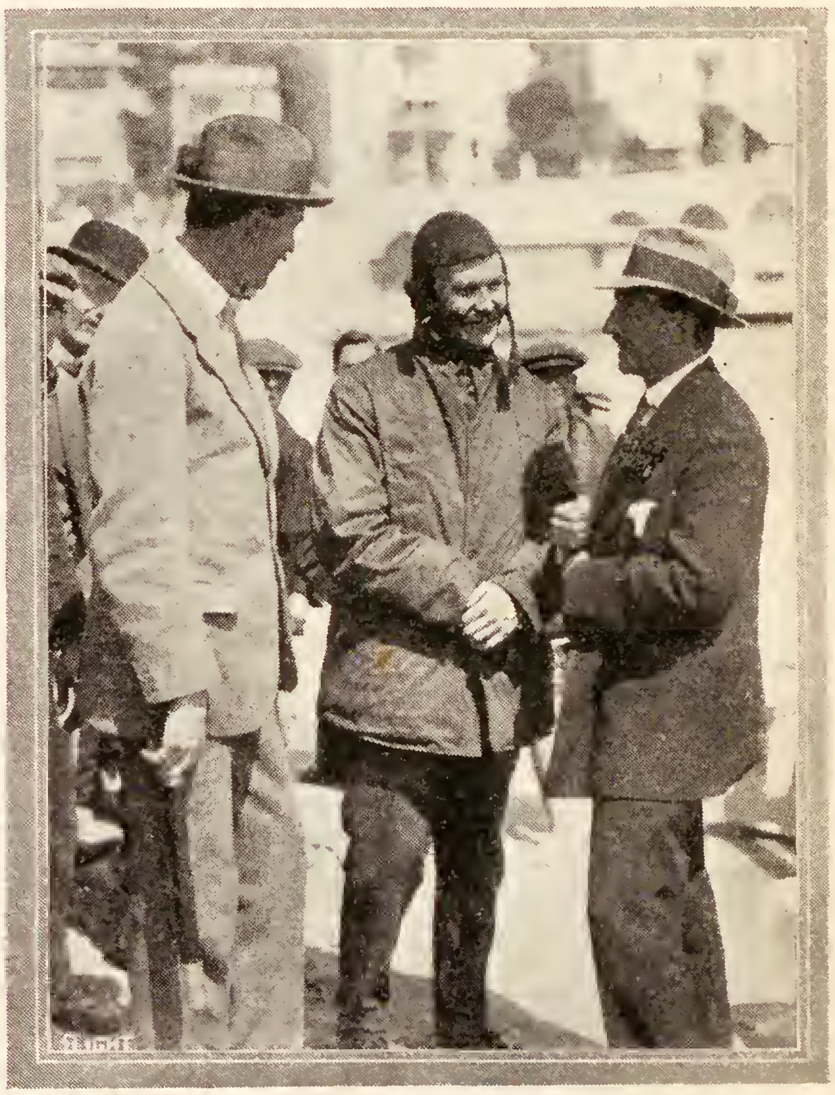
"WILL O' THE WISP."

THE SCHNEIDER CUP COMPETITION.

IT is almost impossible to over-rate the importance of the winning of the Schneider Cup by the Sopwith machine piloted by Mr. C. H. Pixton. At any rate the French have made no secret of the fact that they consider the British victory as a most serious blow at the prestige of French aviation. It may be recalled that this year the competitors were set the task of flying a distance of 150 nautical miles, or 280 kiloms. This flight had to be immediately preceded by one round of the course, in which the competitor was required to "taxi" across the line before rising, then make two descents to the surface of the sea at specified points. Then, without alighting, it was necessary to continue for the flight proper, the starting line having to be crossed in full flight, and as the course was ten kiloms. round, 28 laps had to be covered. Entries had been received from France, Great Britain, the U.S.A., Switzerland, and Germany. Those competitors who were present at the contest on Monday were: Espanet (Nieuport), Levasscur (Nieuport), and Garros (Morane) for France; C. H. Pixton (Sopwith) and Lord Carbery (Deperdussin) for Great Britain; Burri (F.B.A.) for Switzerland; and Weymann (Nieuport) and Thaw (Deperdussin) for the U.S.A. Stoeffler, who was Germany's representative, had a smash on the previous day, as also did Lord Carbery on his Morane, but he promptly made arrangements to use Janoir's Deperdussin in the actual race.

The rules specified that the start must be made between 8 a.m. and sunset, and when two bombs were fired at 8 a.m. on Monday the sea in the Bay of Monaco was calm, but there was a strong easterly wind. Almost immediately after the firing of the bombs Levasseur and Espanet made their appearance, and after carrying out the preliminary round in fine style started on the long flight. Pixton started at 8.16, and the magnificent way in which the Sopwith effected its *amerrissages*, together with its great speed, made a very favourable impression. Pixton's time for the preliminary round was 4 mins. 27⅗ secs., while Espanet took 8 mins. 55⅗ secs., and Levasseur 9 mins. 17 secs., while Burri, who was the next starter, took 6 mins. 17⅘ secs.

Lord Carbery made one round of the course, but, finding some difficulty in handling a machine with which he was not familiar, decided not to continue. Meantime, the other four had been flying regularly, with Pixton steadily building up a long lead. The times for the first 50 kiloms. were: Pixton, 20 mins. 57 secs.; Burri, 29 mins. 17 secs.; Espanet, 28 mins. 13 secs.; Levasseur, 30 mins. 5 secs. At 100 kiloms. the position was: Pixton, 41 mins. 33 secs.; Burri, 57 mins. 54 secs.; Espanet, 51 mins. 53 secs.; Levasseur, 54 mins. 46 secs.; while at 150 kiloms. Pixton's time was 1 hr. 2 mins. 31 secs.; Burri, 1 hr. 27 mins. 36⅖ secs.; Espanet, 1 hr. 16 mins. 47 secs.; Levasseur, 1 hr. 22 mins. 56 secs. At the 16th round Espanet retired, and in the next round Levasseur followed. Pixton now began to slow a little, and his time for 200 kiloms. was 1 hr. 24 mins. 4 secs., while Burri's was 1 hr. 57 mins. 39 secs. After the 23rd round Burri returned to port to pick up some more petrol, and in the meantime, the Sopwith having easily completed the full distance, Pixton decided to make two more rounds so as to be timed over 300 kiloms., which were completed in 2 hrs. 9 mins. 10 secs. No other competitor started, but later in the day Levasseur resumed with the intention of qualifying for third place, but after completing nine more rounds he retired. The result of the race was therefore: C. Howard Pixton, Sopwith hydro-biplane, who covered the 150 nautical miles in 2 hrs. 13⅖ secs., first, with Burri on the F.B.A. flying boat, whose time was 3 hrs. 24 mins. 12 secs., second. Both these machines were fitted with Gnome engines and Integral propellers.



AFTER THE SCHNEIDER CUP RACE.—Mr. Howard Pixton, the pilot of the victorious Sopwith seaplane, being congratulated by M. Schneider. On the left is Mr. DelaCombe, one of the British representatives of the Royal Aero Club at the meeting.

The British delegates, representing the Royal Aero Club, were Messrs. G. Holt Thomas, H. DelaCombe, Lieut. C. L. Courtney, and Harold E. Perrin. The cup was formally presented on Tuesday, when Mr. T. O. M. Sopwith, Mr. Pixton and the British delegates were presented to the Prince of Monaco.

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THE MONACO AERIAL RALLY.

AS briefly announced in our last issue, the best flight recorded at the close of the competition on April 15th was that of Garros over the Monaco–Buc course, while his second flight over the Brussels route secured for him the second place. Briefly the result was as follows:—

1. Garros (Morane-Saulnier, Gnome motor, Integral propeller), Monaco–Paris, 1,293 kiloms. in 12 h. 14 m. 21 s. Over land, 10 h. 32 m. 53⅘ s. Over sea, 1 h. 41 m. 27⅕ s. (record).
2. Garros (Morane-Saulnier, Gnome motor, Integral propeller), Brussels–Monaco, 1,293 kiloms. in 12 h. 27 m. 13 s. Over land, 10 h. 7 m. 18 s. (record). Over sea, 2 h. 19 m. 55 s.
3. Brindejonc des Moulinais (Morane-Saulnier, Gnome motor), Madrid–Monaco, 1,293 kiloms. in 16 h. 2 m. 21⅗ s. Over land, 12 h. 53 m. 21⅕ s. Over sea, 3 h. 9 m. 10⅖ s.
4. Renaux (M. Farman, Renault motor), Buc–Monaco, 1,293 kiloms. in 53 h. 58 m. 43⅖ s. Over land, 51 h. 5 m. 13 s. Over sea, 2 h. 53 m. 30⅖ s.
5. Verrier (H. Farman, Gnome motor), Buc–Monaco, 1,293 kiloms. in 63 h. 15 m. 28 s.
6. Garros (Morane-Saulnier, Gnome motor), Brussels–Monaco, first time, 245 h. 45 m. 46 s.

On the last day of the competition Brindejonc des Moulinais completed his flight over the Monaco–Milan course, but owing to a stop at Padua was disqualified. Garros won the prize of 25,000 francs for the best time over any course, 5,000 francs for his flight to Buc, another 5,000 francs for his flight from Brussels to Monaco, as well as the prizes of the French President, the Grand Duchess of Mecklenburg, the French Naval Minister, and the Belgian Aero Club. Renaux was awarded the prize of 10,000 francs for the best flight by a machine having more than 25 square metres of surface, while Brindejonc took the 5,000 francs for his Madrid–Monaco trip. The only other competitor to finish at Monaco was Mallard on a Nieuport, and he and Verrier were awarded 4,000 francs each, while Hirth, Brindejonc, and Moineau, who covered more than 1,000 kiloms., were given 3,000 francs each, and Stoeffler and Molla, who completed more than 500 kiloms., 1,500 francs each.

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St. Petersburg to Pekin.

THE Russian Aero Club has now decided upon the route which is to be followed by the aviator Janoir in his flight from St. Petersburg to Pekin. There will be fifteen stations on the way at Moscow, Samara, Oufa Kourgau, Omsk, Tomks, Krasuoiarsk, Nijnioudinsk, Irkoutsk, Tchita, Matziewskaia, Tsitsckar, Kharbine, Mouckden, Takou, and the total distance will be about 9,000 kilom.

NAVAL AND MILITARY AEROPLANE ENGINE COMPETITION.

ENGINE TESTING ARRANGEMENTS AT THE ROYAL AIRCRAFT FACTORY.

THE engine testing plant that will be used in the forthcoming Naval and Military Aeroplane Engine Competition is well worthy of the studious attention of engine manufacturers in general and of aeronautical engine specialists in particular. Two fundamental conditions must be satisfied by any plant which is to be used for a purpose of this nature, before the results obtained from tests made with it can be accepted as giving a true indication of performances in actual practice: (*a*) the apparatus employed must be absolutely reliable in every respect, and (*b*) the arrangement must be such that the conditions under which the tests are carried out are analogous to those under which the engine will be subsequently engaged. The fulfilment of these conditions is often a difficult matter, especially where exact measurements are required to be made; but in both of these aspects the plant at the Royal Aircraft Factory will be regarded with a considerable amount of satisfaction, as in its design and construction, special precautions have been observed to ensure the accuracy of the measurements of the power developed, and the fuel, oil and water used, as well as the velocity of the air over the engine. Means have also been provided whereby, if desired, the engine may be tilted (in either a lateral, or a longitudinal direction) to any angle up to 15°; and a thrust or a pull may be applied to the engine crank-shaft.

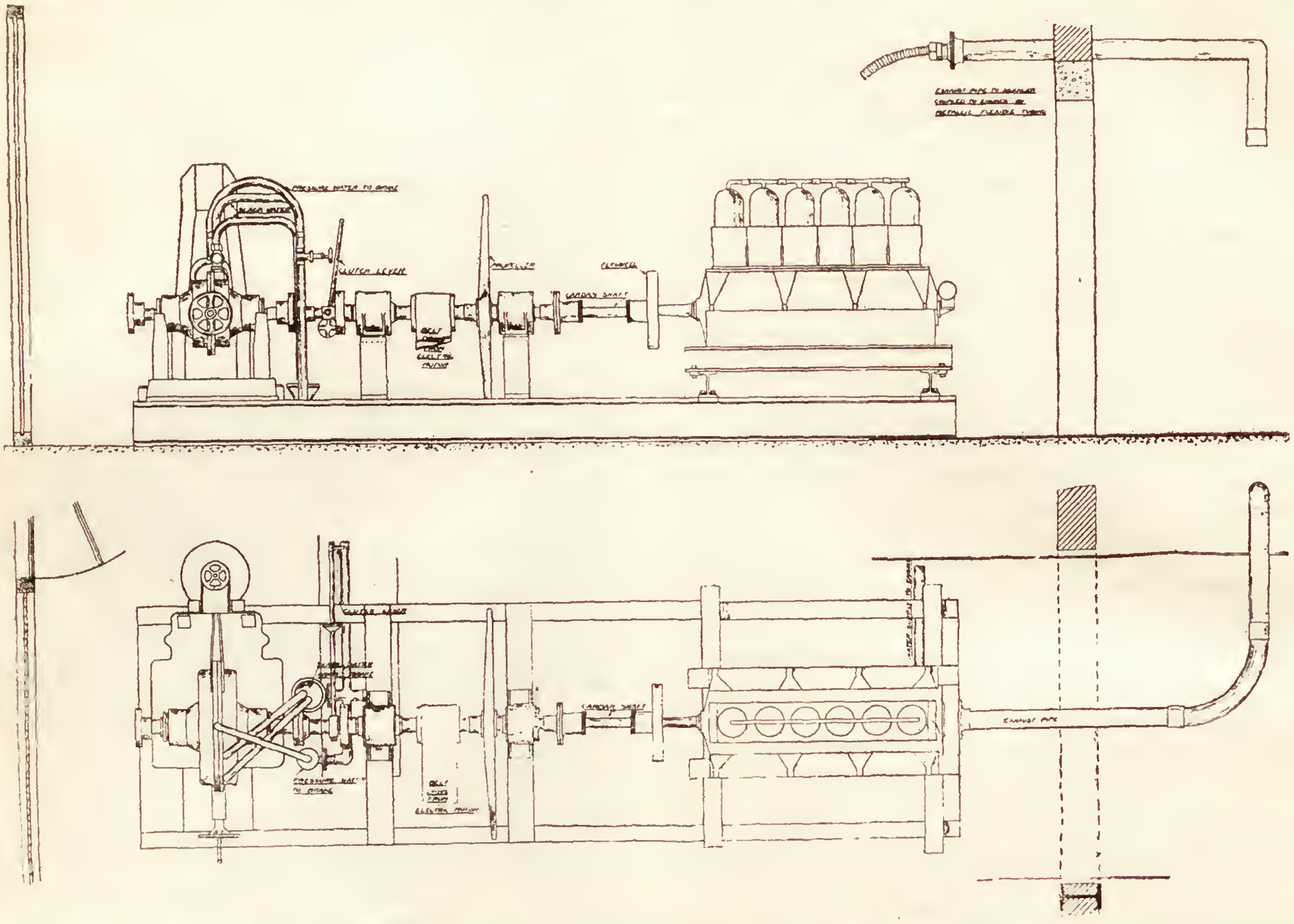


Fig. 1.—Arrangement of testing bed showing the engine, fan and brake in position, but with the air ducts removed.

The instruments employed for measuring fluid flow merit careful examination, not from any novel feature in their construction, but because they represent special applications of certain well-known devices in order to achieve a high standard of accuracy with the minimum of complication and of care in observation.

There are eight test beds, six of which are fixed to the ground, whilst two may be inclined in any direction—the framing for the latter being supported in trunnions and fitted with locking gear for holding the bed in any desired position. The former are in one building, but each is arranged in a separate compartment, the walls of which are carried to a sufficient height above the ground level to completely isolate one engine from another. A workshop, fitted with vice benches, a drilling machine, &c., is provided in the same building so as to allow competitors to effect such small adjustments as may be required in finally fitting and tuning up their engines on the premises. The engines are received in a room adjoining, where the weights, &c., are recorded; but the tilting beds are in a separate building.

The arrangement and details of the fixed test beds are shown in Figs. 1 and 2. These drawings are amongst those which have been

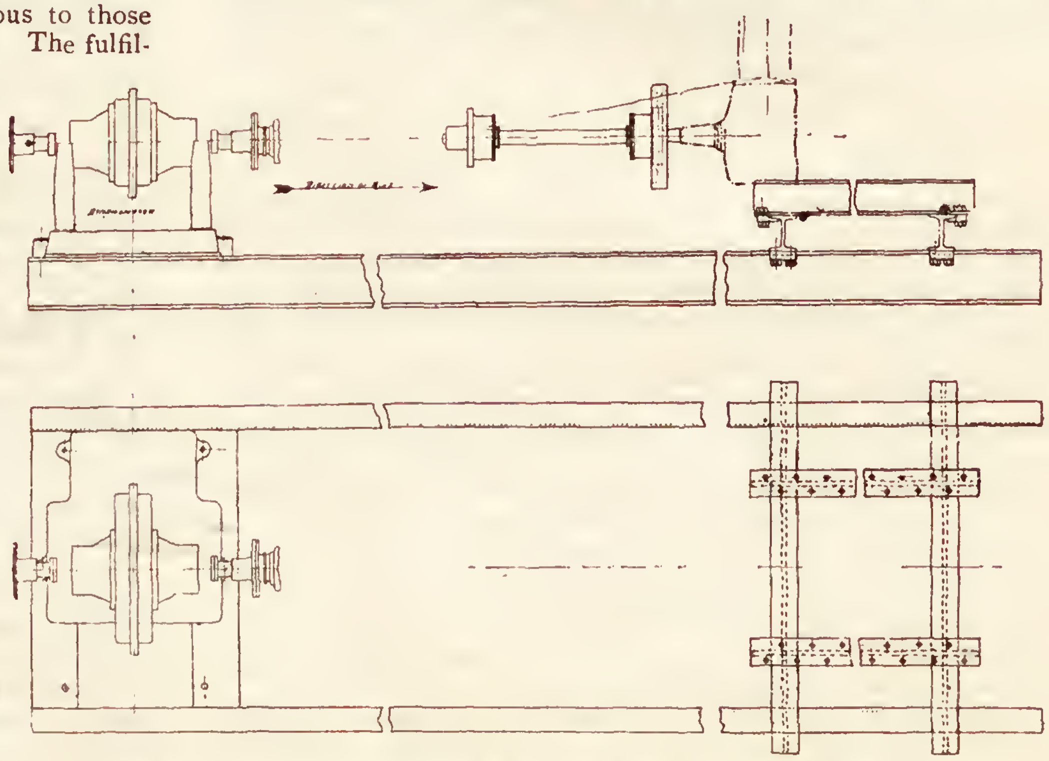


Fig. 2.—Arrangement of girders on fixed test beds.

supplied to various entrants in this competition and to others interested in the erection and the equipment of similar testing plants. Two longitudinal channel girders are grouted into the floor, and carry the water dynamometer at one end and two H section cross girders at the other. These latter are attached to the fixed girders by means of sliding clamps; and, with the short beams placed above them, may be secured in any desired position, thus rendering it possible to readily mount an engine of any size and type upon the bed. Any manufacturer, however, is at liberty to supply his own supports for attachment to the lower fixed girder, should he wish to do so. The tilting beds are similarly provided with adjustable girders to facilitate the mounting of the engines.

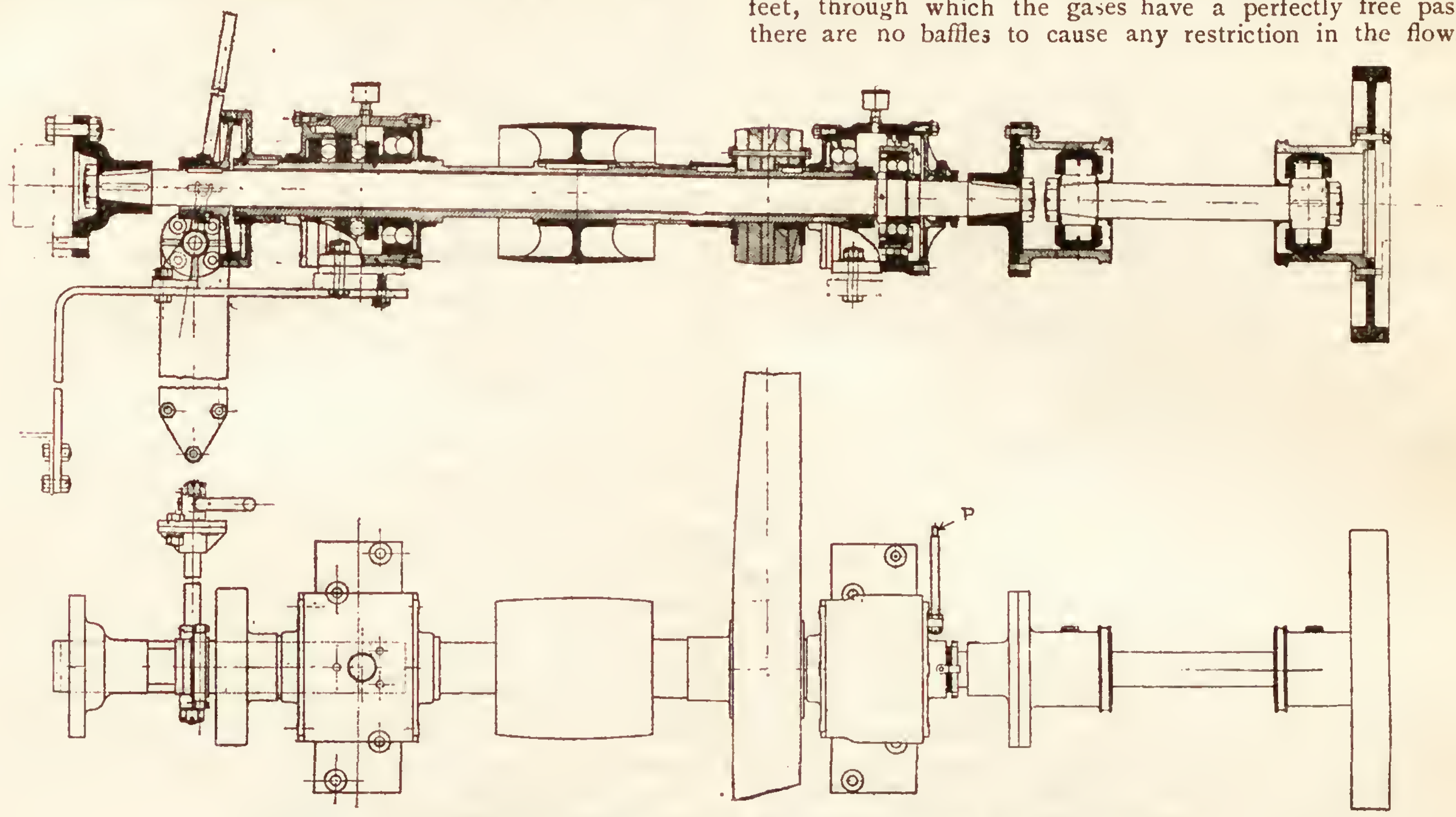


Fig. 3.—Arrangement and details of the transmission and fan shafts.

It will be seen from Fig. 1 that the engine is not rigidly attached to the brake, but that the power is transmitted through a short cardan shaft fitted with universal joints at both ends, and similar in design to those used in automobile practice, so that the slightest defect in the alignment of the engine shafting with the brake shafting will not introduce any inaccuracy in the measurement of the power, neither will there be any thrust or pull on the engine or brake shafts. The details of this shafting are clearly shown in Fig. 3. The exhaust gases from the engine are carried away by means of a flexible metallic tubing having a diameter of 4 ins., connected at one end to the engine exhaust pipe, and at the other to a pipe which passes through the wall to the outside of the building (see Fig. 4). The latter pipe terminates in an expansion chamber having a capacity of about 130 cubic feet, through which the gases have a perfectly free passage as there are no baffles to cause any restriction in the flow. Flap doors are, however, provided in order to quickly release the pressure generated in the event of an unexploded charge becoming fired within this chamber or in the piping communicating with it. A tachometer is driven from the extreme end of the brake rotor shaft by means of flexible shafting, and a revolution counter, for recording the exact number of revolutions made by the engine, is also fitted, as the tachometer merely indicates the revolutions per minute at any instant, and does not register the revolutions made during an interva of time, which is the important factor in determining power.

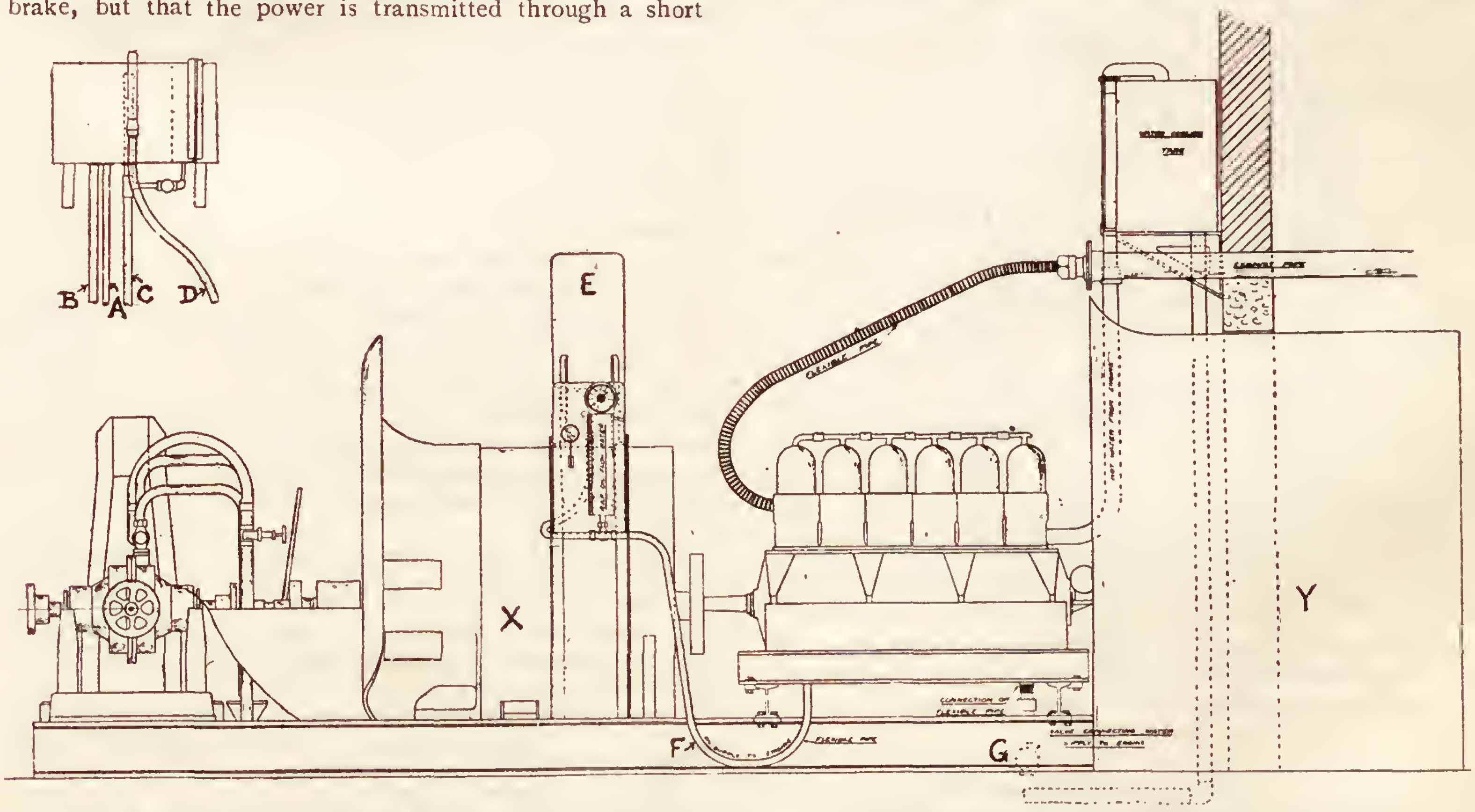
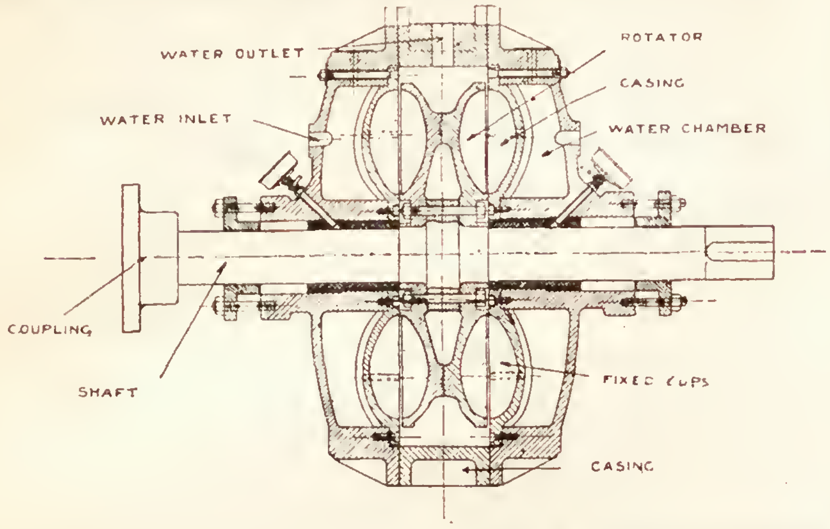

B
A
C
D
E
X
Y
F
G
WATER COOLING TANK
EXHAUST PIPE
FLEXIBLE PIPE
CONNECTION OF FLEXIBLE PIPE
VALVE CONNECTING WATER SUPPLY TO ENGINE

Fig. 4.—Arrangement of oil, water and exhaust piping. The air casings are also shown in position.

The dynamometers used are of the type which is manufactured by Messrs. Heenan and Froude, of Worcester, and in view of the fact that Osborne Reynolds, when carrying out his experiments in connection with the Mechanical Equivalent of Heat, employed a machine embodying the same principle, and a similar construction, there can be no doubt as to their accuracy. The power absorption portion of this machine is in two parts—the rotor, which is a cylindrical casting driven by the engine, and the casing. On the two side faces of the rotor and in the adjacent surfaces of the casing are semi-elliptical cups placed radially as shown in Fig. 5. Water is admitted to these cups *via* the centre of the casing, and, as the rotor rotates, is thrown outwards under centrifugal force. The disposition of the cups in the rotor is such that the outer edge of the semi-ellipse is directed forwards in the direction of rotation, while that of those in the casing face in the opposite direction; consequently, as the water moves outwards, it is projected into the casing cups, and passing inwards towards the centre becomes thrown into the inner edges of the rotor cups, whereupon the circulation is again repeated. The churning of the water in this manner, it will be seen, raises its temperature (thus absorbing the power) and tends to rotate the casing in the direction of motion, upon the ball bearings by which it is supported. This is resisted by a heavy weight suspended from the end of an arm which is attached to the exterior of the outer casing and moves between two fixed stops carried upon the base of the apparatus. A balance, supported upon a special framing, is also attached to the arm and is so arranged that when the engine is not running the balance supports the heavy weight. When power is being transmitted, however, the balance registers the difference between the effective force acting at a radius equal to the horizontal distance between the vertical centre line of the balance and the axis of rotation and the heavy weight. Hence, by subtracting the weight recorded on the balance from that of the heavy mass and multiplying by the horizontal radius at which the force acts, we obtain the torque of the engine direct. There is no necessity for any correction for efficiency, as any friction at the glands which are provided round the shaft at the centre of the casing for preventing leakage of water at that part, or between the sides of the rotor and the casing, is automatically added to the reading recorded on the balance.



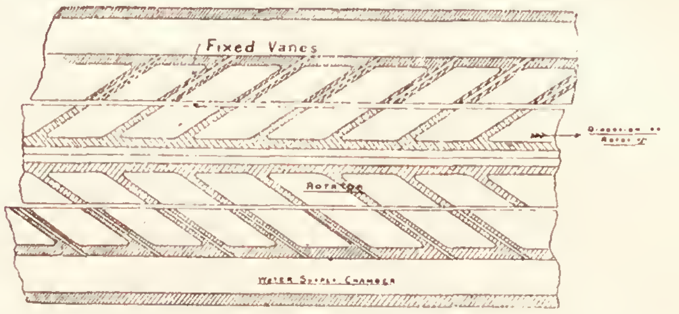


Fig. 5.—Heenan and Froude water dynamometer.

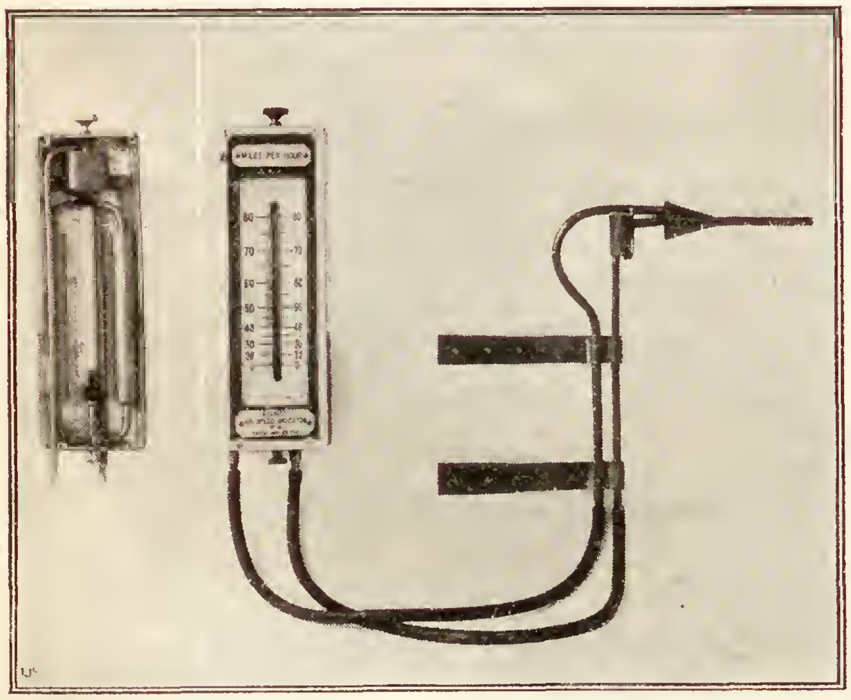


Fig. 6.—Air velocity meter for continuously indicating the draught in the air tunnel in which the engine is working. The internal construction of the velometer is shown on the extreme left.

To prevent an excessive rise of temperature of the water, a continuous supply is provided, which is controlled by vanes interposed between the rotor and the casing, by means of which also the amount of power absorbed is also regulated. These vanes are moved from without by the handwheel seen in Fig. 1, and increase or decrease the effective area of the semi-elliptical cups. The heated water is taken off at the periphery of the casing, as may be observed by reference to the diagrams. This form of brake enables great uniformity of engine speed to be readily obtainable, provided that the supply of water is kept constant, since, because the power absorbed varies as the cube of the speed of revolution, it is necessary that there should be fairly large increments of torque in order to produce small increases in the revolutions; and conversely, the power developed may fall off appreciably without causing an abnormal reduction of the engine speed. This constancy of water supply is assured by feeding the plant from a tank, which also supplies the water service in the test rooms when required, of 12,000 gallons capacity, which is placed in such a position that a head of about 35 ft. of water is maintained. Such an arrangement is far superior to a lead taken direct from the ordinary water mains, where the pressure may vary somewhat from time to time and so permit the engine to "hunt."

The cooling arrangements fall naturally under two headings—water and air. As regards the former, on one wall of the test room there is a water tank (see Fig. 4) which may be connected to the engine directly should it be desired to test a water-cooled engine without its radiators: but if the engine is to be run on its radiator alone, an air velocity of about 60 miles an hour is provided over the engine and the radiator, the draught being created by a special fan. The pipe connections to the water tank in the room are five in number. The cold water supply from the main service is delivered through the pipe A to the tank, from whence it is led by the lead B to the cooling system of the engine: the hot water return being *via* pipe D—of flexible tubing—which discharges to an overhead swivelling pipe. By this means any desired temperature limits may be obtained, as by increasing the cold water supply the temperature in the water can be decreased, the surplus water overflowing to waste by the pipe C, and by controlling the valve G, the water outlet temperature may be lowered or raised. The tank is divided into two compartments—to one of which the aforementioned connections are made, whilst to the other (which is calibrated) a bye-pass is fitted that allows of the emptying of the tank through the waste pipe C. The second compartment is provided for measuring the water supply to the engine, as the discharge from the swivelling pipe D may be permitted to pass into it for a known time, and from this, knowing the inlet and outlet temperatures to the engine, the heat lost, as well as the quantity of cooling water, may be calculated.

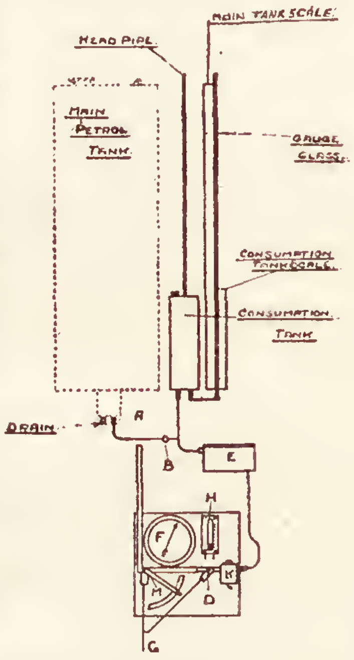


Fig. 7.—Arrangement of the petrol piping.

The air cooling arrangements are of an especially interesting character. It will be seen on reference to Fig. 3 that the transmission shaft is enclosed for a portion of its length by a tubular casing, which runs upon two ball bearings, and upon which a four-bladed fan propeller and a pulley, for driving the same from a 50 h.p. electric motor, are mounted. This tubular shaft is, however, entirely free from the internal power transmission or dynamometer shaft and runs in the same direction, a ball thrust being provided at the dynamometer end of the shaft to take the fan thrust, and a ball-bearing, mounted in a floating housing upon another ball-bearing, is fitted at the engine end. To measure the power that is absorbed at this part of the transmission, a special arm and spring balance, which limit the movement of the housing, has been attached to the floating housing; but it is not likely that this under any circumstances will amount to any appreciable quantity, and will most probably be entirely negligible, having regard to the power transmitted from the engine.

The fan is enclosed by the steel air channel, X, shown in Fig. 4, the intake end of which has been flared, so as to facilitate the flow of air, and to obtain greater uniformity of air velocity over the section in which the engine is placed; consequently, the air is discharged directly over the engine, which is located close up to the outlet end of the channel. A second casing, Y, is fitted to the rear of the engine, which it is possible to move inwards or outwards on rails so as to bring it further over or more remote from the engine, as may be desired. This casing is provided at its outer end with doors. The division of the air casing into two parts in this manner has for its object the better examination and inspection of the engine whilst under test, and renders it possible to make any adjustments during the time that the engine is running under conditions similar to those which obtain in practice, as it has been found that practically no discomfort is experienced when standing in such a position as would be taken up by an attendant.

The air velocity is measured by means of an R.A.F. Velometer, manufactured by Elliott Bros., and is similar to those which are used on aeroplanes for determining the air speed of machines. This is composed of a U-tube of special construction—as may be observed by an inspection of Fig. 6—the two side tubes being connected to a pipe directed against the air current, and which therefore registers the static pressure plus the pressure due to the air velocity, whilst the central tube is arranged as shown, and records the static pressure alone. The resultant reading is, therefore, the pressure due to the air velocity, and the instrument has been calibrated to give the speed of the air in miles per hour from 0 up to 80, so that a continuous record of the velocity of the air over the engine is obtained. The speed of revolution of the fan can be adjusted so as to give any desired air speed over the cylinders up to the maximum required, and the specified velocity of from 55 to 60 miles per hour will be measured at a point about 6 ins. in advance of the nearest cylinder of the engine.

A piece of apparatus has been specially devised at the Royal Aircraft Factory for the purpose of determining the quantity of lubricating oil used by the engine. The oil tank, E, is mounted upon the casing, X, shown in Fig. 4, and the oil may be taken either through the flowmeter, or direct to the engine through the flexible pipe, F, by means of a three-way cock. The oil flows from the main tank to an auxiliary tank provided with a float level indicating device in which a float controls the movement of a pointer over a graduated dial by means of a cord, which is attached to the float and passes round a pulley mounted upon the pivot of the pointer. The dial of the apparatus is graduated so as to read in pints and tenths of a pint of oil; and it will be clear that when oil is being fed to the engine at a uniform rate, the pointer will rotate at a uniform speed, so that if an observer notes the time taken for a certain quantity of oil to flow to the engine, the consumption can be readily calculated therefrom. It should be noted that the apparatus is so constructed that when the auxiliary tank is filled with oil, all communication with the main tank ceases and the engine is run on the auxiliary tank alone. The arrangement employed can be seen on reference to Fig. 4, the small stop watch for timing the flow of oil being seen in the diagram.

Fig. 7 shows the arrangement of the petrol system. The main petrol tank, which has a capacity of over 100 gallons, is placed on the outside of the building. The lead to the engine is taken from A, which is a shut off cock, to the cock B, inside the test room, where it branches off in two directions—to the fuel consumption tank and to the float feed chamber E. From E, which is utilised in order to obtain a constant head of fuel, the petrol passes through a filter K and a constricted tube by a flexible pipe to the engine at G—the flow being controlled, if desired, by a cock fitted with a fine adjustment, the handle of which moves over a graduated scale, as shown at M. If it is not necessary to measure the flow of fuel, a cock is provided at D whereby the petrol may be bye-passed directly to the lead to the engine. The constricted tube mentioned above consists of two special conical tubes placed with their smaller ends together. The increased velocity of the fuel in passing through a passage having a diminished sectional area, results in a reduction of the static pressure at that section—consequently, at varying sections there are varying differences of pressure. To record the differences of pressure existing at the smallest and the largest section of the tube, a pressure gauge, F, of special design, in which a metal diaphragm is embodied, is employed—the movements of the diaphragm being communicated by a light gearing, similar to that used in aneroid barometers, to a pointer, which moves over a graduated dial. The instrument marked H in the illustration is the Velometer, which is placed in this position simply for convenience in observation.

Having described the principal features of this equipment, we would refer to the means provided for starting up the engines under test. On reference to Fig. 3 it will be seen that on the extreme left of the figure, a clutch mechanism is shown, in which the female portion of the clutch is keyed to the external fan shaft, and the inner, male portion, to the dynamometer shaft. When it is required to start an engine, the electric motor is switched on, and the clutch let in gradually by hand; but so soon as the engine commences to run under its own power, the transmission shaft is declutched, and the clutch locked in the "out" position, for which purpose suitable provision has been made.

As regards the tilting test beds, these are equipped in a somewhat similar fashion, and it should be noted that the inclination of the engine does not in any way interfere with the air cooling arrangements, because the air channel and fan are mounted, with the engine and dynamometer, upon the tilting bed.

THE ENGINES.

There is but little doubt that much interest will be centred, during the next few weeks, in the Engine Competition which is to be held at the Royal Aircraft Factory commencing on Saturday next. This interest will not be confined to those who have a stake in the competition, but will be shared by all concerned with aeronautics all over the world; and we anticipate that the results of the tests will provide a fund of information that should prove of inestimable service to all designers of petrol motors.

The Judges Committee is constituted by the following officers:—Brigadier-General D. Henderson, C.B.; Captain M. F. Sueter, C.B., R.N.; Major J. D. B. Fulton, C.B., R.A.; Engineer Lieutenant E. F. Briggs, R.N.; Dr. T. E. Stanton, M.I.C.E., National Physical Laboratory; *Secretary*, Captain J. T. Dreyer, R.A.; and Lieutenant A. J. Miley, R.N.

While Engineer Lieutenant W. Briggs, R.N.; Lieutenant R. O. Abercromby, R.F.C.; Captain Bagnall-Wild; Engineer Lieutenant Cave-Brown-Cave, R.N.; Lieutenant C. L. Courtney, R.N.; Lieutenant T. C. Hetherington, R.F.C.; M. O'Gorman, Esq., C.B.; and Lieutenant J. L. Travers, R.N.R., form the Committee of Management.

The conditions governing the competition, which also indicated what were considered to be desirable attributes in an aeroplane engine, were published in Flight for June 14th last; but it will be well to state that the principal requirements were as follows:—the power should range between 90 and 200, the number of cylinders should be not less than four and the gross weight per horse power calculated for a six hours' run should not exceed 11 lbs., while all engines must be of British manufacture throughout. It is a matter for congratulation that almost every firm at present engaged in the construction of aeronautical engines in this country whose productions have seen service on aircraft, will be represented, and that several others who are newcomers to this branch of engine manufacture will also take part. It is also interesting to observe that 8 out of a total of 22 engines have been entered by manufacturers engaged in automobile work. There are, however, several other firms in this country who are engaged upon the development of the aeronautical engine, and it is to be regretted that from various causes they have not been able to compete on this occasion.

The accompanying table gives particulars of the engines that will participate in the competition, from which it will be seen that the various types of engines, when classified according to the arrangement of the cylinders, are fairly equally represented, the respective numbers being 5 rotary, 6 radial, 5 vertical, and 6 vee. The number of different makes of vee and radial engines manufactured is, however, likely to increase in the future, as the tendency at the present time is to increase the engine power, and in order to do this there are three alternatives—(*a*) to increase the bore and stroke, (*b*) to raise the speed of revolution and gear down the propeller, or (*c*) to increase the number of cylinders. The first method might be resorted to in some cases where, on account of the large number of cylinders, the bore and stroke is not large, but it is doubtful if it could be adopted with success with most vertical engines, as engine starting by hand becomes more difficult, and the vibration set up becomes excessive owing to the heavier explosion and inertia forces brought into play. The procedure indicated at (*b*) is already followed in existing engines with great success, but where this is the case, the engines are already of the vee type, probably owing to the better balance obtained when the two sets of cylinders have 90° between them and the more uniform torque with eight cylinders, but the object in view has largely been, to obtain a higher power/weight ratio. The problem involved, however, is not a simple one and is much more than is indicated by mere increase in speed. Lastly, the third alternative mentioned has the great advantage that the torque variation is reduced, and in carrying it into effect, either the vee or the radial type may be chosen, both of which bring with them a lower weight per h.p. and occupy the minimum of space, while for either the two or the four stroke cycle they utilise the material to a greater extent—the advantage in this respect being with the radial type of engine. To increase the number of cylinders and retain the vertical arrangement would appear to have such disadvantages, notably in regard to the length of space occupied, and the possibility of the presence of torsional oscillation in the crankshaft, as to prohibit this method from being adopted in order to increase the power. Hence we see that the powerful engine of the future—say, all engines above 150 h.p.—will in all probability have the cylinders arranged exclusively in either the vee or the radial fashion. As regards the water-cooled and the fixed types of engine, it is not surprising to find that most engines entered are of these types, 14 being water-cooled and 8 air-cooled, while 17 have fixed and 5 have rotating cylinders. Steel is the most extensively employed material for the cylinders, as only in three makes of engine—the Anzani, the Beardmore Austro-Daimler and the Sunbeam—is cast-iron employed. This, to some extent, is the reason why overhead valves have been so largely fitted, although this arrangement also reduces the weight of the engine, and gives a better shape of combustion chamber. Some form of pump lubrication is universally employed, and on practically all engines means are provided for facilitating the starting of the engine, such as is afforded by an electrical easy-starting device or a compressed-air self-starter, while many of the engines have two-point ignition.

NAVAL AND MILITARY AEROPLANE ENGINE COMPETITION.—PARTICULARS OF ENGINES.

No.	Maker.	B.H.P.	Revs. per min.	Cylinders.						Stroke/Bore ratio.	Piston displacement per min. per B.H.P.	Piston speed.	Weight.		Fuel consumption (approx.).	Lubrication.	Ignition.	Car-burettor.	Main bearings.	Valves.			
				No.	Bore.	Stroke.	Arrangement.	Material.	Jacket.				Complete with all accessories ex radiator.	Per B.H.P.						Position.		How operated.	
																				Inlet.	Exhaust.	Inlet.	Exhaust.
	Air-cooled.				mm.	mm.					litres	ft. per min.	lbs.	lbs.	pints.								
1	Anzani ...	125	1250	10	115	155	Rad.	C.I.	—	1·35	342	1270	464	3·77	0·7	P.	Bosch	Zenith	Ball	Head	Head	A	R. & P.R.
2	British rotary	100	1100	10	124	140	Rot.	St.	—	1·13	373	1010	—	—	—	—	—	—	—	—	—	—	—
3	Gnome (2) ...	105	1200	9	110	150	Rot.	St.	—	1·36	293	1180	275	2·62	0·73	P.	Bosch	Special	Ball	Walls	Head	Piston	R. & P.R.
4	Hart ...	150	1600	9	5″	6″	Rot.	St.	—	1·20	370	1600	—	—	—	P.	—	—	Ball	Head	Head	Auto	R. & P.R.
5	Hardy and Padmore	100	—	5	4″	4″	Rad.	—	—	1·0	—	—	—	—	—	—	—	—	—	—	—	—	—
6	Isaacson ...	100	1200	9	120	150	Rot.	St.	—	1·25	366	1180	250	2·50	—	P.	Bosch	Zenith	Ball	Piston	Head	Mech.	R. & P.R.
7	,, ...	200	1200	18	120	150	Rot.	St.	—	1·25	366	1180	465	2·32	—	P.	Bosch	Zenith	Ball	Piston	Head	Mech.	R. & P.R.
8	Wolseley (semi)	90	1800‡	8	4″	5½″	Vee	St.	—	1·37	361	1650	385	4·28	0·7	D.P.	Bosch	Claudel	W.M.	Head	Head	R. & P.R.	R. & P.R.
	Water-cooled.																						
9	Argylls (2) ...	130	1300	6	125	175	Vert.	St.	St. W.	1·40	258	1490	600†	4·61	0·55	F.&T.	Bosch	Zenith	W.M.	Sleeve valve			
10	Beardmore	90	1300	6	120	140	Vert.	C.I.	C.E.	1·17	273	1280	375	4·17	0·6	F.&T.	Bosch	A.D.	W.M.	Head	Head	R. & P.R.	R. & P.R.
11	Aus.-Daim.	120	1200	6	130	175	Vert.	C.I.	C.E.	1·35	279	1370	500	4·17	0·6	F.&T.	Bosch	A.D.	W.M.	Head	Head	R. & P.R.	R. & P.R.
12	Centrum* ...	150	900	6	150	140	Rad.	—	—	0·94	178	830	—	—	—	—	—	—	—	—	—	—	—
13	Dudbridge	95	1250	7	120	140	Rad.	St.	C.B.	1·17	292	1150	375	3·95	0·6	P.	Bosch	Zenith	Ball	Head	Head	R. & P.R.	R. & P.R.
14	Ironworks	130	1250	9	120	140	Rad.	St.	C.B.	1·17	274	1150	465	3·57	0·6	P.	Bosch	Zenith	Ball	Head	Head	R. & P.R.	R. & P.R.
15	,,	200	1250	14	120	140	Rad.	St.	C.B.	1·17	277	1150	660	3·30	0·6	P.	Bosch	Zenith	Ball	Head	Head	R. & P.R.	R. & P.R.
16	E.N.V. ...	100	1620§	8	95	165	Vee	St.	C.E.	1·74	304	1750	450†	4·50	0·6	P.	Bosch	Smith or Zenith	Ball	Head	Head	Direct	Direct
17	Green ...	120	1250	6	140	152	Vert.	St.	C.R.	1·08	294	1250	440	3·67	0·56	F.F.	Bosch	Zenith	W.M.	Head	Head	O.R.	O.R.
18	Sunbeam (2)	135	2000‡	8	90	150	Vee	C.I.	C.E.	1·66	227	1970	480	3·56	0·6	P.	Bosch	Claudel	W.M.	Side	Side	R.	R.
19	White&Poppe	130	1200	8	120	160	Vee	—	—	1·33	268	—	—	—	—	—	—	—	—	—	—	—	—
20	Wolseley ..	90	1800‡	8	3¾″	5½″	Vee	St.	C.S.	1·46	318	1650	405	4·50	0·65	D.P.	Bosch	Claudel	W.M.	Head	Head	R. & P.R.	R. & P.R.
21	,, ...	130	1200	8	5″	7″	Vee	St.	C.S.	1·40	332	1400	720	5·54	0·63	D.P.	Bosch	Wolseley	W.M.	Head	Head	R. & P.R.	R. & P.R.
22	Wessex ...	130	2200	6	105	150	Vert.	—	—	1·43	264	2160	—	—	—	—	—	—	—	—	—	—	—

* Two-stroke. † With radiator. ‡ Propeller driven at ½ engine speed. § Propeller driven at 900 revs.
Rad. = Radial. Rot. = Rotary. Vert. = Vertical. St.W. = Steel welded. C.B. = Copper brazed joints.
C.E. = Copper electrolytically deposited. C.S. = Copper screwed joint. C.R. = Copper with rubber joints.
F. & T. = Forced to shaft bearings and trough elsewhere. P. = Pump. D.P. = Double pump. F.F. = Fully forced.
W.M. = White metal. R. & P.R. = Rockers and push rods. R. = Rockers. O.R. = Overhead camshaft and rockers.

The engines enumerated in our table differ slightly from the list of engines notified officially as actually delivered at the R.A.F. For example, a 200 h.p. Isaacson water-cooled and a 90 and a 120 h.p. air-cooled engine are stated to have been delivered, whereas the Isaacson Radial Engine Co. have informed us that they only intended submitting for test 95–100 and 190–200 rotary air-cooled engines as specified in the above table.

The horsepower quoted for the various engines are those which can be developed for prolonged periods and all can carry an overload, sometimes amounting to as much as 15 per cent. for shorter periods.

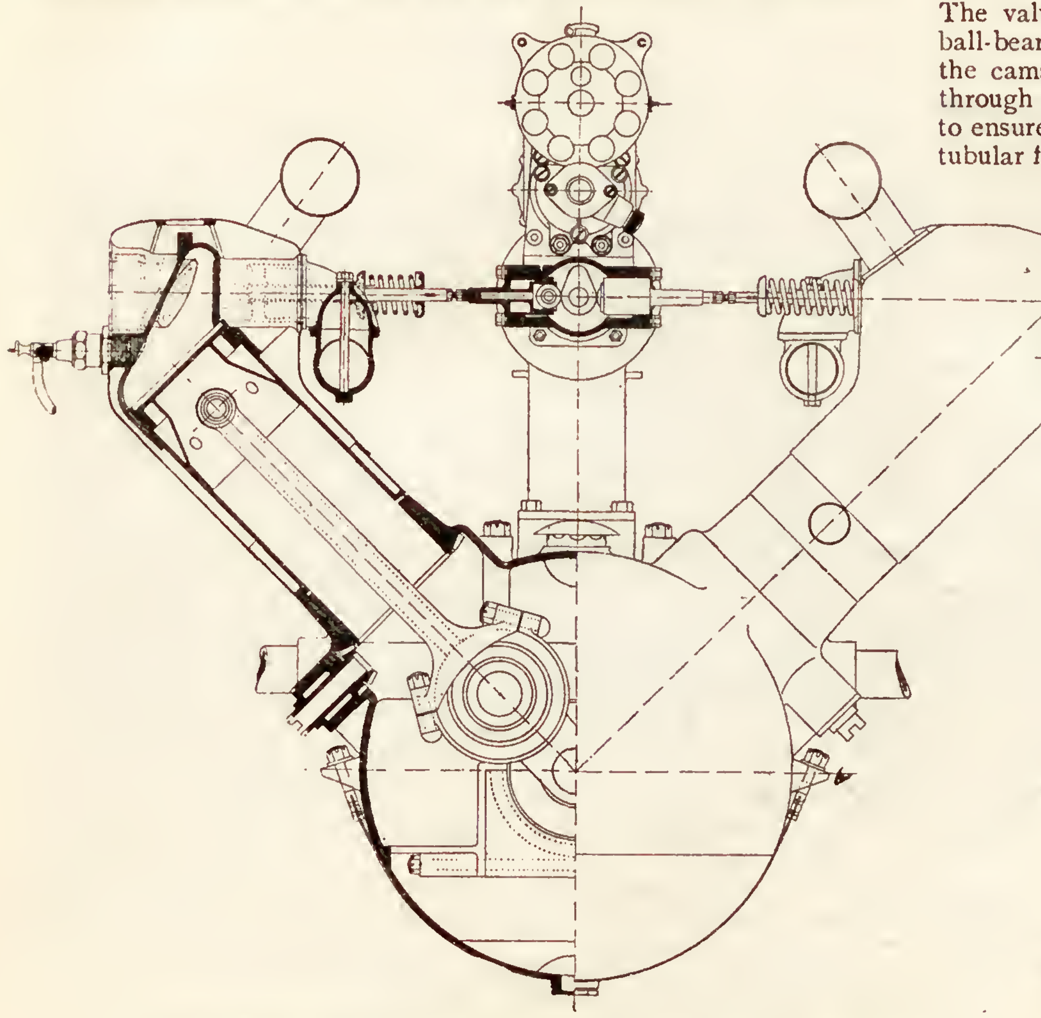
The majority of these engines have been fully described and illustrated quite recently in FLIGHT, and hence they are sufficiently familiar to our readers as to render it unnecessary to do more than refer to the dates upon which full particulars respecting them have appeared, viz. :—

Maker.	Dates.
Anzani	5th July, 1913, 24th Jan., 1914
Argyll	14th and 21st Mar., 1914
Beardmore Austro-Daimler	24th Jan., 14th and 21st Mar., 1914
Dudbridge Ironworks ...	21st Feb., 28th Mar., 1914
Gnome	14th Feb., 14th and 28th Mar., 1914
Green	14th and 21st Mar., 1914
Isaacson	21st and 28th Mar., 1914
Sunbeam	14th and 28th Mar., 1914
Wolseley	14th and 28th Mar., 1914

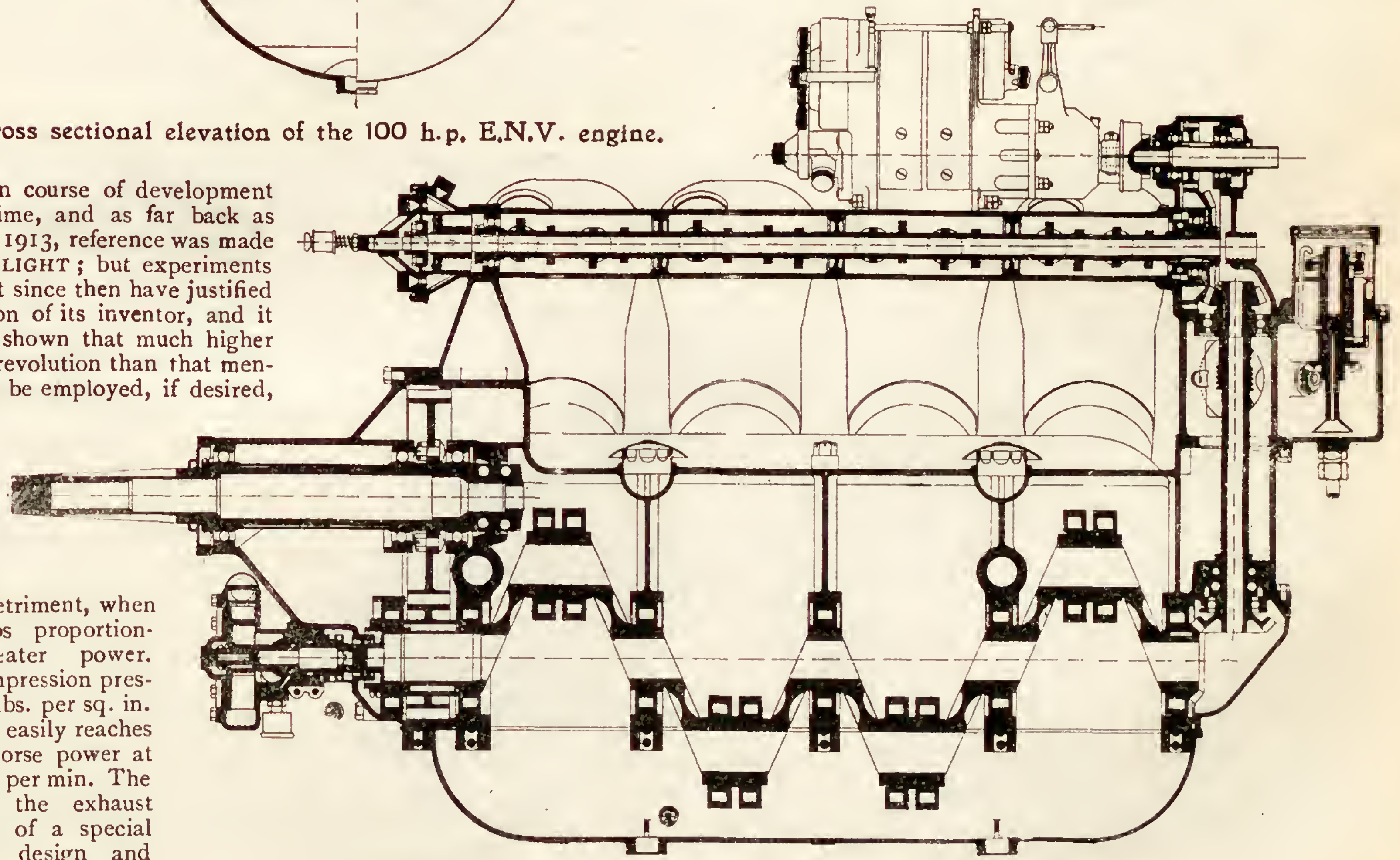
As regards the other engines :—

The engine entered by the **Hart Engine Co.**, of Leeds, is a

British design of the double-motion rotary type, in which the cylinders and crank-shaft rotate in opposite directions and at the same speed of revolution—hence, although the relative speed of the cylinders to the crank-shaft is 1,600 revs. per min. as stated in the Table, the actual speed is only 800 revs. per min. This motor has been in course of development for some time, and as far back as February, 1913, reference was made to it in Flight; but experiments carried out since then have justified the opinion of its inventor, and it has been shown that much higher speeds of revolution than that mentioned can be employed, if desired, without detriment, when it develops proportionately greater power. With a compression pressure of 75 lbs. per sq. in. the engine easily reaches its rated horse power at 1,600 revs. per min. The inlet and the exhaust valves are of a special concentric design and afford very large areas for the passage of the gases. We hope to deal with this engine fully in the near future.



Cross sectional elevation of the 100 h.p. E.N.V. engine.



Longitudinal sectional elevation of the 100 h.p. E.N.V. engine.

The **E.N.V. Motor** is by no means new to the aeronautical world, for as far back as 1908–09 Mr. Moore-Brabazon had one fitted upon his machine, but the E.N.V. Motor Co., of Willesden, N.W., has now formed to design and manufacture an entirely new engine which embodies many features of special interest.

The cylinders are still arranged "en V" and provided with electrolytically-deposited copper jackets, but the cylinder construction is much changed, as may be seen on an examination of the accompanying illustrations. The cylinders are held in place on an aluminium crank-case by a screwed collar that forms a part of a bevel wheel with which a small pinion engages. This pinion is mounted on a bush supported in the wall of the crankcase, which can be rotated by means of a key from the outside, so that the cylinders may be readily assembled on or dismantled from the engine with the minimum of disturbance of other parts. The valves are operated directly from a camshaft which runs on ball-bearings, placed midway between the heads of the cylinders; the camshaft being driven from the crankshaft by bevel gearing through a vertical driving shaft. Cast-iron pistons of special design to ensure lightness are fitted and the connecting-rods, which are of tubular form, run upon roller bearings on a nickel chrome crankshaft—the bearings being held in position by a strap that encircles about two-thirds of the circumference of the shaft. Particular attention is drawn to the method of supporting the crankshaft, which weighs 14 lbs., in the main bearings, which are of the ball type. This construction is adopted for the purpose of obtaining great rigidity, and it will be seen that the bearing caps are held between the "horns" by transverse bolts, while double U-bolts, which pass through columns formed integral with the crankcase to the upper surface, secure the bearing caps in position against the ball-race. The special inclined crankwebs should also be noted, as these greatly facilitate the assembling of the ball and roller bearings upon the shaft.

The propeller, as in many engines nowadays, is not directly coupled to the crankshaft, but a special shaft, of ample length to resist lateral flexure and distortion, is provided suitably mounted on ball bearings, and fitted with double-thrust bearings that can take either a thrust or a pull, the ratio of the gear-reduction being 1·8 to 1. Thus, with an engine speed of 1,620 revs. per min., the propeller rotates at 900 revs. per min. The bottom half of the crank-chamber is an aluminium casting, and is attached to the upper half by straps that are secured by eye-bolts and nuts to lugs formed thereon; whilst the engine is supported on two steel tubes that pass right through bosses cast integral with the crank-case. The water-circulating pump is of the centrifugal type, and is driven directly from the same end of the crankshaft as that at which the radiator, which is a fixed unit with the engine, is mounted.

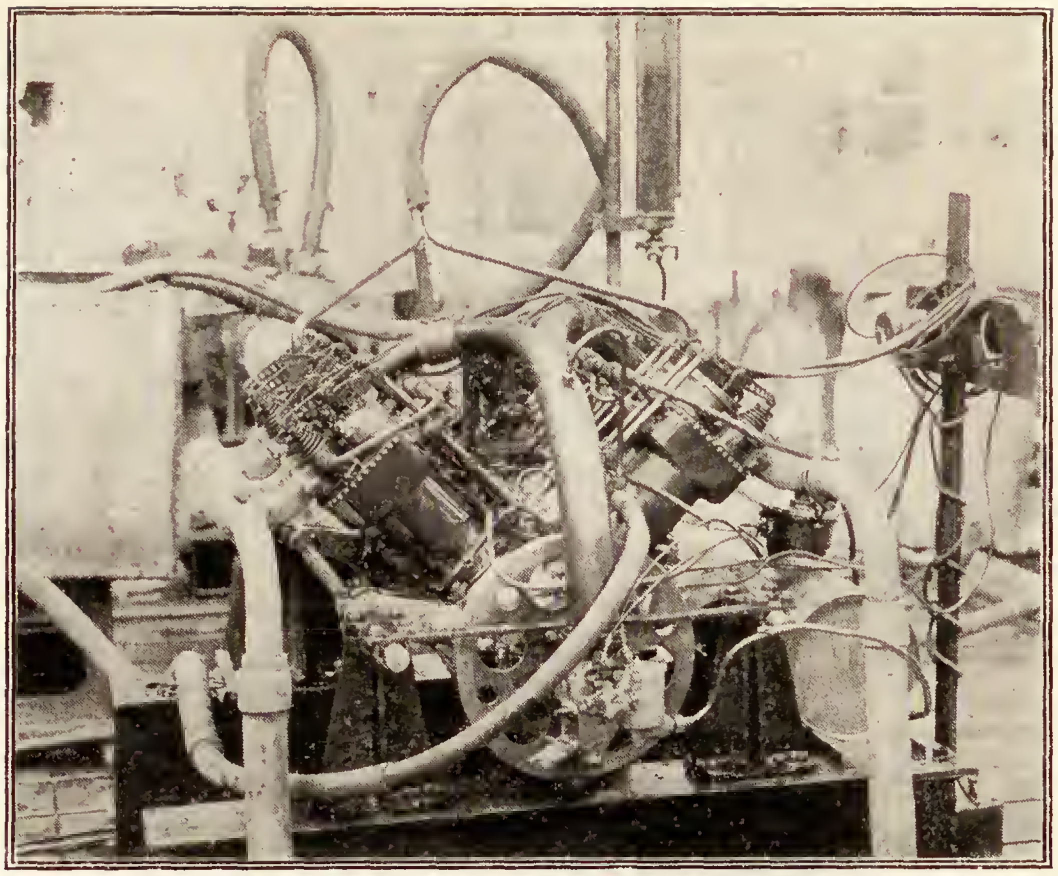
The multiple plunger oil-pump is seen in the box to the extreme right of the longitudinal sectional elevation, and is driven by worm and bevel gearing from the vertical driving shaft. A Bosch H.L.

8 high-tension magneto is fitted as well as the fitting for a compressed air self-starter, for which the distributing valve is to be seen on the extreme end of the camshaft.

The engine forms an extremely compact, complete and accessible power unit, and leaves little to be desired from the points of view of rigidity and workmanship, and should give a good account of itself in the competition.

The **Wolseley 90 h.p. engine** is similar in general design to the 75 h.p. air-cooled engine which was dealt with in FLIGHT for March 28th last, excepting tha water-cooling has been substituted for the air-cooling. Hence it will be unnecessary to give any further particulars on this occasion.

The **10-cylinder 125 h.p. Anzani**, it should be noted, is the first of the British-built models, and has been manufactured by the Coventry Ordnance Works, Ltd. On the occasion of a visit recently to these works, M. Anzani expressed himself as well satisfied with its up-to-date equipment and with the excellence of the workmanship displayed in the Military Trials engine. It is identical in its general design with those engines built in France, and in its preliminary tests has performed very satisfactorily. So much so, in fact, that we understand that in a non-stop run of 11 hours the engine ran at a greater number of revolutions and developed more power than any of the French engines of similar size.


The 90 h.p. 8-cyl. water-cooled Wolseley aero engine.

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THE ROYAL FLYING CORPS.

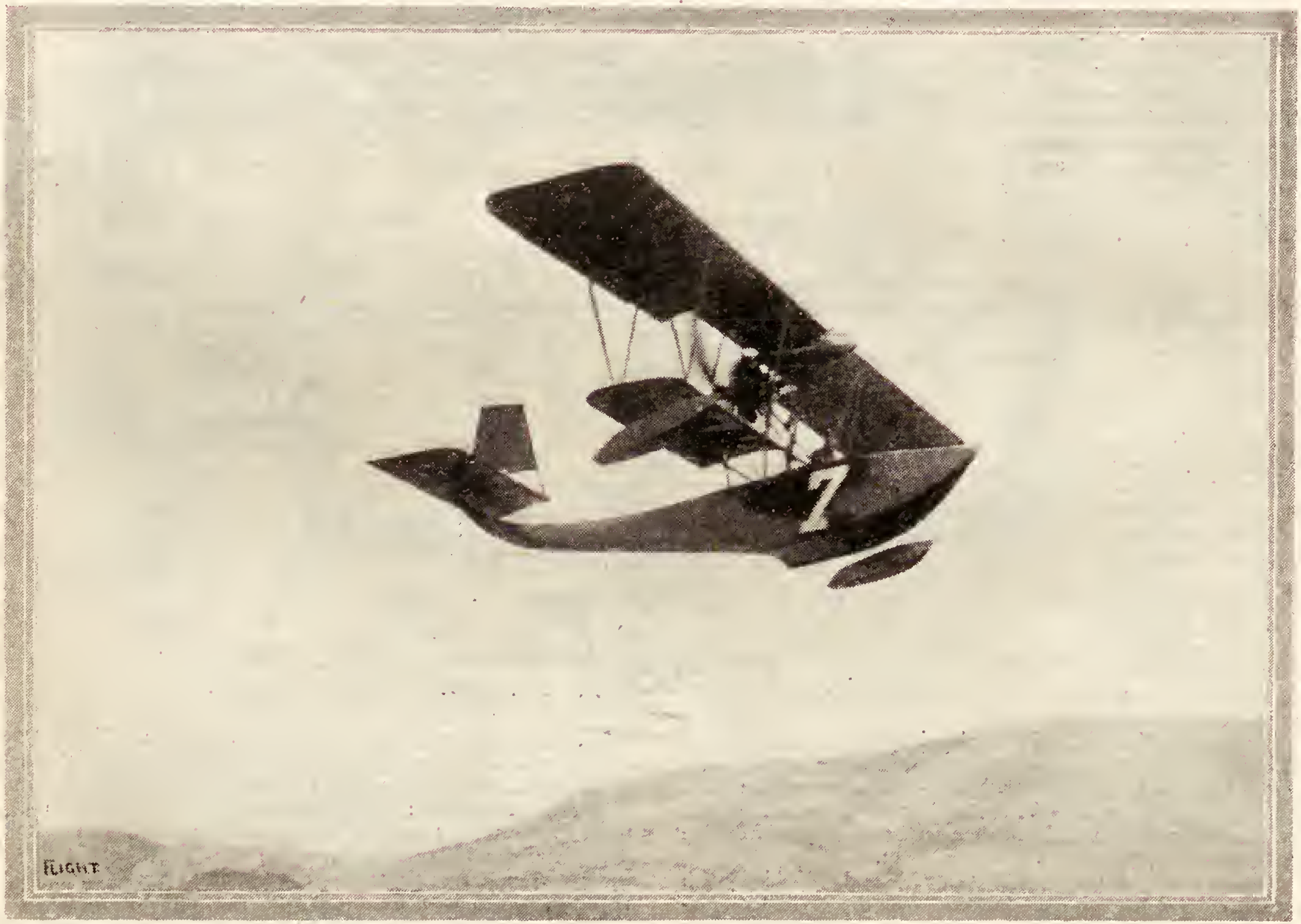
THE following announcement appeared in the *London Gazette* of the 17th inst. :—

R.F.C.—Military Wing.—*Supplementary to regular corps.* Second Lieut. (on probation) Norman C. Spratt is confirmed in his rank.

The following announcements appeared in the *London Gazette* of the 21st inst. :—

R.F.C.—Military Wing.—The date of appointment of Second Lieut. Geoffrey de Havilland to the Reserve is antedated to November 24th, 1912.

Second Lieut. Norman C. Spratt, Special Reserve, is appointed to the Reserve. Dated March 25th, 1914.



The Franco-British seaplane, piloted by Burri, the only other machine besides the winning Sopwith seaplane to finish the course for the Schneider Cup at Monaco.

Foreign Aircraft News.

Long Flights in France.

Rost on his Deperdussin-Gnome, and Poulet on a Caudron-Rhone on the 15th inst. set out to try and beat the duration record of 16 hrs. 20 mins. made by Ingold. They flew over a course between Etampes and Arthenay, but both pilots were much troubled by the wind and Rost gave up after covering 400 kiloms. in 4 hrs. 0 mins. 44 secs., while Poulet had to come down after a flight of six hours' duration. Another attempt was made by Poulet on Sunday last, but again he had to give up after being in the air for six hours.

A photograph taken from 1,500 ft. by Capt. Penfold, the Australian aeronaut-aviator, during a voyage in the air across Sydney city. At the top of the picture is Queen Victoria Market, and the streets are, running from bottom to top, (left) Park Street and (right) Market Street. Across the picture are George Street, Pitt Street and Castlereagh Street.

Buc to Vichy on a Blériot.

On his Blériot monoplane, which is fitted with an 80 h.p. Rhone motor, Baron Pasquier on the 17th inst. flew from Buc to Vichy, with a stop on the way at Nevers.

On Sunday Baron Pasquier flew back to Buc.

Three Hours' Flight on a Nieuport.

On a Nieuport machine, the Italian Capt. Piccio, on the 7th inst., flew from Busto to Padova, a distance of 280 kiloms. in three hours, while on the following day he made the return journey *via* Piacenza, a distance of 340 kiloms. On the 9th, Lieut. Tacchini, also on a Nieuport, flew from Busto to Bologna and back, taking six hours for the trip of 470 kiloms., including a stop of half an hour at Bologna. Lieut. Waldimico also flew from Busto to Turin and back, a round trip of 250 kiloms.

Touring by Aeroplane.

On the 14th inst. the Marquis de Larienty-Tholozan started from Buc on his De Dion-engined M. Farman, and with a passenger flew to Mans in two hours. Later he went on to Laval and Blain, and eventually returned to Buc. On the same day Maurice Farman took his brother Dick from Buc to Etampes and they then made a long flight along the Loire valley, stopping for lunch at Chambord. They subsequently returned to Buc *via* Chateaudun, Tillieres and Dreux after a trip which totalled to more than 400 kiloms.

The Collision at Buc.

The smash at Buc on Sunday afternoon was one of the most terrible in the annals of aviation. Since the first demonstration of looping the loop by Pegoud the Blériot aerodrome at Buc has become increasingly popular as a Sunday afternoon rendezvous for Parisians, and latterly, to add to the interest, races have been arranged. During such a race on Sunday afternoon Deroye and Bidot were having a keen tussle for the lead, and at one of the turns Bidot attempted to pass above Deroye. The chassis of his machine touched the tail of Deroye's monoplane, and both were immediately thrown out of control and crashed to the ground. Deroye and his passenger, M. Albin, were killed in the fall, while Bidot and his passenger, M. Pelado, were terribly injured. The wrecks of both machines burst into flames, and while in the case of Bidot's machine the fire was quickly put out, that of Deroye was reduced to a heap of cinders, while the bodies of the unfortunate pilot and passenger were also considerably burned.

Night Flights on a Savary.

On a Savary biplane fitted with a 100 h.p. Anzani engine, Frantz, on the 14th inst., with two passengers, flew from 11 p.m. to midnight, passing several times over the town of Chartres.

Aeroplanes on New French Stamps.

It is announced from Paris that it has been decided that there is to be a new design for the French postage stamps. It is understood that the chief features of it will be a view of the Eiffel Tower with an aeroplane flying past.

Gibert Joins the Loopers.

On the 14th inst., Gibert, on a small monoplane of his own design, succeeded in looping the loop three times, and also made two short straight flights upside down.

805-Mile Flight in Germany.

Starting from Konigsberg at 5.10 a.m. on Monday morning, Lieut. Geyer, accompanied by Lieut. Mikulski flew to the Johannisthal aerodrome, and after a short stop went on to Mulhausen. From there they flew to Strasburg, arriving at 8.5 p.m., so that the total distance flown during the day was 805 miles, and the average flying speed worked out to 72 miles an hour.

To Tax Aviators in Germany.

It is stated that the German Foreign Minister is at present considering a proposal to impose a tax of probably 100 marks on all aviators visiting Germany, irrespective of whether they arrive on an aeroplane or by any other means.

Another snap taken by Capt. Penfold above Sydney from the same position and at the same time, but with another camera, as the other photograph. Note Sydney Railway Station in the centre of this picture.

Flying in German Colonies.

A flying ground which will be utilised chiefly for military purposes has been formed at Karibib in German South West Africa. Tests will shortly be made by the Government with a view to demonstrating the possibility of using aeroplanes for the transport of medical men and mails in the Colony.

Ehrmann Killed while Looping.

APPARENTLY over-confidence was the cause of the fatal accident to the Algerian aviator Ehrmann while flying at the Allelik aerodrome at Bone, Algeria, on Saturday. He had looped the loop at a height of 1,000 metres and had flown upside down at a height of 300 metres in front of the Grand Stand. Then another loop was attempted, but the pilot failed to allow sufficient distance from the ground. The machine fell, and in the smash the pilot was terribly injured and died immediately.

A Race in China.

OVER a 130 kilom. course from Pekin to Pao-Ting-Fou four Chinese aviators on Caudron machines took part in a race on the 13th inst. Although the name of the winner is not given it is stated that he completed the course in 50 min.

Good Work by the "Eugene Montgolfier."

WITH ten persons on board, the Clement-Bayard dirigible, "Eugene Montgolfier," on the 14th inst., cruised from her station at Maubeuge to Paris in three and a half hours, a landing being effected at Issy. On Monday morning a two-hour trip was made with ten persons on board, while another long voyage with eleven on board was made late in the afternoon.

A New Zeppelin on Trial.

ON the 16th inst. the new Zeppelin "LZ 23" cruised from Friedrichshafen to Badenhof, and was then taken over by the German military authorities. In future she will be designated "Z 8," and will be stationed provisionally at Dusseldorf. On Monday, the dirigible went from Leipzig to Oos, a voyage of 400 kiloms.

BRITISH NOTES OF THE WEEK.

A "Wight" Seaplane for the Navy.

IT is gratifying to record the splendid progress which is being made by British manufacturers such as Messrs. J. Samuel White and Co., Ltd., whose aviation department is under the charge of Mr. Howard T. Wright, in the construction of machines capable of fulfilling the arduous requirements of the Navy. On several occasions recently we have referred to the remarkable performances of the Wight seaplanes built by this firm, and on Wednesday of last week, a sister ship to the "Wight" which was so much admired at Olympia, went through her official tests in fine style. Fully loaded with fuel for four hours' flight, wireless telegraphy apparatus, and pilot and passenger, she climbed 3,000 ft. in 7½ minutes. Her speed according to the indicator was 75 miles an hour, and she leaves the water in from 5 to 7 seconds from opening out the motor. The final hour's flight was carried out without incident.

Parseval Airship Visits Dover.

DOVER had a sight of the Naval Parseval airship on Tuesday. It had cruised over from Farnborough, and returned *via* Maidstone and Chatham, having covered nearly 200 miles in seven hours.

Sydney Pickles Flying Again.

IT will be seen from our Eastchurch notes on p. 437, that Mr. Sydney Pickles has again commenced active flying with his 60 h.p. Anzani-engined Blériot-type monoplane. On Wednesday he started from Eastchurch intending to fly to Hendon, but after covering 35 miles he ran into a thunderstorm and turned back. He covered the 70 miles in as many minutes, while the greatest height attained was 3,000 ft. Although he does not intend to re-enter the ranks of professional airmen, Mr. Pickles promises to do a good deal of amateur flying.

Mr. Blackburn at Harrogate.

THE weather being very favourable last week, Mr. Harold Blackburn made many passenger flights at Harrogate, including many lady passengers, on his 80 h.p. Blackburn monoplane. On Saturday he flew, with Dr. Christie as passenger, to Ripon, and in the evening flew to Saltburn for the week-end.

Mr. Hewitt at Rhyl.

ON Monday Mr. Vivian Hewitt, on his rebuilt Blériot, flew over to Rhuddlan about five miles away and gave an exhibition over the point to point races in very gusty weather. He returned to Rhyl later and when over the sands the engine started missing so badly that it became necessary to land. After fitting another plug a restart was made by the aid of the release clip and a length of rope which is always carried on the machine, from the breakwater.

On Tuesday Mr. Hewitt made a flight of 1½ hrs. over Rhyl and then on to Prestatyn, where an exhibition was given, then on to Point of Air, Flint, and across the mouth of the river Dee to Hoylake. Then back to Rhyl and on to Abergele and Pensarn, finally landing at the Aerodrome, Foryd, after a trip of 1½ hrs.

Caudrons in Great Britain.

NOW that Mr. W. H. Ewen is no longer connected with the firm, it has been decided to change the name of the W. H. Ewen Aviation Co., Ltd., to the British Caudron Co., Ltd. The business will continue to be under the management of Mr. Ramsay and Mr. Hunter.

Bristols Leave Salisbury Plain.

SEVERAL times the British and Colonial Aeroplane Co., Ltd., have had to temporarily close down their school at Lark Hill on Salisbury Plain, and now it is to be transferred definitely to Brooklands, as the ground used by the Bristol school on Salisbury Plain is required for artillery ranges. The concentration of the Bristol flying activities at Brooklands should make the work to be seen there more interesting than ever.

Practical Experience.

THERE has been no lack of books produced upon the subject of aviation, but practically all of them deal either with the history or the theory of the flying machine, and practically no attention has been given to the actual business of handling aeroplanes in the air. This side of flying has however now been adequately dealt with in a book entitled "Flying—Some Practical Experiences," in the writing of which Messrs. Gustav Hamel and Charles C. Turner have collaborated. It is a book which all those who "are thinking of taking up aviation" will do well, not only to get but to thoroughly study it pages. As indicating the scope of the book, it may be useful to mention that the subjects dealt with include: Aptitude for flying, the aviator's first lesson, cross-country flying, choosing a machine, weather, winds, eddies, and other disturbances, high flying, oversea flying, the aeroplane in war, photography. Not only have the authors drawn largely from their own unique experiences, but they have also received material assistance from Mr. Henry Farman, Mr. Alec Ogilvie, Mr. Howard Wright, &c., while the Hon. G. Marconi contributes some notes on wireless telegraphy, and at the end of the book there is a very informative chapter on the physiological medical aspects of aviation. The book is very well illustrated by photographs, and special care has been taken to select pictures that specially illustrate the various aspects of flying dealt with in the various chapters. The book is published by Longmans, Green and Co., at 12*s.* 6*d.* net.

A Book about "Emaillite."

ALTHOUGH it does not always receive the attention it warrants, the "dope" is a most important factor in aeroplane construction. Those who are interested in the matter should not fail to secure from the British Emaillite Co., Ltd., 30, Regent Street, S.W., a copy of the book they have just published and which is full of instructive facts and figures, and is withal illustrated by a unique series of photographs of modern machines doped with Emaillite.

"Come Inside."

THOSE who have to do with the organisation of flying meetings know how serious is the problem of dealing with those "deadheads" who prefer to see the show from outside the fence. A novel method is being tried at Hendon. A little booklet has been prepared giving a number of illustrations taken from the sixpenny and other enclosures and showing incidents which cannot be seen from outside. This little book which has its title, "Inside the aerodrome—for Sixpence" boldly displayed on the front, is distributed among those people who take up their position outside the aerodrome, and that it has not been without effect is shown by the fact that during the Easter holidays over 150,000 people passed the turnstiles—a record for the aerodrome.

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

1. **Elections.**—Assoc. member: Alfred Curtis. Foreign members: Prof. J. G. Rodger and Th. D. Rodger.

2. **Council.**—Mr. Archibald R. Low has been co-opted to fill the vacancy on the Council caused by the retirement of Mr. J. W. Dunne therefrom.

3. **Meeting.**—The twelfth meeting of the present session will be held on Wednesday, May 6th, at 8.30 p.m., when Dr. A. P. Thurston will read a paper, to be followed by a discussion, on "The Measurement of Air Speed."

B. G. COOPER, Secretary.

CORRESPONDENCE.

Climbing.

[1854] After reading Mr. B. C. Hucks' excellent paper in your issue of April 11th, I had expected to see some correspondence on the question raised by Mr. Mervyn O'Gorman as to whether a machine climbs better against than with a wind. But since there was none, perhaps some of your readers may find the following remarks of interest.

Mr. Hucks considers that the custom of rising head to wind is merely due to an illusion; but it seems to me that it is all a question of propeller efficiency at high speeds. When a machine rises head to wind, it is still travelling at its proper air-speed; but when it rises with the wind, the machine does not travel at its correct air-speed, and so the propeller is not so efficient as at the slower speed. For example, a machine whose normal flying speed is 60 m.p.h., when rising against a wind of 40 m.p.h., is still travelling at a speed of 60 m.p.h., relative to the air. But when rising with the wind, the machine will not reach 100 m.p.h., because at the higher air-speed the propeller is not working efficiently; thus the machine will not climb as well as at the lower speed.

Of course, the difference in efficiency would be scarcely noticeable with low winds, but in a high wind rising against the wind must be more rapid.

Hoping that these few notes may be of interest to some of your readers.

Luton. Alfred M. Coate.

Wood in Aircraft.

[1855] The letter of Mr. Alexander L. Howard challenges comment. His main point or "theory" is, that timber in an aircraft owing to "exposure to climatic change" and to "the intense speed at which it is driven through the air . . . . suffers from exactly the same fatigue without the recuperative power which the human being possesses." He asks whether the aeroplane builders have considered the point.

Your correspondent can be assured that aircraft builders have considered the possibility of fatigue, in the mechanical sense of the word, in all structural materials used in aeronautical engineering. The human-like fatigue in wood was not known to exist. The known superiority of seasoned wood over metals with respect to (mechanical) fatigue is one reason why the general substitution of steel for timber in aircraft has been deferred.

One does not need to be an aeronautical engineer to realise that Mr. Howard's apprehensions are practically baseless.

First with regard to climatic change. The statement that "*fresh* timber" stowed in the hold of a hot ship may become affected with fungus is true and irrelevant.

If one *has* to compare wood with human beings, one may point out that through exposure to glare from a furnace men may become afflicted with blindness; but such afflicted men will not be urged to become pilots. Aeronautical engineers do not use fresh timber showing fungus; further, such defective timber if put aside to season is readily recognised at each of its stages towards decay by the experienced timber merchant; and if by accident it is sent in to aeronautical firms the defect is promptly discovered by experienced woodworkers. Fungus and woodworkers existed before aircraft.

The smallness of the sections used in aviation work is an additional help in discovering any defects in wood. Any aeronautical firm will agree that construction of aeroplanes does not suffer from lack of independent inspection. There is no excuse for defective timber being used in aeroplanes. Discussion is thus narrowed to general properties of sound wood used.

The assertion that thoroughly seasoned timber in a damp atmosphere will absorb damp and expand does not carry us far. Aeronautical engineers require quantitative data. Amount of possible absorption depends on the kind of wood, but use of appropriate varnishes and "dope" covering the wood and filling the pores reduces the inconvenience to vanishing point. In any event the question to be answered would appear to be whether the varnished timber used in aircraft shows signs of being adversely affected by moisture to a degree importing danger to the structure. The answer is one for an engineer to make after verifiable and adequate tests, and not for suppliers of raw material to decide *ex cathedra* or even in holy conclave.

The statement that "timber placed in the heat of the sun will crack sometimes with a report like the firing of a gun" is misleading. Seasoned timber built into aircraft in this climate does not go off pop.

That imported timber (not of the kind used in aircraft) occasionally has suddenly cracked in our climate, in the process of seasoning, does not warrant any inference that there are dangers arising from the use of seasoned timber of a different kind appropriately varnished and built into aircraft. One might as well argue that because some young English soldiers have sunstroke in Hong Kong, acclimatised Melanesians are peculiarly liable to suffer from heat.

Having dealt with some of your correspondent's generalities as to timber (a subject in which generalities are peculiarly misleading), let us look into these terrible climatic conditions.

His bugbear is change. Are aircraft exposed to much greater climatic changes than other important structures in which wood is used? In the all-air route to Monaco from London is there greater fluctuation in temperature than in the sea and land route? Are yachts and motor boats immune from exposure to damp and changes of temperature? If not, why are they built of wood? Is it safe to risk the timber in a yacht in the heat of the sun going off "with a report like the firing of a gun"? The air pilot can within limits regulate his temperature, the terrestrial scorcher has to put up with what he finds.

The fear—not resulting from experience—that extreme frost will have a sudden effect on wood does not seem well founded. It is presumably the moisture in the wood that is going to solidify and "bust." But why should extreme frost be worse than a uniform temperature of, say, zero? No further expansion takes place. Seasoned and properly protected timber will stand as much climatic change as the seasoned and properly protected pilot.

Next with regard to speed.—Your correspondent seems to assert "'tis the pace that kills." His theory is that as the outcome of the "intense speed" "timber suffers from exactly the same fatigue without the recuperative power the human being possesses." What sympathy pilots should have for their dumb struts and spars who suffering equally with them the fatigue of each trip are hopelessly doomed to retain and accumulate fatigue while the lucky pilot recuperates, nay, becomes less liable to fatigue after each experience.

Aviation is to bring forth unsuspected fruit—The Psycho-Physics of wood. If it is pure speed which causes this new fatigue then the wooden pipe resting quietly in the passenger's pocket suffers this human-like fatigue equally with the main spar; and the brace button if made of metal does not tire, but if made of wood each trip rushes it on to inevitable doom through accumulated fatigue.

On this new theory of fatigue a pilot and his brother wood flying at 100 miles per hour in calm air is much fatigued while one just able to do 15 miles per hour against a mighty wind would keep fresh for a long time, and cause less fatigue to his wood.

So long as this human-like fatigue does not manifest itself under the guise of diminished tensile strength or some other physical property with verifiable references engineers will be content to grant timber in warplanes the privilege of a true son of Mars "to suffer and be strong."

The tip of a 9 ft. propeller at 1,200 r.p.m. is flying round at about the rate of 360 miles per hour independent of its forward movement, *i.e.*, at a speed of three to four times as fast as the "intense speed" which causes such alarm.

Now this vital wooden part of an aeroplane is shaped in such a way as to make it extremely sensitive to physical effects; it is subject to all the ills the other wooden parts of the machine are liable to, and has a few special ones of its own. Here is a field of research for your correspondent without waiting for accidents.

With regard to investigations of accidents, excellent and authoritative committees already exist equipped with members who have no commercial axes to grind, some of whom combine a knowledge of engineering and aeronautical design, with practical experience in wood work and metal work.

An aeroplane is not a collection of stores to be sorted over by merchants; it should be a compact whole of mutually related parts, and the effect of shock or accident obviously depends not simply on the magnitude of the shock and the virtues of the material but also on the disposition and bracing of the parts.

A merchant supplying material from which parts are made cannot usefully decide questions of design and distribution of stresses. The function of suppliers of raw material would seem to be to see that good material is supplied when they are fortunate enough to get orders.

The periodical inspection of aeroplanes in being is already carried out, but far more frequently than at the interval recommended by your correspondent.

Eastmearn Road, West Dulwich. John E. Huson.
April 22nd.

Armstrong, Whitworth and Co. and Aeronautics.

Speaking at the annual meeting of Messrs. Sir W. G. Armstrong, Whitworth and Co., last week, Sir Andrew Noble said that the development of the aviation department was proceeding satisfactorily on the estate which the company had acquired at Selby. Aeroplanes were being built temporarily at Gosforth, until the directors could remove the manufacture to Selby, where the company had a fine flying ground.

Models

Edited by V. E. JOHNSON, M.A.

Some Further Suggestions for this Season's Competitions.

At the annual general meeting of the Kite and Model Aeroplane Association, held at Caxton Hall on April 16th, the greater part of the time was devoted to suggestions and discussion relative to competitions for the present year.

Although every possible facility was given to members both before and at the meeting to bring forward such, it cannot, we are afraid, be said that the result was so fruitful as one had hoped. It is, of course, the easiest possible thing in the world to pull to pieces any suggestions put forward, and this well-known fact very possibly kept some tongues silent during the meeting, which wagged quite strongly before and after.

It is unfortunate if anyone who has any idea for a competition should not bring it forward, no matter in however crude a form. *That* can be soon licked into shape, and it is not so very unfrequent that some suggestions, which at first sight may be greeted almost with ridicule, later on suitably modified will be found to contain within them the elements of something really good.

A proposal brought forward by Mr. W. E. Evans (Hon. Sec. Paddington and District Aero Club) for machines without separate tails or elevators, No. 7 of last week's issue, appeared to meet with general approval.

Mr. A. E. Clark (Hon. Sec. South-Eastern Model Aero Club) in a letter called attention to the lack of experiments with tractor models fitted with *twin* propellers. In the discussion which followed, the general opinion was that this could probably be met if in tractor competitions those entering were not limited to the use of one propeller.

From a conversation which we had with several members after the meeting, there seems to be a general opinion that the single-propeller model tractor is a better flying machine than the one with twin propellers, owing mainly to the excessive slip stream of the two propellers, which cause the model to climb very rapidly, and as the power falls off to then dive.

Another point referred to was the cross streams caused by the two propellers, if they revolved, as they usually do, at a slight angle of inclination to one another. The writer can claim only a slight practical acquaintance with twin-propeller tractors. But a model in which the two propellers were small flew very successfully, but it did not, of course, make a very long duration. Although difficult, we assume the problem can be solved quite successfully, and we certainly hope to see the subject experimented with this season.

Several suggestions and proposals, with remarks thereon, were sent in by Mr. R. V. Tivy (hon. sec. Mod. Sec. Bristol Aero Club), which we publish *in extenso* below. These were communicated separately to the writers as well. Mr. A. F. Houlberg said that what pilots wanted at the present time was a machine which was normally subject to personal control, and not necessarily automatically or inherently stable, but which could be rendered so at will, for purposes, say, of ascent and descent, and that he thought something could be done to assist such an aim by experiments with models. He did not, however, put forward any practical suggestions for the carrying out of the same. A model which would rise normally, then perform some unstable or abnormal evolutions in the air and then glide correctly to earth, appears to us to fulfil to some extent at any rate the required conditions.

Mr. J. Dollittle desired to see the introduction of a formula into competitions, so that single propeller and twin propeller machines could meet on equal terms. As one who, in the past, has unfortunately had some considerable experience with reference to judging such competitions, the writer cannot recommend them. At present, we are afraid, they satisfy no one, neither competitors nor judges.

Mr. D. Stanger referred to the question of Ornithopter competitions, but, from what Mr. Akehurst said, we conclude the prize will not be offered again, and indeed as a definite competition prize one can hardly expect it. But, it does not appear to us to be unreasonable to suggest that it should be again offered, permanently, as it were, for the first who at any time before a certain number of official observers, succeeds in accomplishing a certain specified result. Several of those present at the meeting deplored the general absence of biplane models at Olympia and in model competitions generally. We quite agree with this view, and think one or two competitions might be restricted to this class. Another suggestion made after the meeting was for a helicopter competition. This has been proposed by the writer more than once, but has never yet been carried through. Many arguments can, of course, be brought forward against it; but such a competition would undoubtedly be full of interest.

The question of geared motors was brought forward by Mr. F. Mayer, with a view to shortening the *fuselage* and concentrating the weight. Mr. Stanger also referred to the subject as well as others, and the proposal was quite favourably received. We are quite sure, *with our present knowledge*, much could now be done with such. Another point discussed was the question of the covered-in *fuselage* Canard type model. If a competition is arranged for such a type, we believe from what was said that it would be well patronised. Quite a number of such appear to have been flown with considerable success.

Aero Models at Olympia and Future Competitions.

By R. V. Tivy.

At the recent Aero Show at Olympia I had an opportunity of seeing a very representative collection of model aeroplanes. I was particularly struck by the extraordinary difference between the full-size machines exhibited at that exhibition and the models. In the matter of design, the model aeroplanes of 1914 are quite unlike the aeroplanes of 1914, and the difference is not, in most cases, I am sorry to say, attributable to the models being any improvement on their prototypes.

The value of models as experimental apparatus depends entirely upon their relationship to full-size machines. The ideal procedure is to build and fly scale models. It is very difficult, using as a motive power rubber or even any of the power plants available, to obtain flights of *any considerable duration* with models built in their principal dimensions and details to scale. I find, generally speaking, that the models which fly farthest in competitions (while they are, perhaps, the best constructed models) are those which are least like full-size machines. Therefore, long distance and long duration of flight must not be put at a premium if we are going to have our models something like our full-size machines (as I hope we are). If we cannot have an entire aeroplane in miniature, let us at least use in conjunction as many parts of an aeroplane as we can.

Something of the nature of a competition seems to be necessary to keep the interest alive. We want this year to devise competitions which will (A) be the means of improving the trend of model design and (B) induce the competitors to undertake definite and useful experiments. The carrying out of these two objects will raise the status of model flying.

I have received various suggestions from members of our model section for competitions to be held this year, and these will be considered by my committee at the next meeting. To these suggestions I should like to add whatever forms of competition the London clubs decide to adopt. As I remarked at the meeting of the Secretaries' Guild, I consider that it is desirable that the various clubs should be doing something like the same kind of work all over the country. I have divided the suggestions received having regard to their essential objects into the two classes (A) and (B) mentioned above.

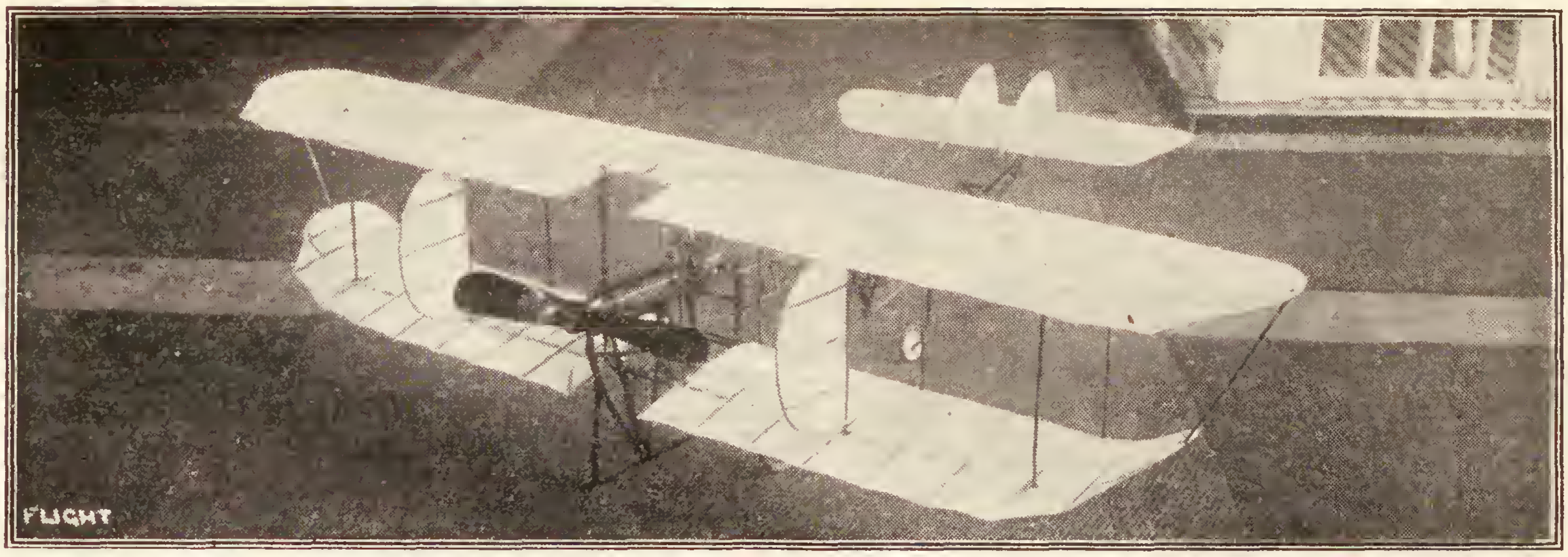
A. *Competitions which are to be the means of improving the trend of model design.*

1. Contest for models having enclosed bodies.
2. Contest for single screw models.
3. Contest for tractor models.

B. *Competitions which will induce the competitors to undertake definite and useful experiments.*

4. Single plane contest (for aeroplanes carrying no forward elevator or tail).
5. Straight flying contest.
6. Variable speed contest (for the greatest variation in speed). In this event the stability of the models when flying slowly can be compared with their stability when flying fast.
7. Quick get-off contest (the mean of the distances in feet with and against the wind to be taken and divided by the effective spread in feet of the wings of the model).

In order that object (A) may be carried out I suggest that wherever possible the models be judged on the following system:—"A minimum distance (of say 100 yards) *or* a minimum duration (of say 15 seconds) shall be fixed. Beyond this minimum no account shall be taken of the distance or duration flown. That marks be awarded for design, construction and flying." The method of awarding marks for flying will depend upon the particular contest in question. For instance, in contests (1), (2) and

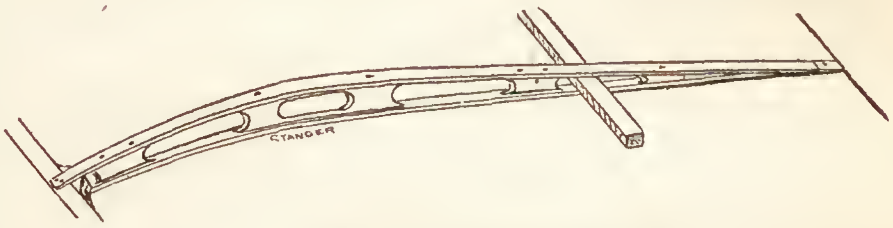


Mr. D. Stanger's Olympia canard type biplane.

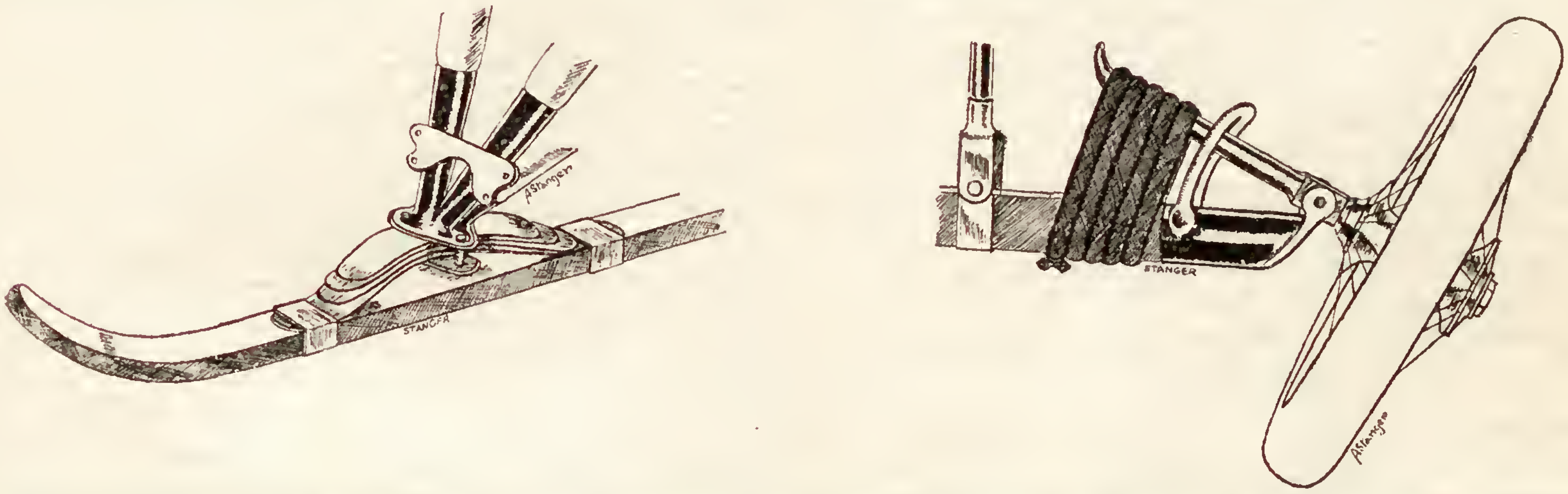
(3) above, marks would be awarded for rising, stability, directional control, landing and any other points which are desirable in a full-size machine. The flying of each model would in this case be judged by two or more judges; one marking the rising and landing (separately) and another the stability and directional control. The awarding of the marks is not necessarily a difficult matter. If the maximum for directional control is 20 marks, the marks awarded would be 20, 15, 10, 5 or 0.

It may be thought that such a system as this would be too complicated to work satisfactorily in practice. This has not been our experience. I enclose a programme of one of our most successful competitions which was judged in this way, the number of models competing being as many as 55. A great deal depends upon the judges. We in Bristol have been very fortunate in securing competent and impartial judges. I have no doubt that the London clubs are equally fortunate.

encourage experimental work and develop the right kind of models. The influence of competitions on the science of model aviation is very considerable. We must make it our business to see that this influence is directed into the right channels.



Ribs on Mr. D. Stanger's biplane.

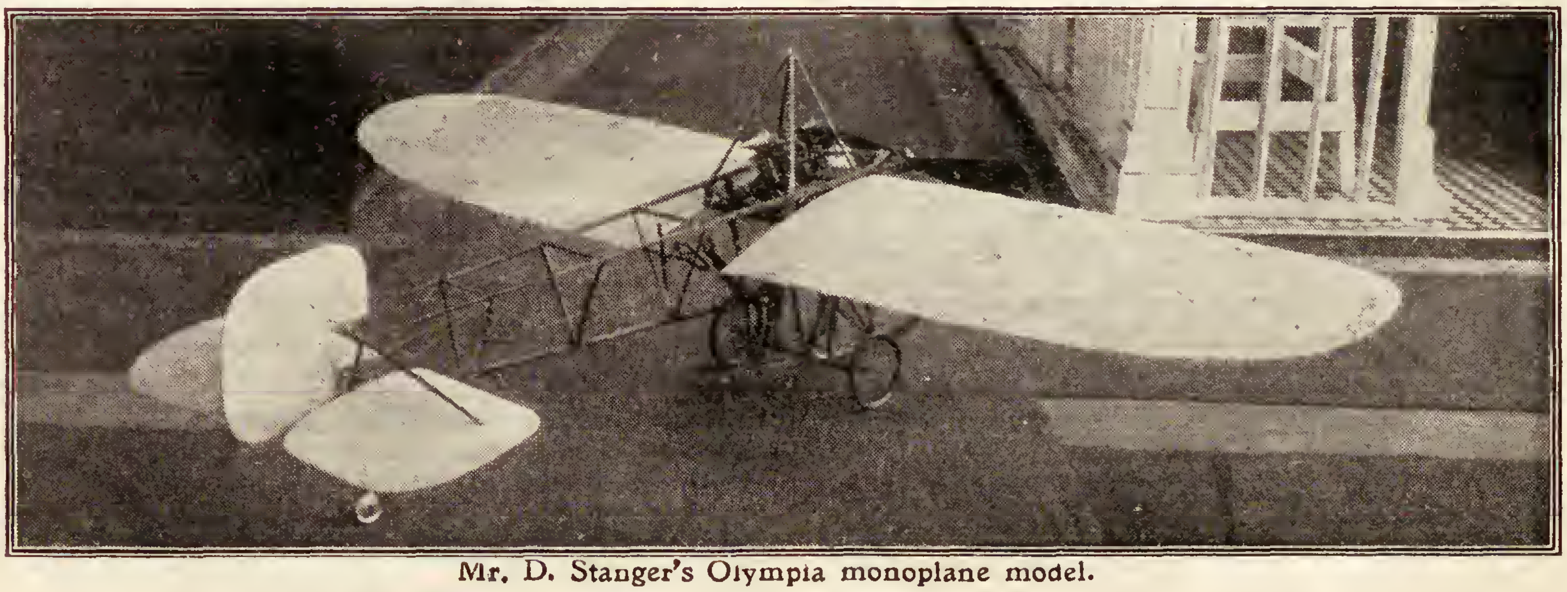


MR. D. STANGER'S MODELS.—On left, monoplane skid; on the right, non-buckling wheels on mono. and on biplane.

I think you will agree with me that the time has now come when we should consider more seriously than we have hitherto, not so much what form of competition is easiest to judge, nor what form of competition will attract most entries, but what competition will

Mr. D. Stanger's Olympia Models.

We have much pleasure in publishing the accompanying photographs, drawings and particulars of these models, which aroused so much attention at the Show. The machine most fancied was, we



Mr. D. Stanger's Olympia monoplane model.

believe, the Canard-type biplane, and this certainly gave the best account of itself in the original flying tests at Hendon; and in the reflown contest made a splendid flight of some 50 secs. at the first attempt, rising off rough ground. Mr. Stanger informs us that this machine did not injure itself whilst taxi-ing along the ground, but at the end of its first flight, the second official trial, and that the 23 secs. flight referred to, was the second and not the first flight in the three trials allowed, as we thought was the case.

Tractor Monoplane.—Span, 10 ft.; chord, 2 ft. Wings rounded at the tips, cambered and double surfaced. Lifting tail. The planes, tail, &c., are covered with a special silk-faced fabric, and doped with standard Cellon.

The *fuselage* is of triangular section, strongly braced with piano wire (breaking strain 300 lbs.) and steel angle-plates. The front members of the framework are carried very low down to a point, and fitted to a heavy hickory skid; a strong laminated spring (shown in one of the drawings) is interposed to absorb shock in landing. The floating axle is sprung on rubber shackles (as illustrated), and is fitted with the designer's non-buckling wheel device. The overall length of the machine is 7 ft.

The petrol motor is a Stanger 4-cylinder V-type engine, which drives a propeller of 30 in. diameter and 22 in. pitch at 1,600 r.p.m. giving a thrust of 14 lbs. Flying speed of the model about 30 miles an hour. Weight of engine, including petrol, oil tanks and pump, 5·25 lbs. Weight of machine in flying order, 20 lbs. The machine has made a number of very good flights.

The Canard Type Biplane.—This machine, as can be seen from the photograph, is a Canard biplane, of which the lower plane has upturned wing tips for lateral stability. The machine is also fitted with four vertical fins, two on the top of the elevator and two between the main planes. The span of the machine is 7 ft., the chord 1 ft., and the gap 13 ins. The elevator span is 30 ins., and the chord 8 ins. The total length of the machine is 4 ft. 2 ins. The *fuselage* is of triangular section, and strongly braced with piano wire—breaking strain, 250 lbs.—and steel angle plates. All bolt holes are strengthened with steel plates. A landing chassis is entirely eliminated, as the *fuselage* is carried very low down, thereby forming a very low skid. The machine is very finely sprung on double helical steel springs, and the floating axle is fitted with wheels fitted with the designer's non-buckling device. Forward of the *fuselage* is fitted a kangaroo skid, hinged on a strong universal joint, and sprung with rubber. The engine (petrol) is a Stanger 2-cylinder V-type, which drives a 22-in. diam. propeller of 18-in. pitch at 2,000 r.p.m., and gives a steady thrust of 9 lbs. The flying speed is about 20 miles an hour. Weight of engine, 2 lbs. 12 ozs. Weight of machine in flying order, 10¾ lbs.

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KITE AND MODEL AEROPLANE ASSOCIATION

Official Notices.

British Model Records.

Single screw, hand-launched	Duration ...	D. Driver... ...	85 secs.
Twin screw, do.	Distance ...	R. Lucas	590 yards.
	Duration ...	G. Hayden ...	137 secs.
Single screw, rise off ground	Distance ...	W. E. Evans ...	290 yards.
	Duration ...	W. E. Evans ...	64 secs.
Twin screw, do.	Distance ...	L. H. Slatter ...	365 yards.
	Duration ...	J. E. Louch ...	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance ...	C. C. Dutton ...	266 yards.
	Duration ...	J. E. Louch ...	91 secs.
Do., off-ground	Distance ...	C. C. Dutton ...	190 yards.
	Duration ...	J. E. Louch ...	94 secs.
Single screw hydro., off-water	Duration ...	L. H. Slatter ...	35 secs.
Single-tractor, do., do. ...	Duration ...	C. C. Dutton ...	29 secs.
Twin screw, do., do. ...	Duration ...	L. H. Slatter ...	60 secs.
Engine driven off grass ...	Duration ...	D. Stanger ...	51 secs.

Annual General Meeting.—The annual general meeting of the Association was held at Caxton Hall, Westminster, on April 16th. Mr. V. E. Johnson, M.A., was elected to the chair for the evening. The officers elected to serve for the ensuing year were:—*President*—The Right Hon. the Earl of Lonsdale. *Vice-Presidents*—Mr. R. M. Balston, Col. J. D. Fullerton, R.E. (Ret.), Mr. B. C. Hucks, Sir Bryan Leighton, Bart., Mr. J. T. C. Moore-Brabazon and Sir Archibald Sinclair, Bart. *Advisory Council*—Messrs. H. G. Bond, W. B. Brooke, H. W. Browse, T. W. K. Clarke, Herbert Chatley, C. R. Fairey, H. H. Groves, G. Gildea, T. O'B. Hubbard, L. Ingram, A. W. Howkins, V. E. Johnson, R. H. Lanchester, J. H. Ledeboer, M.A., F. Mayer, W. H. Norton, F. T. Pringuer, G. Rowlands, G. P. Bragg-Smith, Dr. Thurston, D.Sc., and H. R. Weston. *Chairman of Research Committee*—Dr. A. P. Thurston, D.Sc., A.F.Ae.S. *General Hon. Sec.*—W. H. Akehurst. *Kite Hon. Sec.*—R. H. Lanchester. *Kite Assistant Hon. Sec.*—L. Ingram. *Model Hon. Sec.*—J. H. Lyche. *Model Assistant Hon. Sec.*—A. F. Houlberg. The report and balance-sheet for the year was passed as read. The new President, Lord Lonsdale, was unable to be present, but sent a message stating that he would endeavour to make his year of office a success and that he would do his utmost to help the Council in raising the sum needed for the International Kite and Model Meeting and also for the Volunteer Kite and Wireless Squadron. A vote of thanks was passed to the retiring President, Sir John C. Shelley, and also Lady Shelley for the great interest they had taken in the association during the year. Vote of thanks was passed to all who had subscribed towards the prize fund, also to the hon. secretary for his work during the year. A lengthy discussion was held on suggestions for competitions during the season, and they will be fully considered by the various rule committees. It was decided that the subscription be raised for members from 5*s.* to 6*s.* and that this should include an official badge of the association with the date of year and that all members must wear same at all competitions and meetings; the junior subscription was also increased from 2*s.* 6*d.* to 3*s.* 6*d.* The fellow's subscription of £3 3*s.* and associate fellow's of £1 1*s.* to remain the same, but to include the official badge. A hearty vote of thanks to the chairman, Mr. V. E. Johnson, model editor of FLIGHT, brought the meeting to a close at 10.55.

International Aero Exhibition.—Official trials in Class I for power-driven models for prize offered by the Royal Aero Club was held at Hendon during the week-end. Result was—Mr. D. Stanger with his petrol-driven biplane, 1st, winner of £10, with a splendid flight of 51 secs., the other competitors did not qualify. Mr. Stanger's flight was the finest yet seen in competition in this country, it rising well and maintaining a fine stability throughout. This is also a British record, he having applied for same to be observed.

Annual Subscriptions.—Subscriptions are now due and should be forwarded to the hon. sec., as the early payment greatly facilitates the work of the association.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

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AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

APRIL 26TH, flying on Wanstead Flats, 6.30 and 10 a.m.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

APRIL 25TH, sealed handicap for 6-oz. twin-screw r.o.g. models (postponed from last week). Three prizes. Average of three flights. Bronze medals are offered to members for 60 secs. average on any Saturday before June 1st. Models may be either single or twin screw and weigh not less than 6 ozs., loading not under 4 ozs. per sq. ft. Any member making an average of 60 secs. three times will be awarded a silver medal. No member can win more than one medal. Flights in any competitions can count for these medals.

UNAFFILIATED CLUBS.

Dundee Aero Club (4, FORESTER STREET).

SECOND Round Luis Trophy: A r.o.g. competition for the above will be held in Locbee Park, on Saturday, 25th inst. Flying to commence at 3 p.m. Members please note, no trial flights after 3 p.m.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

USUAL flying meetings this week-end. Rules of the fourth "South Eastern Trophy" competition. April–June Quarter, 1914:—1. This competition shall be open to members of the S.E.M.A.C. only, and is for 2. Models of either the tractor or propeller types, capable of rising from the ground entirely under their own power. 3. Models may be either monoplanes or multiplanes, and must weigh, in complete flying order, not less than 6 ozs., nor more than 8 ozs. 4. The minimum loading for monoplanes is 4 ozs. per sq. ft. 5. The minimum loading for multiplanes is 3 ozs. per sq. ft. 6. The motive power may be any suitable means devised by the competitor. 7. The whole model (except wheels and propellers) must be constructed by the entrant. 8. Models must alight on the chassis at the termination of one official flight and remain in a proper upright attitude for a minimum period of 5 mins. 9. At the completion of their official tests models must be in an undamaged condition. 10. The official flights will be held on May 30th and June 27th. Competitors flying on the first date will be given an allowance of 5 per cent. on their marks. 11. Models will be required to start from very short grass, no artificial surface will be provided. 12. Competitors may change, repair or add to their motive power as required. 13. Each model must be fitted with a protector over the motor-rod, such as a wire or cane loop. 14. Competitors pushing or otherwise assisting their models to rise will be disqualified. 15. The winner shall be the competitor who obtains the greatest duration of flight in one of the official tries. 16. If time permits three official flights will be allowed to each competitor on each or both dates. 17. Competitors must be responsible for all damage done by or to their models. 18. The judges will be three non-competitors appointed by the committee. 19. Each competitor may enter any number of models. 20. These rules may be amended or otherwise added to at the discretion of the judges. 21. Entry forms must reach the hon. secretary at least three days previous to the official flying dates.

⊛ ⊛ ⊛ ⊛

Aeronautical Patents Published.

Applied for in 1912.

Published April 9th, 1914.

2,540.	A. A. HOLLE.	Aeroplanes.

Applied for in 1913.

Published April 9th, 1914.

6,974.	J. L. GARSED.	Flying machines.
7,072.	N. LACROTTE.	Safety shock-absorbers for seats in aeroplanes.

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CONTENTS.

Editorial Comment: PAGE
- Co-operation between Aeronautical Research and the Industry... ... 455
- Armoured Aeroplanes for the French Army... 456
- Land for Aviation Stations 456
- Aircraft in the Mexican War 456

Men of Moment in the World of Flight: Mr. J. Alcock 457
Flying at Hendon 458
The Henry Farman Seaplane (with scale drawings) 460
Royal Aero Club Official Notices 463
From the British Flying Grounds 464
The Rational Design of Aeroplanes. By Archibald R. Low, M.A., A.F.Ae.S. 466
Cedric Lee Monoplanes 468
Hollow Wood in Aeroplane Construction 470
Aviation in New Zealand 471
British Notes of the Week 473
Foreign Aircraft News 475
Models. Edited by V. E. Johnson, M.A. 477
Model Clubs Diary and Reports 478

EDITORIAL COMMENT.

Co-operation between Aeronautical Research and the Industry.

In a paper, entitled "The Rational Design of Aeroplanes," abstracts from which we publish elsewhere in this issue, Mr. A. R. Low calls special attention to the importance of greater co-operation between engineers engaged in research and those employed in the design of aeroplanes—in fact, his paper may be regarded as a justification for his plea. With this we are in complete agreement. Aerodynamical science is now progressing very rapidly, and problems are daily arising to confront the aeroplane constructor that research could readily assist in solving; and failing which, they must rely to a large extent upon trial and error methods—which are always expensive—and be guided by the dictates of past experience—that may or may not have been sound—in nearly similar circumstances.

At the N.P.L., and at the R.S.F., we have a considerable amount of valuable research being conducted, but unfortunately the results obtained are not available until months after the conclusion of the experiments, when their value has become considerably reduced, if they have not become, in some measure, of academic interest only. Of this we have an excellent example at the present moment, as the Annual Report of the Advisory Committee for Aeronautics for 1912-13 has not yet been published! It was suggested in the course of a discussion on a paper read before the Aeronautical Society last year, that a monthly report might be issued; and that if there was any objection to the dissemination of this information broadcast at such early periods, a certain number of firms could be made acquainted with the results of experimental work. We do not, however, believe that there can be any valid reason why more frequent reports should not be made public—certainly not if the tests to which they refer have been concluded; and as regards the assistance thus given to other firms engaged in the aeronautical industry in foreign countries, it is common knowledge that progress in any branch of science has never been accelerated but rather retarded by secretiveness. An open exchange of thought and information is the only sure way in which the industry can be ultimately benefited. But even though these reports are published at more frequent intervals, there still remains the fact that the matter dealt with does not constitute one-tenth of the research which it is possible and desirable to inaugurate, and there are many problems that occur to the private constructor concerning which he requires immediate information.

For these reasons we welcome the suggestion of the Chairman (Mr. Mervyn O'Gorman), that aeronautical constructors should instal experimental wind tunnels at their works in the same way that manufacturers in other branches of engineering science have organised a research department. These tunnels are not expensive to construct, and the equipment required depends largely upon the extent and the nature of the investigations to be made. In any case, the information gained would more than compensate for any outlay involved, as the subject of the investigations, which would be largely formulated by the works' officials—the works' manager and designer—would be based upon past and present difficulties and future probable requirements. There is, however, one important fact to bear in mind—these tunnels will prove absolutely useless, or worse, unless those who have charge of the experiments are thoroughly grounded in aeronautical science, and skilled in the handling of instruments of a similar character. Good men, capable of undertaking this work, are to be obtained, provided that a sufficient salary is offered, but this may prove prohibitive with some firms who have not adequate resources to fall back upon. And to all such we would make the suggestion that many engineers would be prepared to undertake the work, if they were at liberty to disclose the result of their investigations, at a salary which is well within the possibilities of any constructor in this country. Then we should have that co-operation between the theoretical and practical sides of aeronautical science which is so much to be desired.

* * *

Armoured Aeroplanes for the French Army.

Although we have to some extent become used to reading in the French journals that all is not well with military aviation in France—in fact, we have seen it seriously stated quite recently that, in French opinion, the premier place is occupied by Germany, with Great Britain second and France a bad third—the French army appears to be making a good deal of quiet progress. The latest piece of information according to *Le Matin* is that the Air Corps is now in possession of a squadron of armoured aeroplanes, each carrying a quick-firing gun, capable of throwing a shell weighing half-a-pound. These machines are of the monoplane type, and are two-seaters, having the vital parts protected by chrome-nickel steel armour, 2½ millimetres thick, which is proof against rifle bullets at a range of 700 metres. They have engines developing 95 h.p. and a stated flying speed of about 62 m.p.h.

On paper, these seem to be exceedingly formidable machines and not to be matched in the air service of any other power. Their armour will enable them to fly with comparative safety at fairly low altitudes, which is good for purposes of observation. According to most authorities the unarmoured machine will have to maintain an altitude of over three thousand feet in order to be reasonably safe from modern rifle fire, while, with one reservation, the new French type ought to be able to fly safely over a hostile position at a height of possibly less than two thousand feet. The reservation of which we have spoken is that of the danger of the propeller being hit and disabled, and this seems to be the weak point from which all machines of the armoured type must inevitably suffer. The propeller is perhaps the most vulnerable part of any machine, and supposing it to be hit and disabled—and for it to be hit almost necessarily connotes its disablement—the armoured aircraft is in no better and no worse case than its unarmoured sister. At the same time, the chances of its being disabled from the cause noted, would appear to be much greater, since the pilot would certainly be tempted by his armour to fly lower and thus take the more chances.

On the other hand, there are, even at this early stage of the history of aerial war, several instances on record of pilots and observers being hit by hostile fire without disablement of the machine. During the Balkan campaigns, two instances of pilots being killed while flying were recorded. More recently in Morocco, a machine carrying two Spanish officers was hit repeatedly and both officers seriously wounded, again without anything happening to the machine itself. On balance, therefore, it would seem that provided the handicap of the lesser speed imposed by the extra weight of armour be not too great, the arguments so far as we know them at present are in favour of the armoured type. Probably the casualties that have happened to aviators in war would have been avoided had the machines been of the type which has now been adopted into the French army. It is as well, however, not to be too dogmatic on this point, because it is necessary to keep in mind in pronouncing this opinion that it has to be assumed that all other circumstances were equal. That is to say, supposing these casualties were to have been avoided by the use of armour, the speed and altitude of the machines should have been as they actually were and not as might easily have been the case had the machines been armoured. It is, as we have already pointed out, a fair presumption to suppose that the pilots would have been flying lower and slower, relying on the armour for protection, than they actually were. Thus, the result in the end might easily have been the same. It simply comes down to this, that we shall really not know what are the comparative capabilities of the armoured and unarmoured aeroplane until they have been taught during the next great war. And that being so, we are not particularly curious to know. At the same time, it will be well that our own military authorities should keep closely in touch with what is being done in the direction under discussion.

* * *

Land for Aviation Stations.

As we write, an interesting case is being heard at the Surveyors' Institution, arising out of the desire of the War Office to acquire certain land at Orfordness, on the Suffolk coast, for an aviation station. The case is an ordinary one of arbitration regarding the price to be paid for the land, but the interest of it seems to lie in the progress of aviation which it connotes. Particularly significant was the evidence of Mr. Grahame-White, who expressed an abiding faith in the future of aviation as a commercial proposition—in fact, he went so far as to say that he looked to the new science to revolutionise the transport services of the world. He may have been, as some would think, unduly optimistic, though we are very much inclined to subscribe to his opinion, but at least he was prepared to back his opinions, and said that he would very much like to have an option on the land in question. That is one side of the interest.

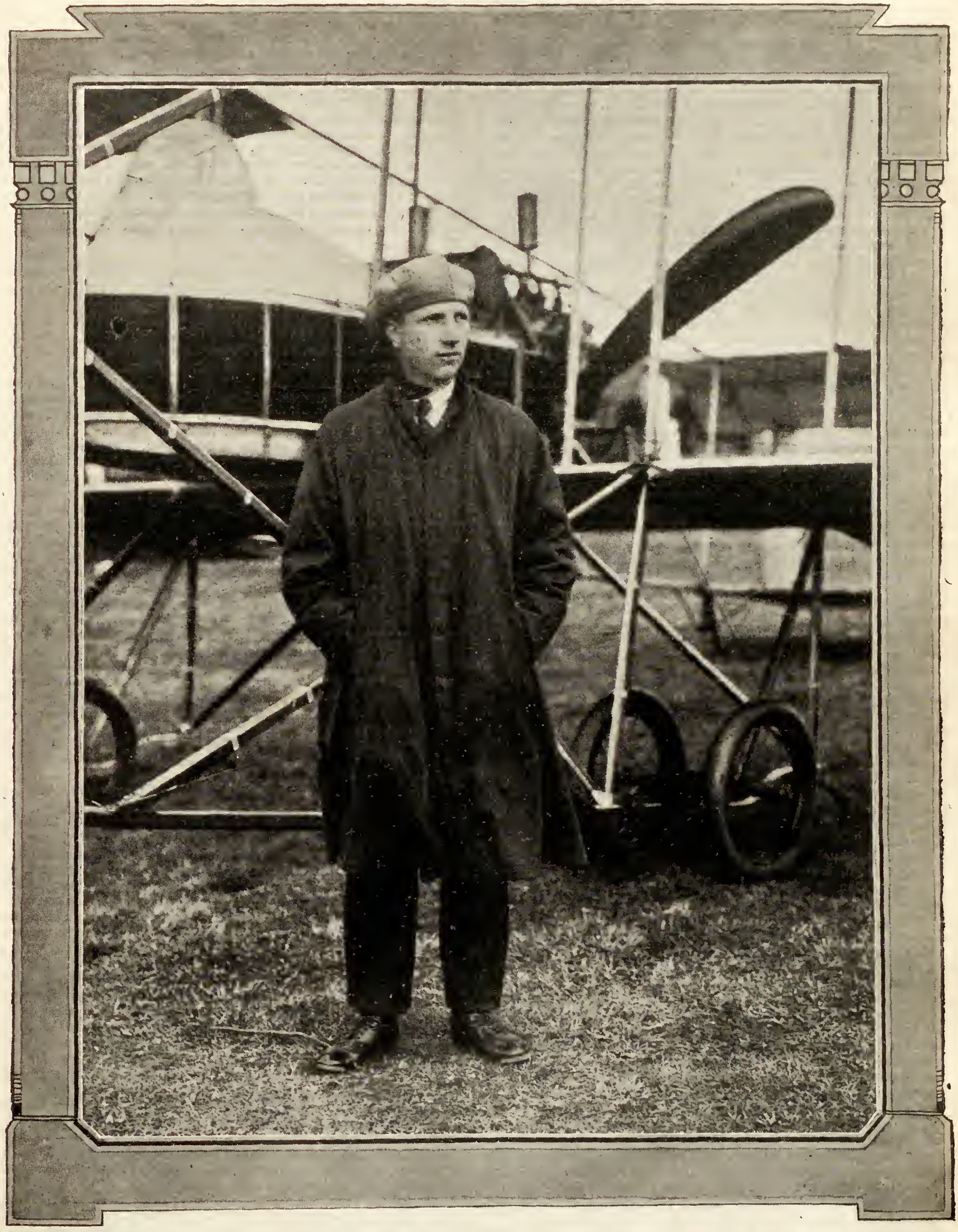
The next point of interest that emerges is that the Government appears to be alive to the situation and is bent on acquiring land to serve for military stations at the most suitable points to meet the menace from across the North Sea. We have no desire to mix in matters of high politics, but as thinking citizens it is impossible for us to ignore the fact that the main danger, so far as we are able to foresee at the moment, is from the quarter indicated. That realisation, supposing it to be equally present in the minds of those responsible for our defence, must necessarily mean the strengthening of points nearest to the zone of danger. It is this realisation which has doubtless prompted the War Office in its selection of the particular site in question and the decision to acquire it must meet with the approval of all who have the cause of aerial defence at heart.

* * *

Aircraft in the Mexican War.

According to the *Times* correspondent with the American fleet, "two hydroplanes from the battleship "Mississippi" are scouting round Vera Cruz." Just in this commonplace way is information conveyed which, but a very few years ago, would have been given columns of descriptive writing as one of the greatest marvels of science—the last and greatest wonder of the world. There is nothing much to be said about it, either, for we have, truth to tell, become somewhat tired of pointing the moral of progress so often. It really seems sometimes that all the romance, all the wonder has dropped right out of aviation, when we find it treated in the matter-of-fact words employed in the chronicling of events nowadays. Even so, there is a wonderful object-lesson in it all, which the reader can easily discern for himself, without any prompting on our part.

MEN OF MOMENT IN THE WORLD OF FLIGHT



MR. J. ALCOCK, who has recently been flying the 100 h.p. Sunbeam-engined Maurice Farman so splendidly at Brooklands. Trained as an engineer, he joined Mr. Maurice Ducrocq, and was his chief mechanic for 2½ years. In Nov., 1912, he took his ticket on Mr. Ducrocq's Farman, on which he won several competitions in 1913. For a short time last year he was instructor at the Avro School at Shoreham.

FLYING AT HENDON.

LAST week has been both an historic and a sad one for Hendon. On Thursday a world's record was put up by F. W. Goodden, who, for the first time, looped the loop in the dark, whilst on Sunday one of the Aerodrome's most promising pilots, Philippe Marty, met with an accident which cost him his life. Thursday was the occasion of the first night-flying demonstration of the season, as well as the usual afternoon show of exhibition and passenger flights. The afternoon was fine, with a 30 m.p.h. N.W. wind blowing, and at 3.30 p.m. J. L. Hall came out on his 50 h.p. Avro biplane, after which Louis Noel pluckily made his first flight since his smash the previous Thursday, ascending on the 60 h.p. Morane-Saulnier, which he had never flown before. Shortly after, J. M. Cripps went up on the 50 h.p. G.-W. 'bus No. 109. Later on, L. A. Strange went up on the same machine, and Hall and Noel gave an exhibition on the Avro and Morane-Saulnier respectively. The 100 h.p. Anzani-Handley Page biplane then made its first appearance after a long period of confinement for alterations. Piloted by E. R. Whitehouse, it made a very pretty flight, banking over in fine style. After his first flight alone Whitehouse made several passenger flights, about four in all. Strange then took up a passenger on the 'bus, and F. W. Goodden ascended on the 60 h.p. Caudron and put up several loops. After this Marty went up on the Morane-Saulnier and executed five single loops and a couple of tail slides. One of the latter was rather peculiar, as when he pointed the nose of the machine upwards it remained in this position for some appreciable time, in fact, the machine seemed to climb some distance before the nose "flopped" earthwards in the usual manner. The rest of the evening was devoted to numerous flights by E. Baumann on the 40 h.p. Wright, Goodden on the Caudron and Whitehouse on the Handley Page. At 7.45 p.m. Strange and W. Birchenough went up in the twilight, the former on 'bus 109, and the latter on the bi-rudder 'bus which had just come out of hospital after a slight mishap the day before. By this time the aerodrome presented an extremely pretty appearance, as hundreds of fairy lamps of various colours which lined the different enclosures had been lit up, whilst the pylons were also illuminated. The first flight in the dark was made by Louis Noel on 'bus 109, which was decked with numerous small electric lamps. Noel remained up for five minutes, and immediately he landed Birchenough ascended on the bi-rudder 'bus, similarly illuminated, and also flew for five minutes—his first attempt at night flying. He had no sooner landed than Baumann went up on the Wright, and put up five minutes of very pretty figure flying; it was also Baumann's first experience of night flying.

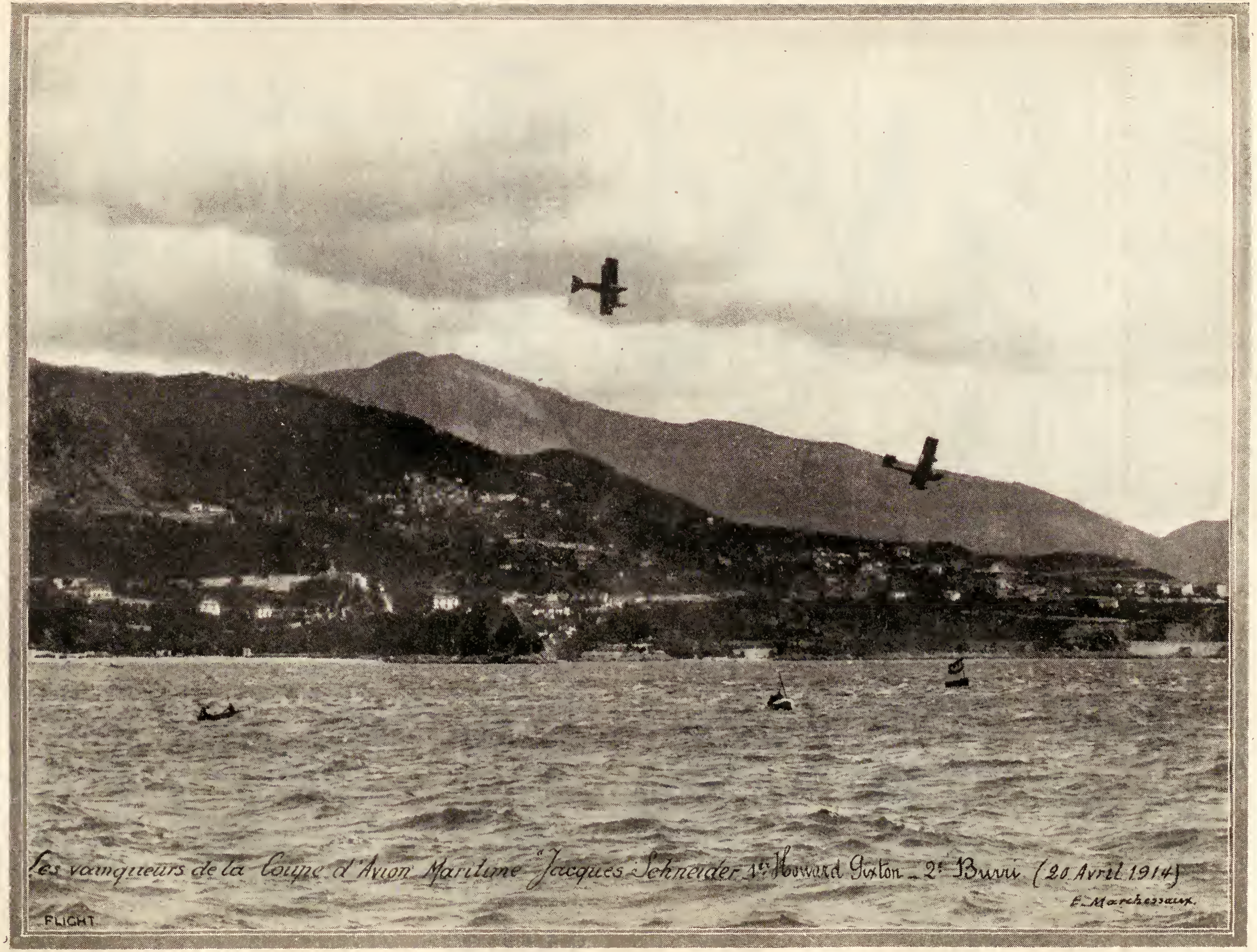
The event of the evening, however, was Goodden's looping demonstration on the 60 h.p. Anzani-Caudron. It must be admitted that at first some anxiety was felt as to whether this plucky attempt would be successful, for it must be remembered that when flying in the dark it is almost impossible to ascertain what position the machine is flying by observing the earth, as the latter is as good as invisible. The question was, therefore, would Goodden be able to recover his normal flying position after completing the loop? The accumulators, employed for illuminating the machine, formed another problem, for it was not known if the machine would loop with the extra weight, although the difficulty of strapping in this electrical passenger was dealt with in an excellent manner. However, at five minutes past nine Goodden started off, and as soon as he was well clear of the ground he switched off his lights and continued to climb in total darkness, only switching on a single light above the *nacelle* now and again. When he reached a height of 2,000 ft. he switched on all the lights and executed his first loop. It was a pretty sight, the tiny lights on the machine looking not at all unlike a shower of meteors as they plunged earthwards. After his first loop he made two more at heights of about 1,000 and 1,500 ft., and then put up some fine banked spirals, finally descending after having been aloft for 25 mins., and making an excellent landing. He received a tremendous ovation and many congratulations. The final event was the bombarding and blowing up of the "battleship" anchored in the centre of the aerodrome, in which the two G.-W. 'buses took part assisted by numerous fireworks by J. Wells and Sons.

The fourth anniversary of the London–Manchester flight was celebrated on Saturday by the St. George's Meeting, the principal event being a 16-mile cross-country handicap. A strong easterly wind was blowing, but otherwise it was an ideal day, and many pectators turned up. The proceedings opened at 3.18 p.m. with a splendid "stunt" flight by Pierre Verrier on a new 80 h.p. Henry Farman biplane, Philippe Marty following shortly after on the 60 h.p. Morane-Saulnier. W. Birchenough came out next, and took up a passenger on the bi-rudder 'bus, whilst Verrier on the H. Farman, and J. L. Hall on his Avro also ascended. A little later on Marty went up on the Morane-Saulnier, and executed five loops, including two double ones, and three tail slides at heights of about 1,000 ft. A start was then made for the cross-country race, but owing to the wind the distance was reduced to 12 miles, or three laps of the Bittacy Hill circuit. The limit man was W. Birchenough on the bi-rudder 'bus (9 mins. 10 secs.); Verrier on the 80 h.p. H. Farman starting second (1 min.), E. Baumann on the 100 h.p. Handley Page biplane third (33 secs.) and P. Marty on the 60 h.p. Morane-Saulnier was at scratch. The Handley Page biplane only made its appearance at the last moment, whilst the starter's flag was raised in fact, and had no sooner started when the engine gave out and Baumann only just managed to effect a proper landing inside the aerodrome; the others got away without incident. Marty obtained an easy victory, coming in first by 22 seconds, Birchenough being second, with Verrier 19 seconds behind. The times and handicaps are as follows:—

		Handicap.	Handicap Time.
		m. s.	m. s.
1.	Philippe Marty (60 h.p. Morane-Saulnier monoplane)	scratch	21 51
2.	W. Birchenough (50 h.p. G.-W. biplane) ...	9 10	22 13
3.	P. Verrier (80 h.p. Henry Farman biplane)	1 0	22 32
	E. Baumann (100 h.p. Handley Page biplane)	0 33	retired

After the race, further exhibition and passenger flights were put up by Verrier on the H. Farman, R. J. Lillywhite on the bi-rudder 'bus, and R. H. Carr made a test flight on the G.-W. five-seater aerobus (100 h.p. Green) with a mechanic, Lillywhite and M. Osipenko as passengers. This flight being satisfactory, Carr then took up another three passengers, whilst Strange ascended on the bi-rudder 'bus, and Marty put up another looping display, executing one single loop, one double loop, and a tail slide at heights varying from 1,000 to 800 ft. Carr made two more passenger flights on the five-seater, at one time taking up Mr. D. Thorburn and Mr. W. Barr (of Cellon). The remaining flights of the evening were made by Birchenough on the bi-rudder 'bus with passengers. The new 100 h.p. Gnome G.-W. "pusher" military biplane was brought out for an airing late in the evening and the engine tested—Claude Grahame-White and Carr narrowly escaping a nasty encounter with the four-bladed propeller through the engine starting unexpectedly. Early in the evening the megaphone man announced that Gustav Hamel had left Derby at 5.30 p.m. and might be expected any moment, but it was not until 7.35 p.m. that he suddenly appeared over the sheds at the west end of the aerodrome. He had with him as passenger the Baron de Gunsberg, and explained his late arrival as being due to the fact that he "dropped" into Lord Desborough's place at Taplow for tea. He also had to descend in a field at Bicester owing to a broken petrol pipe.

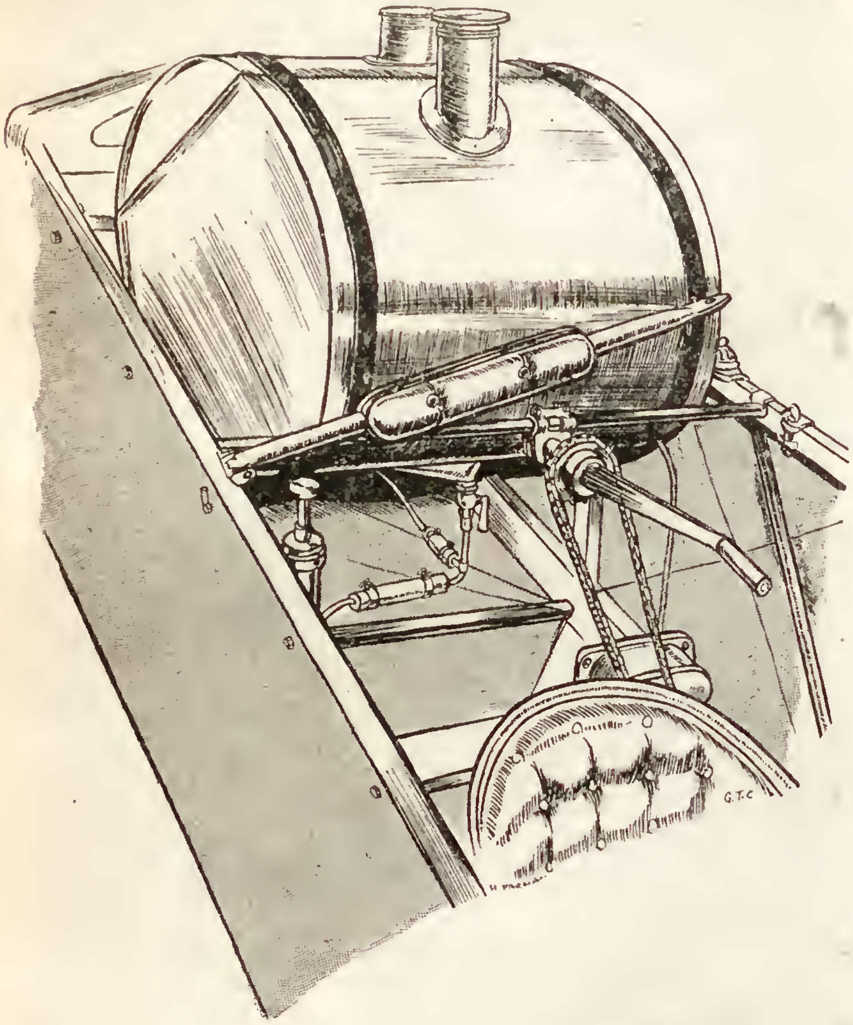
Glorious weather favoured the flying exhibitions on Sunday, and there was again a large attendance in all the enclosures. The following contributed to the afternoon's flying:—Claude Grahame-White, R. H. Carr, and Louis Noel made several trips on the G.-W. five-seater aerobus, three or four passengers being taken up at a time. F. W. Goodden went up on the 60 h.p. Caudron, and looped several times, and Philippe Marty also gave looping demonstrations on the 60 h.p. Morane-Saulnier, and ascended to an altitude of 7,500 ft. P. Verrier flew two new Farman biplanes—one at a time, of course—and numerous other flights were made by E. Baumann on the 40 h.p. Wright, J. L. Hall on his 50 h.p. Avro, L. A. Strange on the G.-W. tractor biplane "Lizzie," and W. Birchenough, J. M. Cripps, and R. J. Lillywhite on G.-W. 'buses. Marty's unfortunate accident occurred at about 6 o'clock. He was descending from one of his brilliant exhibitions with a rather steep dive, and when about 150 feet from the ground he started a spiral, which got sharper and sharper, until finally the machine plunged nose first to the ground, not far from No. 1 pylon. The machine struck the ground with such force that the *fuselage* telescoped, breaking in half just behind the unfortunate pilot, whilst the rest of the machine was totally wrecked. Marty was removed from the wreckage with difficulty, and though he was still alive it was seen that he was terribly injured, but fortunately unconscious. After being carried to the aerodrome hospital, where he received first aid, he was removed to the Central London Sick Asylum, and there passed away. Poor little Marty was only 21 years old, yet a magnificent and careful flyer. He was very popular everywhere in aviation circles, his unassuming, good-natured manners charming all who met him, and so he will be missed by many. How his accident originated is yet to be ascertained, but there is little doubt that had he been higher up when the machine got out of control, he would have been able to save himself.


Les vainqueurs de la Coupe d'Avion Maritime "Jacques Schneider" 1er Howard Pixton – 2e Burri (20 Avril 1914)
E. Marchessaux.
FLIGHT

A remarkable photograph secured by Mons. E. Marchessaux at Monaco on April 20th, during the final contest for the Schneider Aviation Cup.—This negative is absolutely untouched, and shows Mr. Howard Pixton's Sopwith machine passing the Franco-British seaplane piloted by M. Burri. The above is one of the autograph photographs of the amateur photographer which he presented to the two pilots who finished for this cup.

THE HENRY FARMAN SEAPLANE.

Of the difficulties which confront the designer of waterplanes none is perhaps greater than that of making adequate provision for the absorption of shocks due to alighting on the surface of the water. A study of some of the most successful waterplanes appears to indicate that the systems employed by designers fall into three categories. One type is characterized by flat-bottomed floats flexibly suspended from the chassis, another has rigidly mounted floats with either "V" shaped or rounded bottoms, which serve to lessen the shock when alighting, since they allow the float to sink partly into the water, thus gradually taking the load as the amount of displacement is increased, while the third type is in reality a combination of the other two, having floats with rounded or "V" shaped bottoms flexibly mounted. It will be readily seen that in the third type a form of progressive springing may be obtained by suitably proportioning the shape of the float bottom and the flexibility of the shock absorbers. It is too early yet to venture an opinion as to which type will ultimately survive, but the method of springing the floats in the Henry Farman seaplane, which belongs to the first-mentioned type, is so ingenious as to entitle this machine to special attention on that account only, apart from any other merits it may possess.



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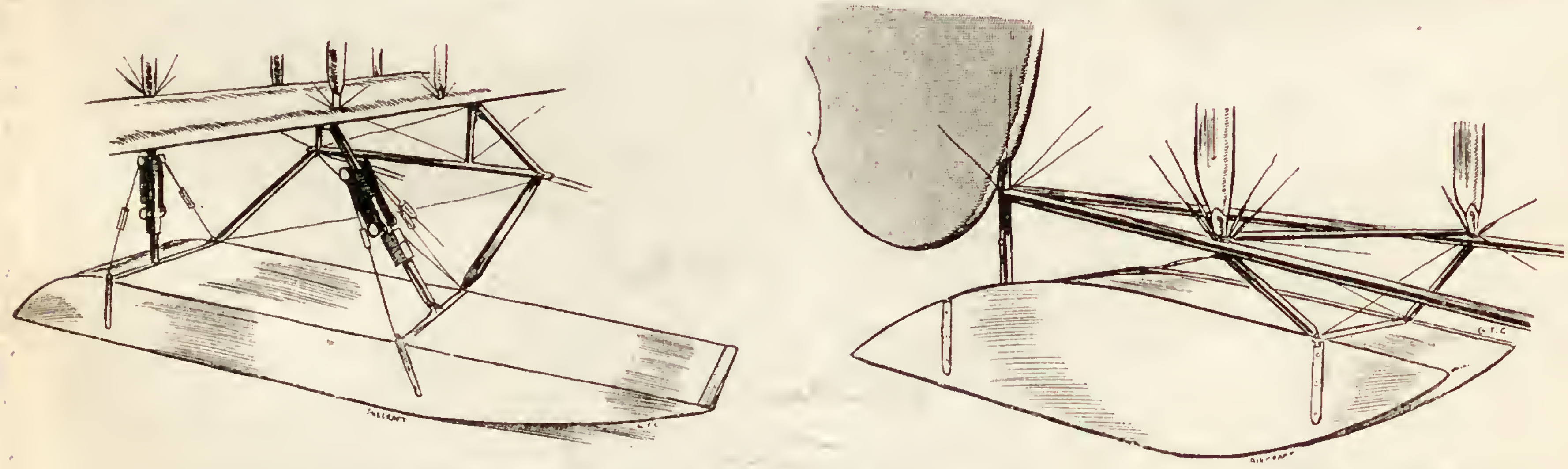
Sketch showing starting handle and petrol tank mounting on H. Farman seaplane.



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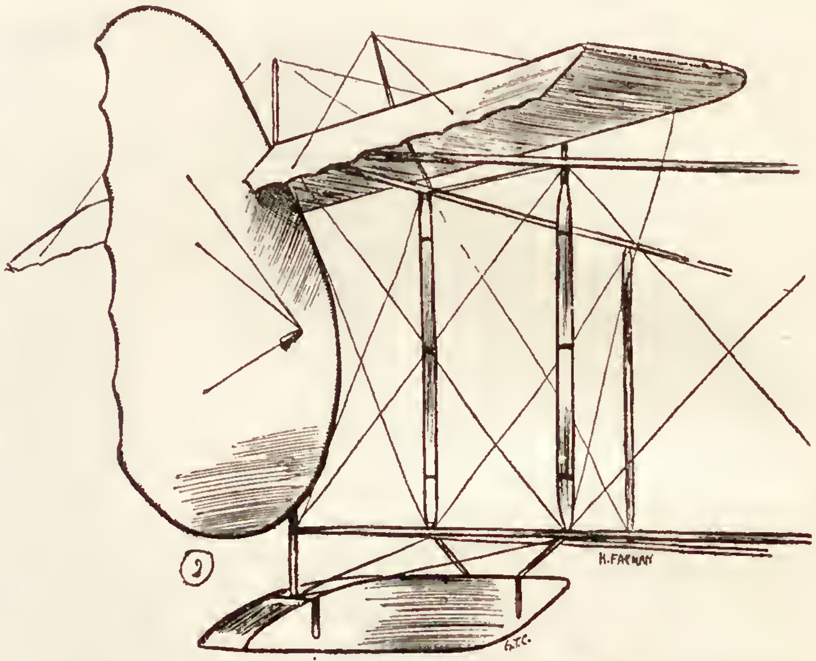
One of the main floats with its attachment on the H. Farman seaplane, and on right the tail float.

The machine itself differs in detail only from the land machines of the same make, which are already familiar to our readers, such alterations as have been effected being more in the nature of detail improvements and general dimensions; as an aeroplane the machine remains unaltered. One of the characteristics of the Henry Farman biplane that has been retained in this machine is the comparatively small gap between the planes. This is all the more noticeable on account of the increased span of the upper plane, which has an even greater overhang than that of the land machines. The reason for increasing the span is no doubt that, in order to carry the extra weight of the floats, and still keep the loading reasonably low, greater area is required, and also the extra resistance on the upper plane helps to counteract the added resistance of the floats over that of the land chassis.



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Tail planes and float of H. Farman seaplane.

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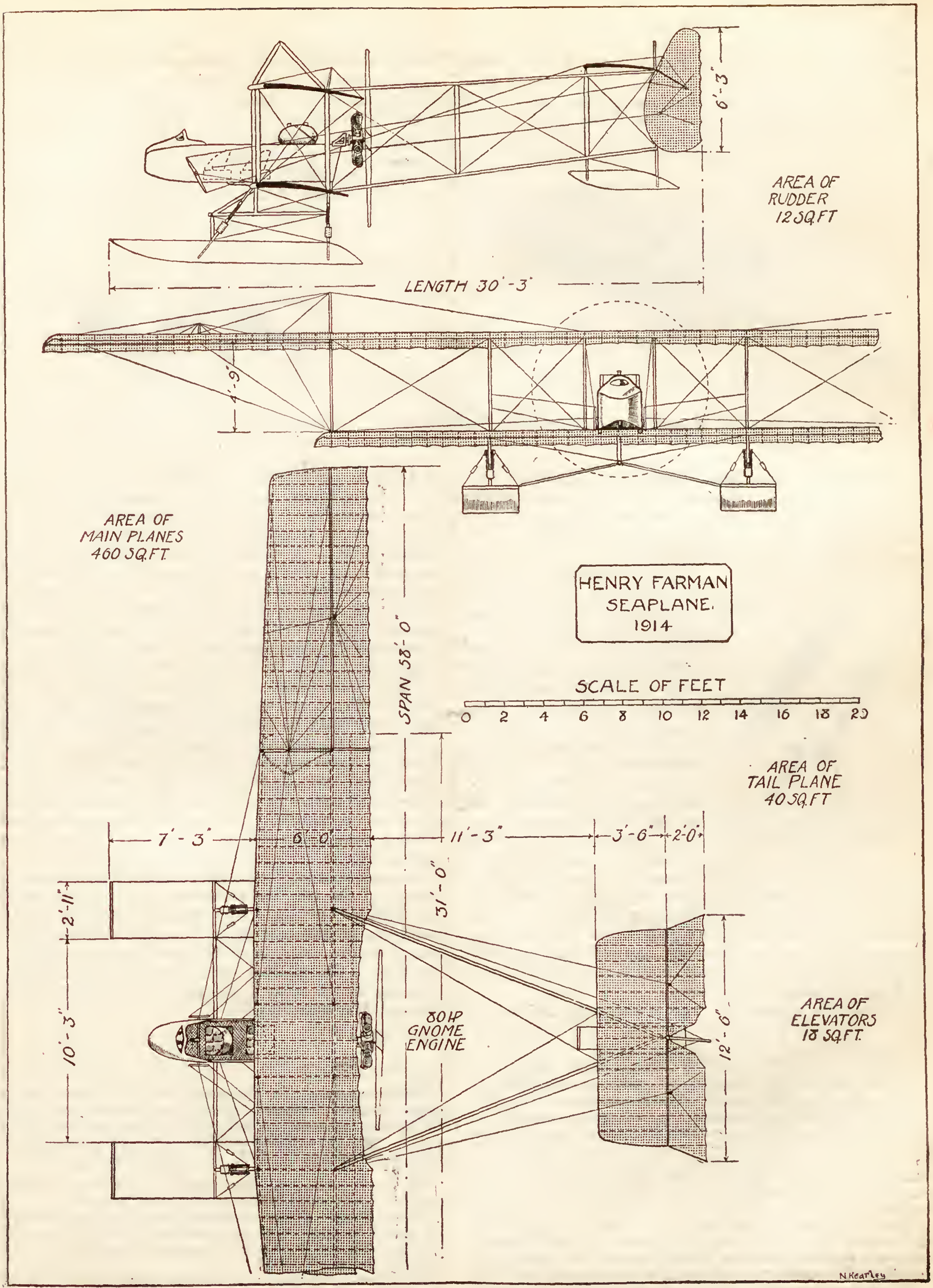
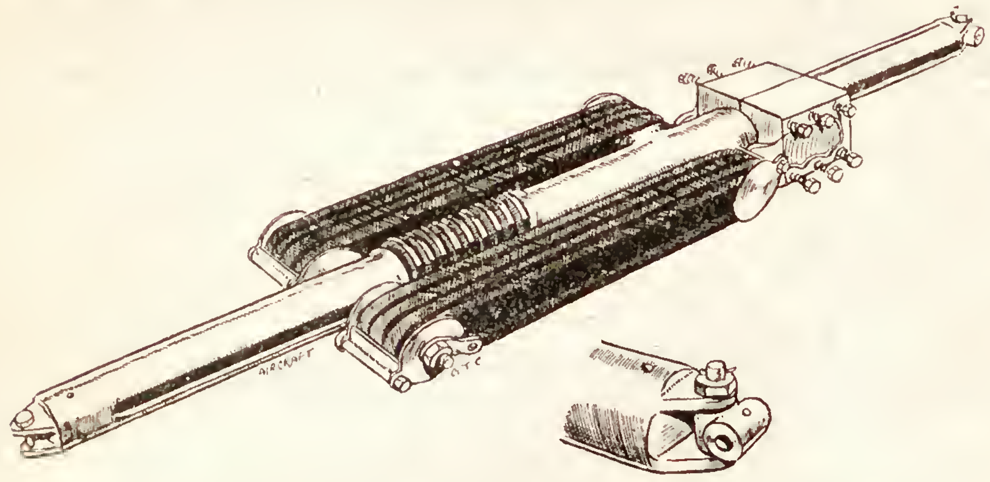


"Flight" Copyright.

H. FARMAN SEAPLANE.—Plan, side and front elevations to scale.

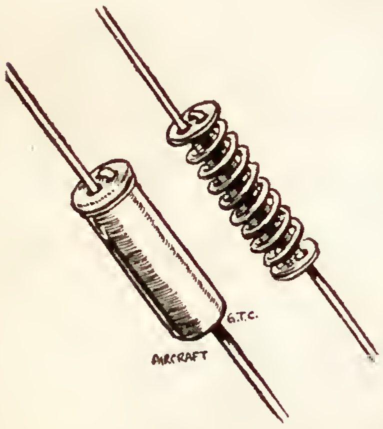
As in the land machines, compensated *ailerons* of large area are fitted to the upper plane extensions, and are operated by the usual Farman type control lever, whilst the balanced rudder is actuated by a pivoted foot bar. The pilot's and observer's seats, which are of the bucket type, and made of aluminium, are arranged tandem fashion on a long tool box. Behind the passenger's seat is a starting handle as shown in one of the accompanying sketches, and the back rest of the seat is pivoted at one end so that it may be swung upwards out of the way to provide clearance for the starting handle.



"Flight" Copyright.

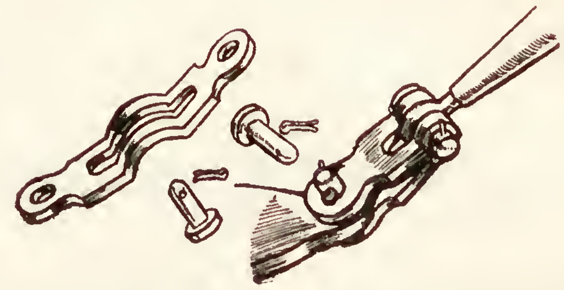
Detailed sketch showing method of springing on H. Farman seaplane.

The petrol and oil tanks are mounted on transverse steel tubes resting on the upper *longerons* of the *nacelle*, thus ensuring a free flow of petrol from the tank to the carburettor in all ordinary positions of the machine. An interesting point in connection with the construction of the *nacelle* is the employment of steel-tube *longerons* in the front portion. This method of construction has the advantage, amongst others, that there is no wood to splinter and injure the pilot in case of a smash. In the rear portion of the *nacelle*, where they serve as supports for the engine bearers, the *longerons* are of wood, thus lessening the vibration. The engine—an 80 h.p. Gnome—is mounted on overhung bearings, and sufficient clearance is provided for the propeller by cutting away part of the trailing edge of the upper plane.



The coil springs incorporated in chassis stay wires.

The two main floats, which are of the plain non-stepped type, are supported each on two telescopic steel tubes carrying cross-pieces that serve as anchorage for the rubber shock absorbers. The telescopic tubes are provided with universal joints at both ends to allow of the free movement of the floats. From the upper cross-piece, which is welded to the lower telescopic tube, wires are taken to the gunwales of the floats. These wires have incorporated in them small coil springs enclosed in metal casings, as shown in the accompanying sketch, so that the floats are free to oscillate slightly around their longitudinal axis.



A neat steel clip which takes the place of the usual chain link.

Oblique transverse tubes run from the inner gunwales of the floats to a central tubular structure coming down from the *nacelle*. These tubes are attached to the structure by means of a hinged joint, whilst their attachment to the floats is by means of a ball-and-socket joint in order to allow of the upward travel of the float. The object of the hinged joint at the point of attachment to the central structure is to allow the outer ends of the tubes to travel upwards with the float whilst at the same time preventing the tubes from turning broadside on.

It will thus be seen that each float is capable of three separate movements, *i.e.*, it can move upwards and downwards bodily, it can rock slightly round its longitudinal axis, and, finally, as both front and rear chassis struts are provided with shock absorbers, the float can oscillate round its transverse axis. Under actual working conditions the movements of the floats are of course combinations of the three above-mentioned movements of which the floats are capable The flexibility of this arrangement is enormous as each float can adapt itself independently of the other to the unevenness of a rough sea.

A small float supported on four steel tubes takes the weight of the tail planes when the machine is at rest on the surface of the sea. The workmanship in the Farman machines already enjoys such an excellent reputation that it is unnecessary to enlarge upon it here—suffice it to say that, in the machine described, the workmanship is well up to the usual high standard maintained by the Aircraft Manufacturing Co.

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ROYAL FLYING CORPS (MILITARY WING).

War Office summary of work for week ending April 25th :—

No. 2 Squadron. Montrose.—The pilots of all three "flights" were out daily making reconnaissances, amongst other places to Edinburgh and Berwick, to select landing grounds. Lieut. Dawes flew from Farnborough to Montrose on Monday, the 20th, landing twice *en route* to fill up with petrol. His machine was a 70 h.p. Renault B.E. Lieut. Empson arrived at Montrose on Friday, 24th, on a Maurice Farman, having left Farnborough two days previously.

No. 3 Squadron. Netheravon.—In "C" Flight alone 2,000 miles were covered during the week. A reconnaissance scheme in conjunction with the Royal Engineers was carried out, and successful experiments with aerial photography were continued.

No. 4 Squadron. Netheravon.—Numerous flights were made daily, including several by Warrant and Non-Commissioned Officers. The workshops are now being fitted up with power-driven plant.

No. 5 Squadron. S. Farnborough.—The Squadron was engaged throughout the week on a practice mobilization. On Thursday, the 23rd, the Squadron was fully mobilized, and was inspected by the Director-General of Military Aeronautics and by the Aldershot Command Headquarter Staff. De-mobilization commenced on Friday.

No. 6 Squadron. S. Farnborough.—Reconnaissance flights over the country round Aldershot were carried out daily.

Flying Depôt. S. Farnborough.—The Flying Depôt was fully occupied with repair work to aircraft and mechanical transport, with assisting the Aeronautical Inspection Department, and the technical training of recruits.

Headquarter Flight. S. Farnborough.—Much flying was done in connection with experimental work. Numerous kite and free balloon ascents were also made.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

JACQUES SCHNEIDER INTERNATIONAL MARITIME RACE.

Luncheon to Mr. T. O. M. Sopwith and Mr. Howard Pixton.

To celebrate the British victory at Monaco on April 20th, 1914, the Royal Aero Club will entertain Mr. T. O. M. Sopwith and Mr. Howard Pixton to luncheon at the Royal Automobile Club, Pall Mall, S.W. (by kind permission) on Tuesday, May 12th, 1914, at 1.15 p.m.

The Marquess of Tullibardine, M.V.O., D.S.O., M.P., the Chairman of the Club, will preside.

In order to facilitate the arrangements, Members are requested to notify the Secretary as early as possible, if it is their intention to be present.

Tickets, inclusive of wines, 10s. 6*d*. each.

Members are notified that on this occasion they may be accompanied by one guest only.

HAROLD E. PERRIN, Secretary.

Royal Aero Club,
166, Piccadilly, W.

Committee Meeting.

A MEETING of the Committee was held on Tuesday, April 28th, 1914, when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Prof. A. K. Huntington, Major F. Lindsay Lloyd, Mr. F. K. McClean, Mr. J. T. C. Moore-Brabazon, Mr. Alec Ogilvie, Mr. Mervyn O'Gorman, C.B., Mr. C. F. Pollock, Com. C. R. Samson, R.N., and the Secretary.

New Members.—The following new Members were elected:—Lieut. I. M. Bonham-Carter, Leonard Carter, G. B. M. Fleming, Aubrey Hyman, Henri André Jouve, W. Joynson-Hicks, M.P., C. F. Lan-Davis, Prince Leon Sapieha de Koden, S. A. Screeton, E. O. Musgrove Slatter, and Frederick Wilkinson.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

762 2nd Lieut. John Bruce Bolitho (Devonshire Regiment) (Bristol Biplane, Bristol School, Salisbury Plain). April 15th, 1914.
763 Prince Leon Sapieha (Austrian Subject) (Grahame-White Biplane, Grahame-White School, Hendon). April 15th, 1914.
764 2nd Lieut. John Bower Harman, R.F.A. (Bristol Biplane, Bristol School, Salisbury Plain). April 15th, 1914.
765 (Hydro-aeroplane) Oswald Lancaster (Hydro-aeroplane, Lakes Flying Co., Lake Windermere). April 15th, 1914.
766 Comte Jacques de Fitz-James (Vickers Biplane, Vickers School, Brooklands). April 16th, 1914. (Subject to permission of Aero-Club de France.)
767 Ernest Victor Samuel Wilberforce (Vickers Biplane, Vickers School, Brooklands). April 16th, 1914.
768 Mark Dawson (Vickers Biplane, Vickers School, Brooklands). April 16th, 1914.
769 George Carruthers (Caudron Biplane, Ewen School, Hendon). April 21st, 1914.
770 Geoffrey Charles Gold (Blériot Monoplane, Blériot School, Hendon). April 21st, 1914.
771 Lieut. Philip Stafford Myburgh, R.F.A. (Bristol Biplane, Bristol School, Salisbury Plain). April 21st, 1914.
772 Lieut. Reynell Henry Verney, A.S.C. (Caudron Biplane, Ewen School, Hendon). April 22nd, 1914.
773 Lieut. William Henry Dyke Acland (Vickers Biplane, Vickers School, Brooklands). April 22nd, 1914.

Jacques Schneider International Maritime Race.—The following is the translation of a letter received from the Aero Club de France:—

> "We have great pleasure in sending you our most hearty congratulations on your recent brilliant victory in the Jacques Schneider International Maritime Race.
>
> "We had hoped indeed, to retain this valuable trophy, but it is a consolation to us that it has been won by a nation who is the friend of France, whose Aero Club entertains the best relations with you.
>
> "We are pleased to take advantage of the visit of your King to Paris at the present time to send you our heartiest greetings and best wishes for your prosperity."

Luncheon to Mr. T. O. M. Sopwith and Mr. C. Howard Pixton.—The Committee being of opinion that many Members of the Club would like to join in celebrating this splendid British victory, it was decided to entertain Mr. Sopwith and Mr. Pixton to luncheon. The Secretary was instructed to make the necessary arrangements, particulars of which appear in these notices.

Age Limit for Aviators' Certificates.—On the motion of Mr. Mervyn O'Gorman, C.B., seconded by Mr. Frank McClean, it was unanimously resolved to recommend to the Fédération Aéronautique Internationale at its next meeting that the age limit be reduced from 18 years to 17 years.

British Altitude Records.—The report of the National Physical Laboratory on the barographs used by Eng.-Lieut. E. F. Briggs, R.N., in his flight on a Blériot Monoplane, on March 11th, 1914, at Eastchurch was considered. It was unanimously resolved that the British Altitude Record for pilot alone be granted to Eng.-Lieut. E. F. Briggs, R.N., the height accomplished being 14,920 ft. The previous Record was held by Capt. J. M. Salmond, R.F.C., being 13,140 feet.

Appointment of Timekeepers.—The following Official Timekeepers were appointed for the year 1914:—

F. T. Bidlake
J. H. Burley
A. Deacon
T. D. Dutton
A. V. Ebblewhite
A. Fattorini
C. P. Glazebrook
H. Hewitt Griffin
A. G. Reynolds
Z. Wheatley

F.A.I., Conference, Paris.—Mr. Griffith Brewer and Mr. J. T. C. Moore-Brabazon were appointed to attend the Extraordinary Conference of the F.A.I., to be held in Paris on Tuesday next, May 5th, 1914. This Conference will be attended by delegates from all countries, and it is expected that Officials from the various Governments will also be present. The object of this Conference is to discuss fully, the question of Aerial Navigation Regulations and particularly Prohibited Areas.

Flying to the Danger of the Public at Brooklands.—The Committee had before them reports received from the Brooklands Automobile Racing Club, regarding the flying of Mr. C. F. Lan-Davis over the Public Enclosures at Brooklands at a low altitude on Saturday, April 11th, 1914.

Mr. C. F. Lan-Davis was called before the Committee to explain the circumstances.

The Committee found that the flying was of a nature which endangered the public and showed great lack of judgment. Taking into consideration his limited experience, the Committee decided to confine the punishment to a severe censure and to caution him as to his future flying.

Public Safety and Accidents Investigation Committee.

A meeting of the Public Safety and Accidents Investigation Committee was held on Tuesday, April 28th, 1914, when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Eng.-Lieut. E. F. Briggs, R.N., Mr. F. K. McClean, Mr. Alec Ogilvie, Major-Gen. R. M. Ruck, C.B., R.E., Com. C. R. Samson, R.N., and the Secretary.

Col. H. C. L. Holden, C.B., F.R.S., was unanimously elected Chairman for the year.

Fatal Accident to Sergeant E. N. Deane.—The Committee received the report of the Club's representative, and eye-witnesses of the accident attended and gave evidence.

The report of the Committee was drawn up and ordered to be submitted to the Committee.

Fatal Accident to Mr. G. L. Gipps.—Draft report was considered and passed and ordered to be submitted to the Committee.

The enquiry into the accidents of Capt. C. P. Downer, Capt. C. R. W. Allen, Lieut. J. E. G. Burroughs, Lieut. H. F. Treeby, and Mr. E. T. Haynes was deferred.

Competitions Committee.

A meeting of the Competitions Committee was held on Thursday, April, 23rd, 1914, when there were present: Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Major F. Lindsay Lloyd, Mr. F. K. McClean, and the Secretary.

Gordon-Bennett Eliminating Trials.—The arrangements for the Gordon-Bennett Eliminating Trials were discussed. It was decided to allow each entrant to fly three machines in the Eliminating Trials.

The Secretary was instructed to ascertain from the War Office if arrangements could be made for holding the Trials on Salisbury Plain towards the end of August.

It was decided to invite the entrants to the next meeting of the Competitions Committee to discuss the details of the Trials. This meeting will be held on Thursday, May 7th, 1914, at 4 p.m.

Royal Aero Club Golf Match.

A golf match has been arranged between the Royal Aero Club and the Royal Automobile Club, and will take place at Huntercombe on Thursday, May 21st, 1914. The match will be eight a side, and will be played on handicap, singles in the morning and foursomes in the afternoon.

Members wishing to take part are requested to communicate with the Secretary, stating their handicap.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

MONDAY, last week, the following machines were up:—No. 27 Sopwith, 80 h.p.; 40 Caudron, 50 h.p.; 3 Short, 80 h.p.; 50 B.E., 70 h.p. Renault; 65 Short, 80 h.p., cross-country to Chatham and back; 39 Blériot, 80 h.p. Le Rhone; 16 Avro, 100 h.p.

Tuesday, No. 34 Short, 50 h.p.; 66 Short, 80 h.p., gun machine.

The following made a fine flight to Dover, flying over the Royal yacht in the harbour before leaving for France and returning:—No. 50 B.E. Renault, 70 h.p., Com. Samson; 39 Blériot, 80 h.p. Le Rhone, Lieut. Briggs; 40 Caudron, 50 h.p., Lieut. Osmond; 27 Sopwith, 80 h.p., Sub-Lieut. Littleton; 16 Avro, 100 h.p., Sub-Lieut. Pierse; 3 Short, Sub-Lieut. Rainey, 80 h.p.; 34 Short, 50 h.p., Private Edmonds, R.M.L.I.; Flight Com. Seddon also flew from Isle of Grain.

Wednesday, fine morning, storm midday. No. 2 Short 50 h.p. to Isle of Grain and back; 10 Short, 140 h.p.; 39 Blériot, 80 h.p. Le Rhone; 66 Short, 80 h.p., gun machine. The following were scouting nearly all day:—No. 3 Short, 80 h.p., Lieut. Finch-Noyes; 16 Avro, 100 h.p., Sub-Lieut. Pierse; 27 Sopwith, 80 h.p., Lieut. Littleton; 34 Short, 50 h.p., Private Edmonds, R.M.L.I.

Thursday, rained early morning, later fine. Major Gerrard, R.M.L.I., on B.E. 70 h.p. Renault, arrived from Central Flying School; also Lieut. Babbington, R.N., on B.E. 70 h.p. The following were again scouting: No. 65 Short, 80 h.p., Lieut. Osmond; 3 Short, 80 h.p., Lieut. Finch-Noyes; 27 Sopwith, 80 h.p., Lieut. Rainey; 16 Avro, 100 h.p., Sub-Lieut. Pierse; 34 Short, 50 h.p., Private Edmonds, R.M.L.I.; also up, 10 Short, 140 h.p.; 39 Blériot, 80 h.p. Le Rhone; 104 Sopwith, 80 h.p.

Friday, fine, rather windy. More scouting, the following being up: 39 Blériot, 80 h.p. Le Rhone, Lieut. Briggs; 49 B.E., 70 h.p. Renault, Lieut. Osmond; 3 Short, 80 h.p., Sub-Lieut. Young; 65 Short, 80 h.p., Lieut. Vernon; 27 Sopwith, 80 h.p., Sub-Lieut. Rainey; 104 Sopwith, 80 h.p., Sub-Lieut. Marix; 10 Short, 140 h.p., Com. Samson; 2 Short, 50 h.p., P.-O. Andrews; 34 Short, 50 h.p., Private Edmonds, R.M.L.I.; two flights 27 Sopwith, 80 h.p., machine gun practice.

Saturday, fine. Major Gerrard, B.E., 70 Renault; Lieut. Babbington, B.E., 70 Renalt, returned to Central Flying School; Sub-Lieut. Rainey on 27 Sopwith, 80 h.p., with passenger, flew to Southampton; 2 Short 50 h.p., 10 Short 140 h.p., 3 Short 80 h.p., and 39 Blériot 80 h.p. Le Rhone were also up.

Mr. Churchill, accompanied by Lieut. Spencer Grey, visited the aerodrome, and made an inspection, returning to the Isle of Grain about midday.

Civilian Flying.—Monday, the Hon. M. Egerton was out on his 50 h.p. Short. Mr. Sydney Pickles made a fine flight to Whitstable and back on his 50 h.p. Blériot-Anzani.

Tuesday, the Hon. M. Egerton was again out.

Wednesday, Mr. Sydney Pickles started for Hendon on his 50 h.p. Blériot, with M. S. Marsden as passenger, but ran into a storm near Gillingham and had to return.

Thursday, Mr. Ogilvie was out first on his Wright 50 N.E.C. engine, second on new machine, same type, 25 h.p.; this machine is very smart, considering the h.p., and climbs beautifully. Mr. Sydney Pickles was also out.

Friday, Hon. M. Egerton and Mr. F. McClean were out.

Saturday, Mr. F. McClean made two flights with passengers.

Sunday, fine. Hon. M. Egerton two flights, Prof. Huntington two and taxying grounds with passenger. Mr. Ogilvie on both his machines. Mr. Jezzi testing engine.

Brooklands Aerodrome.

ON Monday morning, last week, the Vickers and Bristol Schools were working. In the afternoon, Herr Roempler was out on the D.F.W. biplane, Mr. Waterfall on the Martinsyde monoplane, and Lord Edward Grosvenor's mechanic was tuning up his 50 h.p. Blériot. The Vickers pupils were again at work. The wind velocity registered was up to 22 m.p.h.

Capt. Herbert arrived from Netheravon on a Maurice Farman biplane on Tuesday morning. Herr Hans Vollmuller arrived on the Albatros biplane from Farnborough with Major Brooke-Popham as passenger. In the afternoon, Mr. Waterfall (with Mr. Guy Blatherwick as passenger) flew to Farnborough. Capt. Herbert returned to Netheravon on the Maurice Farman with Major Brooke-Popham as passenger. Mr. Alcock made several flights on the Sunbeam-engined Maurice Farman. Lieut. Collett had a flight on the Albatros biplane, with which he was much impressed. The Vickers pupils were busy. Mr. Barnwell circled round the Parseval airship, which was on its way back from Dover. Lieut. de Havilland arrived with a passenger from Farnborough. Wind blowing up to 18 m.p.h.

The Vickers pupils were out on Wednesday. The Sopwith "scout" biplane flew to Farnborough. Mr. W. H. Dyke Ackland passed his tests in excellent style on a Vickers biplane, rising to 1,200 ft. in the altitude tests. Wind blowing up to 26 m.p.h.

On Thursday, Mr. Merriam was testing a new Bristol biplane, and was afterwards engaged with pupils. In the afternoon, Lieut. Robin Grey arrived from Farnborough on a 50 h.p. Avro. Mr. Barnwell was flying across country with a pupil on the 70 h.p. Vickers biplane. The Bristol and Vickers Schools were at work. Wind blowing up to 29 m.p.h.

On Friday, the Vickers and Bristol pupils were busy. Lieut. Robin Grey left for Eastbourne on the 50 h.p. Avro. Arrival of Lord Edward Grosvenor's second Blériot monoplane (two-seater 80 h.p. Le Rhone). In the afternoon Lieut. Collett made a couple of flights on the Albatros biplane, after which Herr Vollmuller made a flight. Mr. Waterfall arrived back from Farnborough on the Martinsyde monoplane. Arrival of No. 2 Sopwith "scout" biplane; erection and engine-testing. Mr. Gustav Hamel flew the Albatros biplane (his first trip on a biplane). Wind velocity up to 31 m.p.h.

Lieut. Collett, on Saturday, took Comte James FitzJames for a flight on the Albatros biplane. Mr. Barnwell was testing the 100 h.p. Vickers gun-carrying biplane. Lieut. Collett made a number of fine flights on the D.F.W. biplane, as did Herr Vollmuller on the Albatros biplane. Mr. Pixton was out on the No. 2 Sopwith "scout" biplane. Mr. Raynham was testing the A.B.C.-engined Avro biplane.

On Sunday, fine exhibition flights were made by Mr. Pixton on the Sopwith "scout" biplane, Herr Vollmuller on the Albatros biplane, Mr. Merriam on the Bristol biplane, Mr. Knight on the Vickers biplane, and Mr. Raynham on the Sopwith "scout" biplane. The winners of the ballot for the free passenger flights—Mr. Herbert Evans, 4, Hollick Buildings. Woking, and Mr. Douglas William Henderson, 203, Oxford Road, Reading—were taken for flights respectively by Herr Vollmuller on the Albatros, and Mr. Merriam on the Bristol biplanes.

Bristol School.—Monday, last week, passenger tuition was given to Lieut. Britten, Lieut. Smithies, and Lieut. Mills (new pupil). Lieut. Smithies followed with solo circuits. Tuesday and Wednesday, owing to the strong breeze, the pupils assisted in the repair and erection of machines in the hangars.

A new school biplane was brought and tested by Merriam, Thursday, who then took Lieut. Mills for a passenger flight on straights and circuits. Mr. Eastwood (new pupil) was afterwards taken for his first trip. Merriam then gave tuition to Mr. Racine Jacques and Lieut. Mills.

Friday, passenger tuition to Mr. Lucas and Lieut. Mills. The wind then prevented further school work.

Tuition impossible Saturday owing to bad weather.

Vickers School.—Monday, last week, Barnwell, Elsdon and Knight on biplanes, with Major Phillips, Lieuts. Wood-Smith, Farie and Leighton. Lieuts. Acland and Leighton solos.

Tuesday, Barnwell, Elsdon and Knight on biplanes with Major Phillips, Lieuts. Acland and Wood-Smith, and Messrs. Murray, Liddell and Collins. Mr. Hinshelwood on Blériot mono. Knight and Elsdon on biplane with Lieut. Underhill.

Knight and Elsdon on biplanes, Wednesday, with Major Phillips, Lieuts. Farie and Wood-Smith, and Messrs. Liddell, Collins and Murray. Lieuts. Underhill and Acland solos. Lieut. Acland for *brevet*, getting through in fine style.

Thursday, Barnwell, Knight and Elsdon on biplanes with Major Phillips, Lieuts. Wood-Smith and Underhill, and Messrs. Murray, Liddell and Collins.

Barnwell, Knight, Elsdon and Webb on biplanes, Friday, with Major Phillips, Lieuts. Underhill and Wood-Smith, and Messrs. Liddell and Collins. Lieuts. Underhill and Leighton and Mr. Liddell, solos.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Mr. Weber rolling with Instructor Howarth and straights with Instructor Strange. Messrs. Smiles and Parker solo straights, circuits, &c., Major Piercy straights with Instructors and alone. Messrs. Boyesen, Robinson, Lowe, Moore, Cowley, Norris straights with Instructors Strange, Howarth, and Cripps in passenger seat.

Tuesday, Messrs. Parker, Smiles, and North solo circuits, figures of eight, &c., Messrs. Weber, Cowley, Moore, Robinson straights with Instructors Howarth, Strange, and Cripps. Mr. Peck (new pupil) rolling with Mr. Cripps. Major Piercy solo straights.

Wednesday, Mr. Peck rolling alone. Messrs. Weber, Robinson, Cowley, Peck, Moore, straights with Instructors Strange and Howarth in passenger seat. Messrs. Parker, Smiles, and Major Piercy solo straights, circuits, &c. Mr. Moore solo straights.

Friday, Major Piercy and Mr. Parker straights, circuits, &c. Messrs. Boyesen, Cowley, Peck straights with Instructors Howarth and Strange.

Beatty School.—Pupils up with Instructor Baumann on dual-control Wright machine last week. Monday morning, Messrs. Ding 12 mins., Watts 5 mins., Ruffy 15 mins., Stewart 7 mins., Hodgson 10 mins., Bentley 10 mins., Major Piercy 22 mins. Afternoon, Messrs. Watts 20 mins., Ding 15 mins., Ruffy 10 mins., Bentley 8 mins., Stewart 8 mins., Hodgson 7 mins.

Tuesday morning, Ding 9 mins., Bentley 10 mins., Watts 5 mins., Ruffy 10 mins., Hodgson 11 mins. Afternoon, Watts 12 mins., Ding 10 mins., Ruffy 7 mins., and Major Piercy's son was taken up by Baumann for a joy ride.

Wednesday, Ding 15 mins., Ruffy 9 mins., Watts 18 mins., Bentley 10 mins., Piercy 8 mins., Hodgson 8 mins. During the Wednesday morning training Mr. Ding was up by himself doing circuits in very good style, then Mr. Ruffy went up with Baumann, and did some very good figures of "8"; afterwards Mr. Watts took the machine up by himself, and seems to be handling it very well.

On Thursday Mr. Baumann took part in the night flying, and made some very good flights.

Friday, Messrs. Ding 9 mins., Garvin 4 mins.

W. H. Ewen School.—School was out on Monday, last week, at 6 a.m. After test flight by Mr. W. T. Warren on *brevet* machine Mr. G. Carruthers did several circuits and figures of eight.

Tuesday morning school out at 5.30 o'clock, Mr. Verney doing straights and circuits, after which Mr. G. Carruthers went through his *brevet* tests in excellent style, climbing 800 ft.

After test flight Wednesday at 6 a.m. by Mr. W. T. Warren on *brevet* machine, Mr. Verney did circuits and figures of eight, afterwards going through the tests for the R.Ae.C. certificate in excellent style. Mr. R. McGregor did straights on 35 h.p. Caudron No. 1.

Mr. J. Bankes-Price, who recently passed his *brevet* tests on a 35 h.p. Caudron biplane at the W. H. Ewen School, Hendon.

At 6 a.m. on Friday, Mr. Warren was out with pupils. After test flight by him, Mr. R. G. Garvin did straights and circuits, and Mr. McGregor straights.

Hall School.—Monday last week, Messrs. A. P. Arcies and P. Palmer had instructional flights on Avro at 1,000 ft. Later on in day J. L. Hall, with H. C. G. Allen, mounted to 3,000 ft., and had beautiful view of sunset, afterwards descending in long *vol plané*.

Tuesday, J. L. Hall out on Avro, taking up Messrs. Haines and R. Gibson 500 ft., the latter taking snapshots. H. Gearing also had passenger flight 1,500 ft.

J. L. Hall, Wednesday, on Avro with pupils. Thursday, J. L. Hall exhibit flight. Friday, J. L. Hall taking instruction in morning. Messrs. A. Gibson and Harries doing straights on 25 Anzani, R. Gibson showing good progress for a beginner. J. L. Hall out testing No. 1 Caudron.

Mr. Victor S. Wilberforce, who last week took his *brevet* at the Vickers Flying School, Brooklands, on Vickers biplane.

Saturday and Sunday, J. L. Hall exhibition on Avro.

Salisbury Plain.

Bristol School.—Passenger tuition Monday, last week, to Mr. Hay (3), Mr. Parker (4), Capt. Walcot (2), and Air-Mechanic Locker (2). Solo flights were made by Lieut. Myburgh (4), Lieut. Rabagliati (4), and Capt. Walcot. Lieut. Myburgh successfully completed the first two parts of his certificate tests.

Tuesday, Jullerot, Stutt, and Voigt gave tuition to Lieut. Rabagliati, Lieut. Smythies, Mr. Parker (2), and Mr. Hay (2). Air-Mechanic Locker, Capt. Walcot (2), Lieut. Myburgh, Lieut. Rabagliati, Lieut. Smythies made solos, after which Lieut. Myburgh completed his certificate tests at 720 ft.

Passenger tuition was given Wednesday to Mr. Parker (2), Mr. Hay (2), Mr. Gresley (2), and solo flights were executed by Capt. Walcot (2), Lieut. Smythies (3), Lieut. Rabagliati (4), Air-Mechanic Locker (3), and Mr. Hay.

Thursday, the weather was too bad for tuition to pupils, the wind continuing throughout remainder of the week.

Shoreham Aerodrome.

The weather has been favourable for morning and evening flying every day last week, and much work has been done.

Pupils doing straights alone were: Ackman, Gates, Cannon, Sholt-Douglas, Mayland-Wilson, C. H. Maskall, A. Maskall, and each of these pupils have also been up a number of times on the Henry Farman-type machine with the pilot, Mr. W. H. Elliott.

On Sunday a considerable advance was made by the pupils, four of whom did their first circuit alone in the evening, these being Messrs. A. Maskall, R. C. Cannon, C. H. Maskall, and D. Ackman.

On Tuesday last, Mr. Elliott, with Mr. B. H. England as passenger, flew to Horsham on the school machine, returning on Wednesday morning to the 'drome at well over 3,000 ft.

Pashley School.—The Instructor for last week was C. L. Pashley. The following were up with instructor: Gray, Dawson and Mortimer. Straights alone by Gray and Mortimer, and circuits and eights by Hale and Mortimer.

THE RATIONAL DESIGN OF AEROPLANES.*

By ARCHIBALD R LOW, M.A., A.F.Ae.S.

AT the outset the author examines the nature of the assumption made in dealing with the flow of fluids in impulse turbines, and observes that the allowance to be made for the loss of energy due to turbulence or fluid friction is based on experiment and allowed for by empirical methods, while the path of a particle of fluid is undetermined. In hydrodynamics, he points out, the first step is the solution of the problem involved in the flow of a very large stream of fluid past a very long and narrow plane barrier, which problem is the fundamental problem of flight. The "cloud" of particles is now a cloud of mutually interfering particles, and this mutual interference renders invalid all attempts to predict the general motion of a large mass of fluid by analogy with the motion of a single particle; so that, while the results of hydrodynamics are of great interest and value from the point of view of giving a sound outlook on the nature of fluid flow, when it comes to getting reasonably accurate numerical values, we are thrown back on experimental methods. He proceeds to indicate that there is so great a difference between the actual reactions in fluid flow and those derived from hydrodynamical theory, as at present understood, that quantitative results cannot be entertained; but he gives several examples which show that hydrodynamics can be employed to predict the general course of experimental results. He observes that in aerodynamics we should try to form a correct picture of the lines of flow and then think in terms of velocities and pressures in accordance with Bernouilli's Theorem, and continues:—

Turning now to experimental work, most of the results to-day at our disposal are the result of wind-tunnel experiments. It has been definitely asserted by ill-informed writers that the reaction of still air on a moving surface differs from the reaction of uniformly moving air on a fixed surface in its nature. This assertion denies, of course, the relativity of motion, and so by implication Newton's laws. It is therefore necessary to restate the elementary fact that the discrepancies between wind-tunnel work and measurements on aeroplanes in mid-air, arise from the fact that the walls of the wind-tunnel reduce the mass of free air, and by their friction disturb the uniformity of flow, not to speak of lack of uniformity of intake. There is further the effect of the kinematic coefficient of viscosity in creating a certain lack of aerodynamic similitude. The same errors would be introduced if the air in the tunnel were still and the model were carried along it, with the exception of the effect of wall friction in creating lack of uniformity.

We therefore come to wind-tunnel experiment, knowing that many small sources of error exist, and, as far as those outside the National Physical Laboratory are concerned, not knowing whether the average absolute error in applying results to *full-sized aeroplanes* is 20 per cent. or 2 per cent.

Empirical Formulæ.—The results of these experiments are expressed in the form

$$\left.\begin{aligned} R &= KSV^2 \\ Y &= K_ySV^2 \\ X &= K_xSV^2 \end{aligned}\right\}$$ where K, K_y, K_x, are the coefficients of total reaction of lift and of drag.

The assumption that the reaction and its components are proportional to the square of the velocity requires correction on account of the viscosity of air, but as these corrections are refinements beyond the scope of the present paper, it is sufficient to draw attention to the existence of the effect.

Now the object of every experimenter has been to express K_y K_x as functions of the angle i of chord incidence.

It is needless to say that all such functions are empirical, and that on the closeness of the values given by the empirical formulæ to the observed readings depends the usefulness of the formulæ.

An example is shown in Fig. 1 of an experimental curve taken from Eiffel's work, and three empirical equations which differ only in substituting multiples of i for i, thus causing the curve of lift to fall off sooner. In this case the experimental curve of lift has its maximum at nearly 90° ÷ 5 or 18° of incidence. It is also found that the coefficients of lift and drag vary with the aspect ratio and with the camber, so that K_y and K_x are functions of incidence, camber, and aspect ratio.

Another form of the equations is

$$R = k\,(\Delta \div g)\,SV^2,\ Y = k_y\,(\Delta \div g)\,SV^2,\ X = k_x\,(\Delta \div g)\,SV^2,$$

where Δ is the weight of unit volume of air, g the acceleration of gravity, whence $K = k\,(\Delta \div g)$, $K_y = k_y\,(\Delta \div g)$, $K_x = k_x\,(\Delta \div g)$.

The dimensions of K, K_y, K_x, are those of

$$\frac{R}{SV^2} = \frac{[MLT^{-2}]}{[L^2L^2T^{-2}]} = \frac{[M]}{[L^3]}$$

which are the dimensions of density. The dimensions of k, k_y, k_x, are zero, since K and $\Delta \div g$ have both the dimensions of density. Using then the coefficients k, k_y, k_x, of zero dimensions, the following empirical expression follows, fairly closely, a wide range of values for various cambers and aspect ratios:—

$$k_y = [\cdot 53 + \cdot 10\,\psi]\sin \cdot 6\,\alpha^2 i + \cdot 20\,\psi$$
$$k_x = \cdot 48\,[\sin \cdot 3\,\alpha^2 i]^2 + \cdot 05\,\psi + \cdot 010$$

α^2 is the aspect ratio, so that if the surface is y^2 the sides of the (assumed) rectangular wing are αy and y/α. ψ is the angle, in radians, between the tangents at the leading and trailing edges taken on the upper surface just before the edges are rounded off on small radii. These are for surfaces of cylindrical section only. Surfaces with sections of variable curvature may be compared with the nearest cylindrical surface.

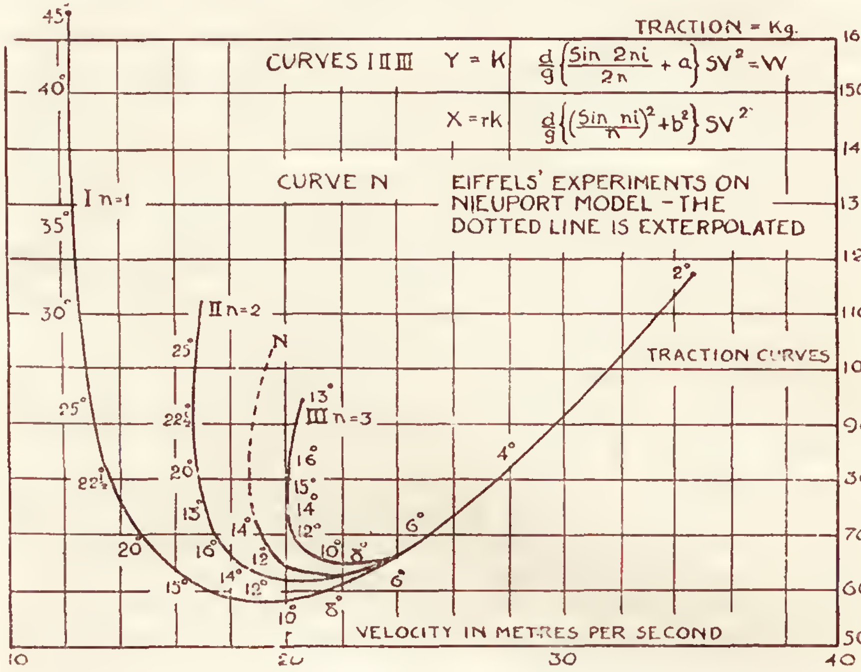

Fig. 1.

The following table gives values of ψ for different cambers:—

Camber.	Arc in radians.	Camber.	Arc in radians.
0	0	1 in 16	·50
1 in 30	·027	1 in 13·5	·059
1 in 27	·030	1 in 12	·066
1 in 20	·40	1 in 8	·098

In order to find the best gliding angle for a lifting surface only, it is necessary to take the ratio k_y/k_x and differentiate with respect to it α^2, and ψ and equate the partial differential coefficients to zero. This gives three equations between the three variables, and a solution is, therefore, obtainable if it exists. In practice, however, every engineer will prefer to draw curves of the ratio k_y/k_x and choose the best.

It is found that there is no limit to the increase of the aspect ratio, but that the best camber is about 1–20 or $\psi = \cdot 40$. This best gliding angle for surface only is often assumed to give the best gliding angle for the whole machine.

But here we must assume a constant added to k_x to account for stanchions and bracing which increase with the surface, and another constant to $k_x\,(\Delta \div g)\,S$ to represent the head resistance of the body and undercarriage, which are practically independent of the surface, so that the gliding ratio of the whole machine becomes $k_y \div (k_x + c_1 + c_2 \div S)$.

The gliding ratio is thus a function of the surface which in turn is a function of the horse-power, velocity and total weight, &c.

The variables which we have to introduce are—Surface, aspect ratio, camber, incidence, horse-power, useful weight, engine weight, glider weight, total weight. Of which any five may be taken as independent, the other as dependent. In order to solve formally for the best wing section for the whole machine, we have at least five variables, and the five partial differential coefficients of k_y/k_x with respect to these variables equated to zero, give the necessary equations for solution.

The lesson to be immediately drawn is that the problem of finding the best camber, chord, span, and incidence for a given machine is not so simple as that of finding the best proportions for wing only. Trial and error in the design room and tests in the field seem to indicate a camber of about 1 in 15 as a good average. It is possible, but unlikely, that further investigation will gain an appreciable advantage over the slow and costly process of trial and error.

Of air screws, scarcely anything can be said here, save that recent research by Mr. Bramwell of the National Physical Laboratory, has confirmed the hypothesis of Drzewiecki, first applied to water screws in 1882, that the analogy of lifting surfaces may be applied to elements of the blades. An assumed efficiency of seventy per cent. between thrust horse-power and torque horse-power is quite sufficiently accurate for all practical discussion of the general run of phenomena.

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* Abstract from a paper read before the Aeronautical Society of Great Britain on March 4th, 1914.

Stress Calculations.—It is now necessary to introduce the question of stress calculations. Each wing or supporting surface is attached to, and forms part of, a framed structure or girder. This girder is analogous to a girder bridge, whose own weight is unimportant in comparison with a dead load at the centre of the span. As the weight of the wing itself is supported by the distributed pressure of the wings, no matter how heavy the wings become, and how small the central load, the actual weight of the wing frame itself does not add to the stresses in its members. Taking into account the special conditions of loading, the established methods of calculating stresses in framed structures are immediately applicable.

It is known that in steady flight the root of the wing surface is more heavily loaded than the tip, and that the upper surface is more heavily loaded than the lower. What conventional loading are we to assume?

The whole question of local stresses in gusts is practically untouched. Again, we have combined compression and buckling in wing spars. Owing to the special form of loading and bracing the fibre stresses from these superposed forces and moments may be approximately equal.

The usual method of analysing these stresses at present is to break up the actual frame into a fictitious pin-joint frame, whose joints coincide with the points of attachment of stanchions and main spars. To these pin-joints a fictitious continuous beam is supposed to be linked by vertical links; and to this fictitious beam is applied the loading. In each continuous member the bending moments, points of inflexion and reactions at pin-joints are calculated by the theorem of three moments, usually on the assumption that the points of support are level under all loads, and the reactions vertical. The reactions so calculated are applied to the pin-joint frame and give compressions and tensions from the ordinary stress diagram for pin-joint frames. The stresses and bending moments so obtained are then superposed and each member is calculated for combined compression and buckling, the free length being taken as the distance between points of inflexion.

Many far-reaching assumptions underlie this method, all of which are approximate, and some of which may be very poor approximations indeed. Some obvious queries arise. Are the points of inflexion unaltered when end thrust or end tension is superposed on lateral load? What is the general nature of the movement of the points of support out of the straight line joining the two end points?

Another type of frame is rendered possible by the use of steel tube and rigid welded sockets for both spars and stanchions. As the whole frame is rigid, warping is impossible and *ailerons* must be used. So far as the writer knows, no solution of the stresses in this latter frame is available, though it is obviously stronger than a similar frame with pin-joints between the stanchions and the main spars.

To close this section, it is clear that the efforts of designers to lighten frame works have already reduced the weight of the glider for the load it has to carry.

The Coefficient of Glider Weight.—The writer has already, in the Journal, defined a coefficient of glider weight, and has pointed out its importance in determining the maximum useful load that can be lifted or the maximum speed that can be a tained with a given useful load. A good empirical equation for the lower limit of this coefficient to which the best efforts of structural design are tending, is an absolute necessity if general questions of limiting size, speed, useful weight, and desirable horse-power are to be answered accurately.

The Coefficient of Power Plant Weight.—Another coefficient, closely connected with the coefficient of glider weight, is the coefficient of power plant weight, "k_1," which is defined conveniently as the weight of all items which vary with the horse-power. It is a fair approximation to take a residual constant weight of about fifty kilograms for all horse-powers from 50 upwards, and to represent the additional total weight by the straight line diagram shown in Fig. 2 for the bare motor.

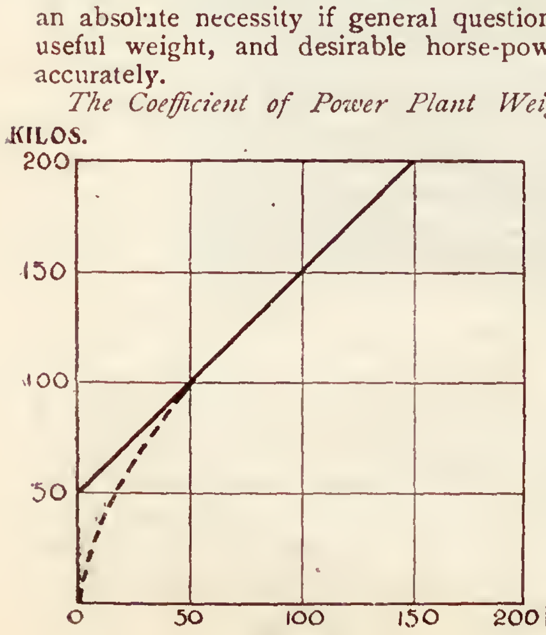


Fig. 2.

This diagram gives $k_1 = [(50 \div x) + 1]$ kilograms, where x = h.p. To this must be added the fuel weight, which is the weight consumed per hour per horse-power multiplied by the horse-power hours of the flight, and the same for cooling water. Further, an allowance must be made for tankage and radiators, say from 10 per cent. to 15 per cent. of fuel and water weights. Further elaborations of the values of k_1 cannot be indulged in here. It should be stated, however, as a matter of common knowledge, that air cooled motors are lighter than water cooled motors per horse-power, but that the consumption of petrol and lubricating oil is greater. The result is that if power plant weight per horse-power be plotted against hours flight, the straight line of weight for an air cooled motor will in general start much lower for very short flights, and will rise faster, crossing the water cooled line at somewhere between five and fifteen hours' duration.

These figures are only rough and require further very careful discussion by experienced and competent engineers. If, however, we assume that k_1 and k_2 are known, the former as the simple function of the horse-power x and time t, $k_1 = [(c_1 \div x) + c_2 + c_3 t]$ where c_1, c_2, c_3 are nearly constant coefficients drawn from experience, and if the aerodynamical coefficients k_x, k_y are reasonably represented by the empirical formulæ already given we are in a position to investigate the whole range of possible design for any power, useful load, surface, velocity, and range of speed in a quite general manner.

Stability.—No mention has yet been made of stability, and till this point it has been assumed that every machine is stable, or at least controllable. To discuss the problems raised in seeking stability, it is necessary to commence with the possibility of equilibrium in flight, for which only the position of the centre of gravity and the reactions on the planes should be known. If, however, any agency sets up oscillations, the whole question of dynamical stability is raised, involving the moments of inertia of the machine A, B, C, the products of inertia, if they exist, D, E, F, about the axes of rotation.

We require to know not only the coefficient of lift and drag for various incidences, but the coefficients of the rotary derivatives, k_{xu} k_{xv} k_{xr}, &c.—to extend Bryan's notation slightly—quantities whose experimental determination has not yet been published. From these, as we know, Professor Bryan has derived his special forms of Routh's discriminant functions $\mathfrak{A}$ $\mathfrak{B}$ $\mathfrak{C}$ $\mathfrak{D}$ $\mathfrak{E}$ $\mathfrak{H}$. And Mr. Bairstow has recently shown this society models whose $\mathfrak{A}$ $\mathfrak{B}$ $\mathfrak{C}$ $\mathfrak{D}$ $\mathfrak{E}$ $\mathfrak{H}$ were small negative quantities, and which had corresponding types of instability.

The systematic determination of stability coefficients can at present be undertaken by technical engineers of high competence and reliability. Yet it will not be long before every specification inviting tenders will require the results of stability calculations to be embodied in the tender, and he believed that at least two European Powers have inserted this requirement. The same is already true of nearly every other quantity referred to in this paper.

The object of this paper is achieved if it has brought emphatically to the notice of those interested in aviation what a formidable series of special developments of engineering science must be carried out before it will be possible to say in the design room, "These figures and these drawings will, if translated into wood and canvas, steel and brass, produce an aeroplane whose performance and air-worthy qualities will be thus and thus." That nation will take the lead whose scientists, and whose technical engineers, and whose works engineers, and whose pilots best understand each other and work together most cordially.

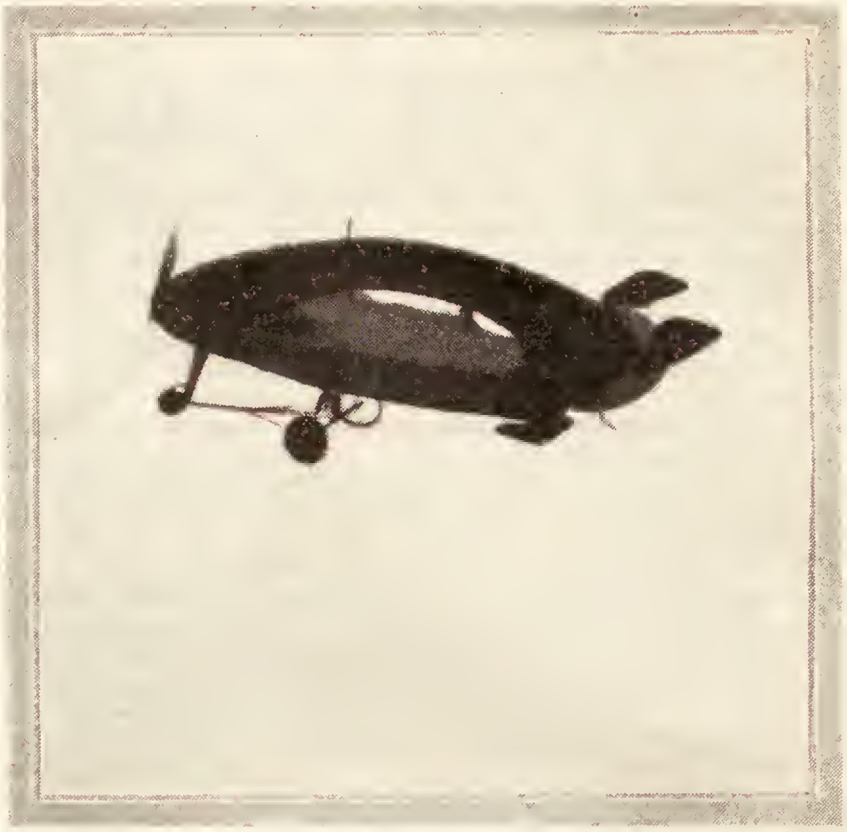
In the subsequent discussion, Dr. Thurston pointed out the importance of working from sound aerodynamical theory and how attempts to cut down weight often had the effect of increasing the head resistance. Mr. Bramwell said that the author of the paper, when he stated that the weight of wings was unimportant, was referring to steady flight, but accelerations from any cause render weight an important factor. At the N.P.L. they had achieved a considerable degree of accuracy in their measurements—the error not exceeding one half per cent.—and the smaller the model, the better. This error did not represent the actual value when applied to the full-sized aeroplane, as it would be necessary to make the scale correction. Mr. Green said that they had to start their design from consideration of the landing speed.

The Chairman (Mr. Mervyn O'Gorman), observed that the paper was full of suggestion, and advocated the setting up of experimental tunnels by aeronautical constructors, for while these were quite inexpensive, there were so many problems to be solved and investigations to be made, that they would amply repay the manufacturer.

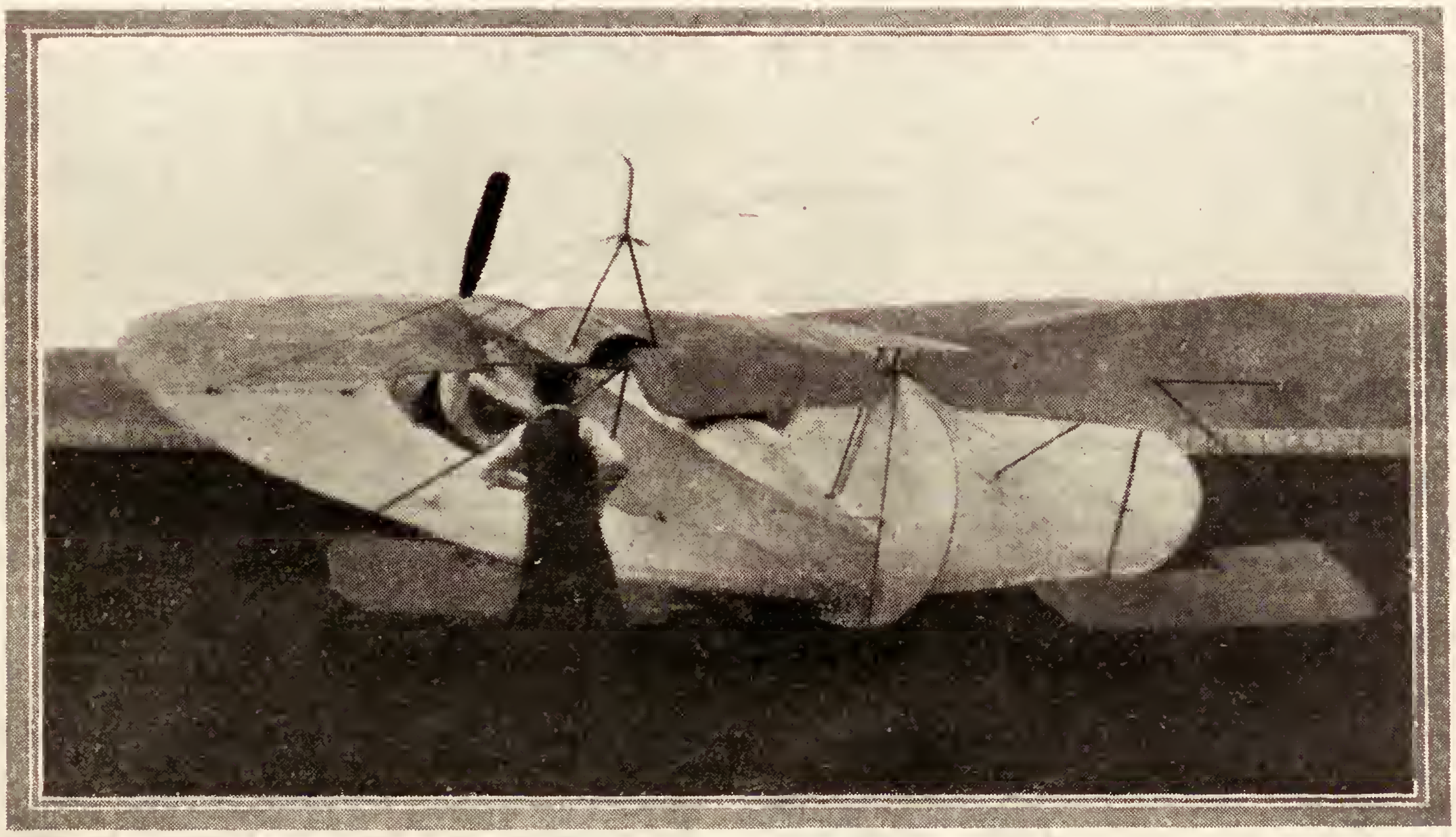
Mr. Low, in the course of his reply, stated that his paper had not been so complete as he would have liked, owing to circumstances over which he had no control, but his purpose would have been served if it resulted in greater co-operation between engineers engaged in research and those employed in the design of aeroplanes.

THE CEDRIC LEE MONOPLANE.

As in the early days of the Dunne machine, considerable mystery enshrouds the Cedric Lee monoplane, practical experiments with which have been carried out at the Shoreham aerodrome for some months past. Not the least point of interest in connection with the Cedric Lee monoplane is that it is more or less at variance with certain aerodynamical theories as accepted to-day. Unfortunately, detailed particulars of this interesting machine cannot at present be placed before our readers, as the Cedric Lee Co. do not yet wish these to be made public. Since, however, several successful flights have been made in public, and as entries have been made for the coming Gordon-Bennett race, the following brief particulars, together with the accompanying illustrations, should be of special interest. The most important feature of this machine is that it flies "pterygoid," that is, like a dart, or its length is greater than its span. The latter, in fact, is only some 20 ft. The planes are annular in plan form, being centrally divided fore and aft by the *fuselage*. The whole of the plane section in side elevation forms one large camber, but the front portion of the plane is also cambered. The covered-in *fuselage* is rectangular in section, tapering to a vertical knife-edge at the rear. In the middle of the *fuselage*, in the "hole" of the plane, are the passenger's and pilot's seats, the former occupying the front one, where an excellent view below can be obtained. The engine, a 50 h.p. Gnome, which drives a tractor screw, is placed inside the *fuselage* in front of the passenger's seat, air scoops being fitted in the sides of the *fuselage* for cooling. Hinged to the rear extremity of the plane are two elevators, whilst two others are mounted above them, one on each side of the vertical rudder, which is hinged to the rear end of the *fuselage* and to a vertical fin mounted on to top of the latter. A strong three-wheeled chassis is fitted, one wheel being right in front to protect the propeller. It is claimed that this particular model has a speed range of from 45 m.p.h. to well over 70 m.p.h. Strong construction is another of its features; on one occasion a landing was made on one of the "wing tips," but the machine only rolled a little way on the outer edge of the plane and then settled down on its chassis again without any ill effects. Mr. Gordon England has made several flights on this machine, and just recently Gordon Bell has joined the Cedric Lee Co., and has also made several flights. Unfortunately he met last week-end with one of those accidents that must always be associated with valuable experimental work, so that activities will be delayed for the present, but we understand that the two machines for the Gordon-Bennett are well in hand at the works.



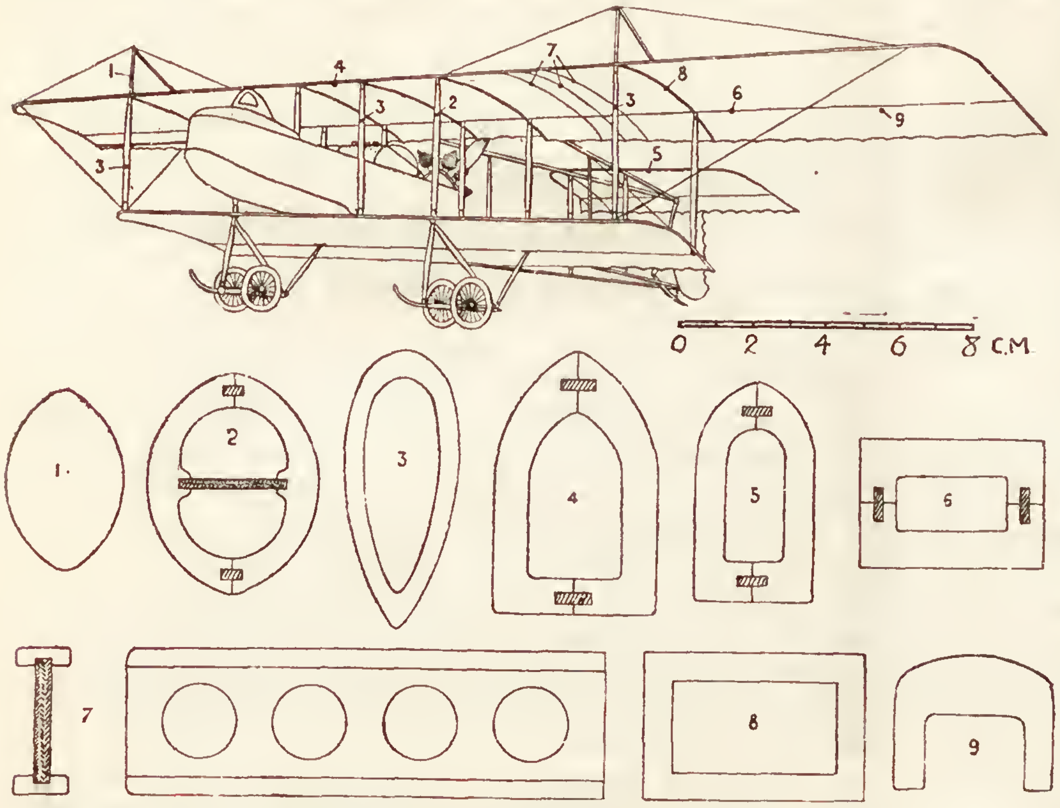
The Cedric Lee machine in flight.



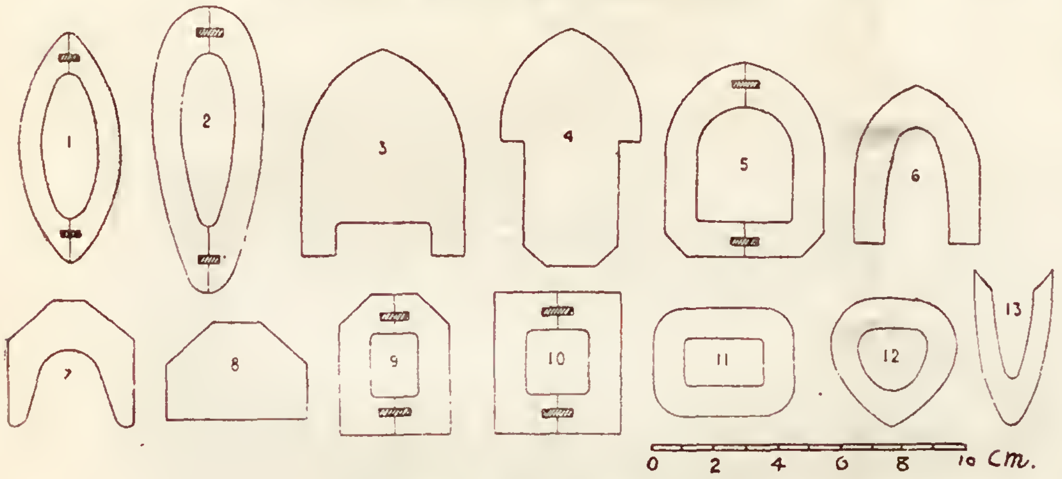
The Cedric Lee machine.

HOLLOW WOOD IN AEROPLANE CONSTRUCTION.

SOME time ago, it will be remembered, we published an article on "An Aeroplane in the Making." As an example of modern practice in aeroplane construction, we described the procedure followed by the Sopwith Aviation Co., of Kingston. This week we supplement our description by an abridged translation of an article by M. P. James, in *L'Aerophile* of the 15th ult., in which he describes the procedure followed by Farman Brothers and others in hollowing out the various members of their machines.



Sections of the H. Farman parts with reference numbers corresponding to figures on diagrammatic sketch.



Sections of M. Farman parts.

"The methods of aeroplane construction, both with regard to wood and steel, have advanced immensely since the days of the box kite, and the increased loads carried have produced an increase in the dimensions and strength of the machine. In order to meet the new requirements without attaining too heavy a dead weight, stronger and lighter framework was found to be necessary, and while some constructors turned their attention to steel others decided to utilize hollow wood.

"Those who used wood construction frequently employed I sections for spars and ribs, whilst the struts were of streamline section; but all these members had a great disadvantage. Being made out of a single piece of wood they lost their shape under the influence of moisture in the air, and machines which were left in the hangars, especially during the winter months, became badly adjusted. Below is described the method of construction employed by Farman, Doutre, Lioré, &c.

"The members are made in two symmetrical pieces, joined together by two glued strips running throughout their entire length. The member thus formed does not offer a very great resistance to bending strains and especially to compression strains, under the effect of which the two component parts have a tendency to come apart. In order to remedy this, the member is bound with glued fabric, a finish which makes it stronger than if it had been made in a single piece.

"The binding is carried out in two different ways, according to whether the member is of constant section or of varying and rounded section. In the first case the member after being hollowed out and glued, is bound throughout its length with a spiral of glued fabric, each winding slightly overlapping the preceding one. In the second case it would be very difficult to make the fabric conform to the rounded outline of the strut, and unevenness and wrinkles would result. This difficulty is overcome by using strips of fabric cut on the bias and by sandpapering the fabric when it is dry. This method is used by some constructors, but it is more generally preferred to make annular bindings with certain intervals, which have the same effect as the continuous band, require less fabric and glue, and are easier to make. The material used for binding is either whipcord or strong fabric.

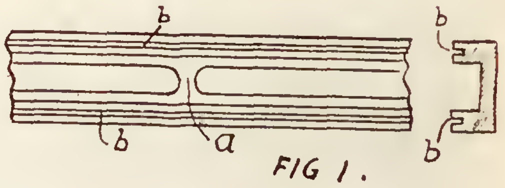


FIG 1.

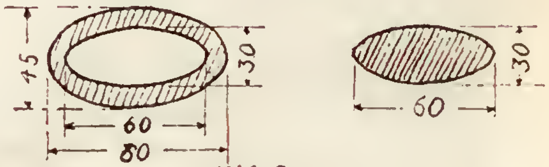
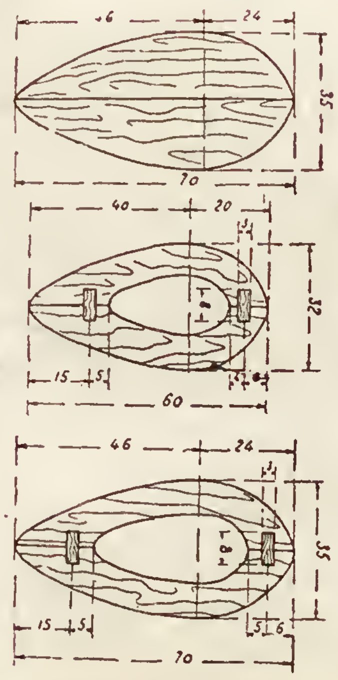
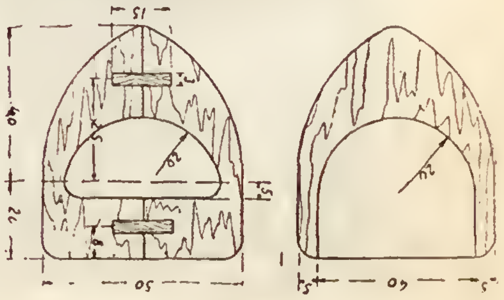


FIG. 2



Sections of Doutre biplane struts.

"The rectangular pieces from which the members are made are first spindled out to a hollow section. Care is taken to leave at certain intervals solid parts, as in *a*, Fig. 1, and grooves are hollowed out for the strips *b*. Especially in the struts it is usual to leave solid places where the bindings are to come.



Sections of Doutre wing spars.

"The two pieces are then glued with the wooden strips in place, and dried under pressure. A member manufactured in this manner is hollow internally, whilst externally it is rectangular. Next the outside is machined down as if it were a solid piece of wood. If it is a *longeron*, the sides are cut to a suitable angle; if it is a strut, the outline is rounded off to the desired section, and finally the member is bound with fabric in one of the two ways described above.

"The increase in stiffness obtained by using hollow wood permits the use of spruce instead of ash. This wood has an advantage over hard wood in that weight for weight it can be given a greater cross-section, and it is well known that in wood construction a greater bulk should be employed than that arrived at by calculation, for the wood, not being homogeneous, cannot without danger be employed below certain sections.

"Our illustrations show some sections of the H. Farman machine, with an indication of the members to which they correspond. Special attention is drawn to the ribs and struts, which have webs of three-ply wood that are particularly strong, and absolutely indeformable by moisture. Sections are also given of the Maurice Farman and the Doutre.

"We will now show by an example the increase of resistance obtained, weight for weight, by the use of a hollow strut instead of a solid one. Let us suppose that we have a streamlined strut, Fig. 2, measuring 30 by 60 mm. The sectional area is $\pi \times 15 \times 30$, and the weight is proportional to this area. The resistance would be determined by its modulus of resistance, which is equal to $\frac{\pi}{32} \times 108$. A strut of hollow wood, measuring 80×45 and 60×35 mm., will have the same sectional surface. Its modulus of resistance will be $\frac{\pi}{32} \times 207$. If we work out the proportion we find $\frac{207}{108} = 1{\cdot}9$, so that the resistance of the hollow wood strut is nearly twice as great as that of the solid strut. From this the advantage of this method of construction will be readily appreciated."

* * *

WIRELESS TELEGRAPHY.

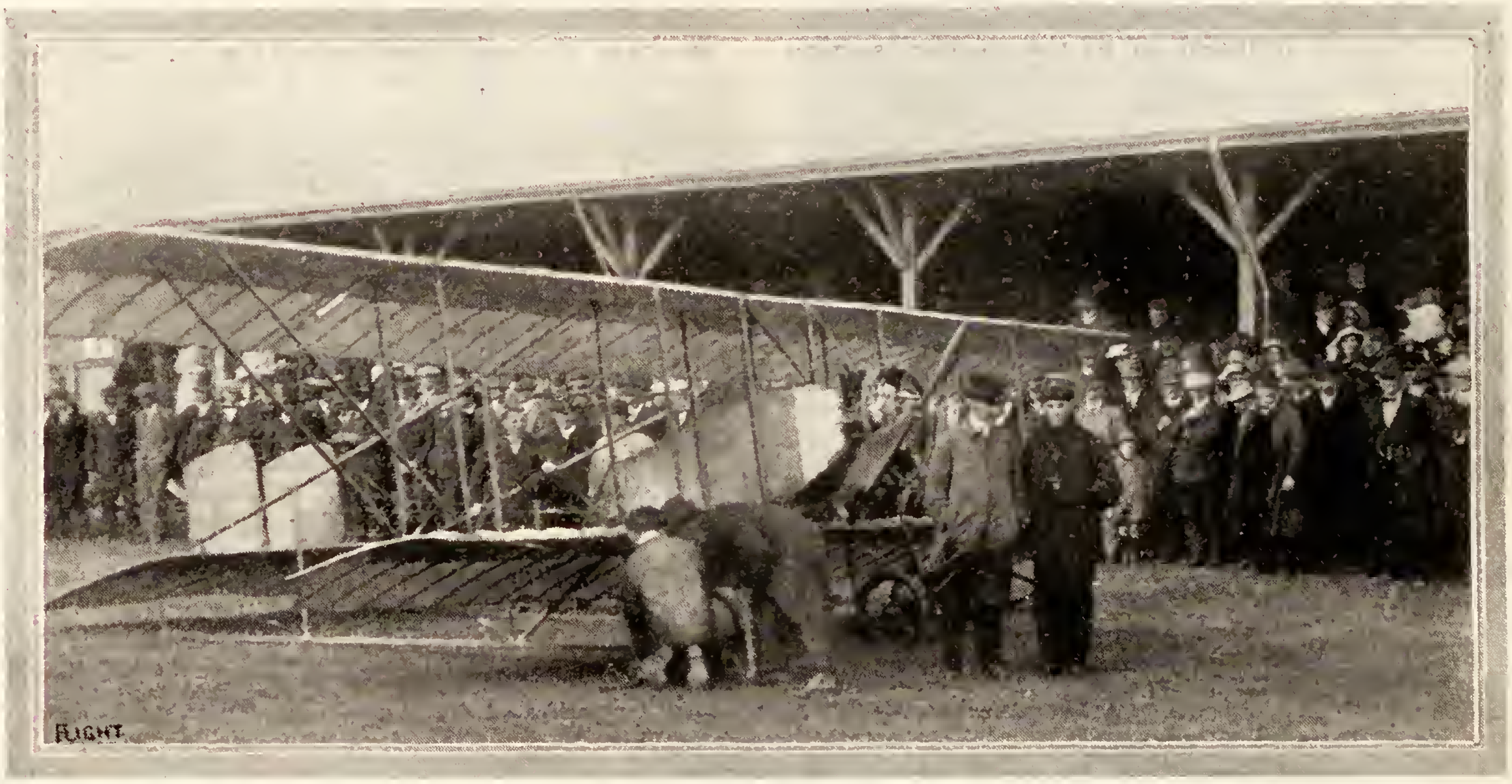
A paper of considerable value to all who are interested in the subject of Wireless Telegraphy was read by Mr. H. Fothergill before the North East Coast Institution of Engineers and Shipbuilders on the 23rd ultimo. At the outset, the author indicated the manner in which electro-magnetic waves were produced and the differences between the damped waves employed in the Marconi and the Telefunken systems and the undamped waves employed by Poulsen and by Goldschmidt. He then explained the operation of the essential features of these four systems of telegraphy, with the assistance of diagrams and photographs showing the arrangement and details of the equipment used at various sending and receiving stations, and concluded by referring to recent developments in wireless telegraphy.

Owing to the already extensive nature of the paper, it was not possible to deal specifically with the application of wireless aircraft, but the paper is one that can be read with profit by all who have a knowledge of this branch of engineering science.

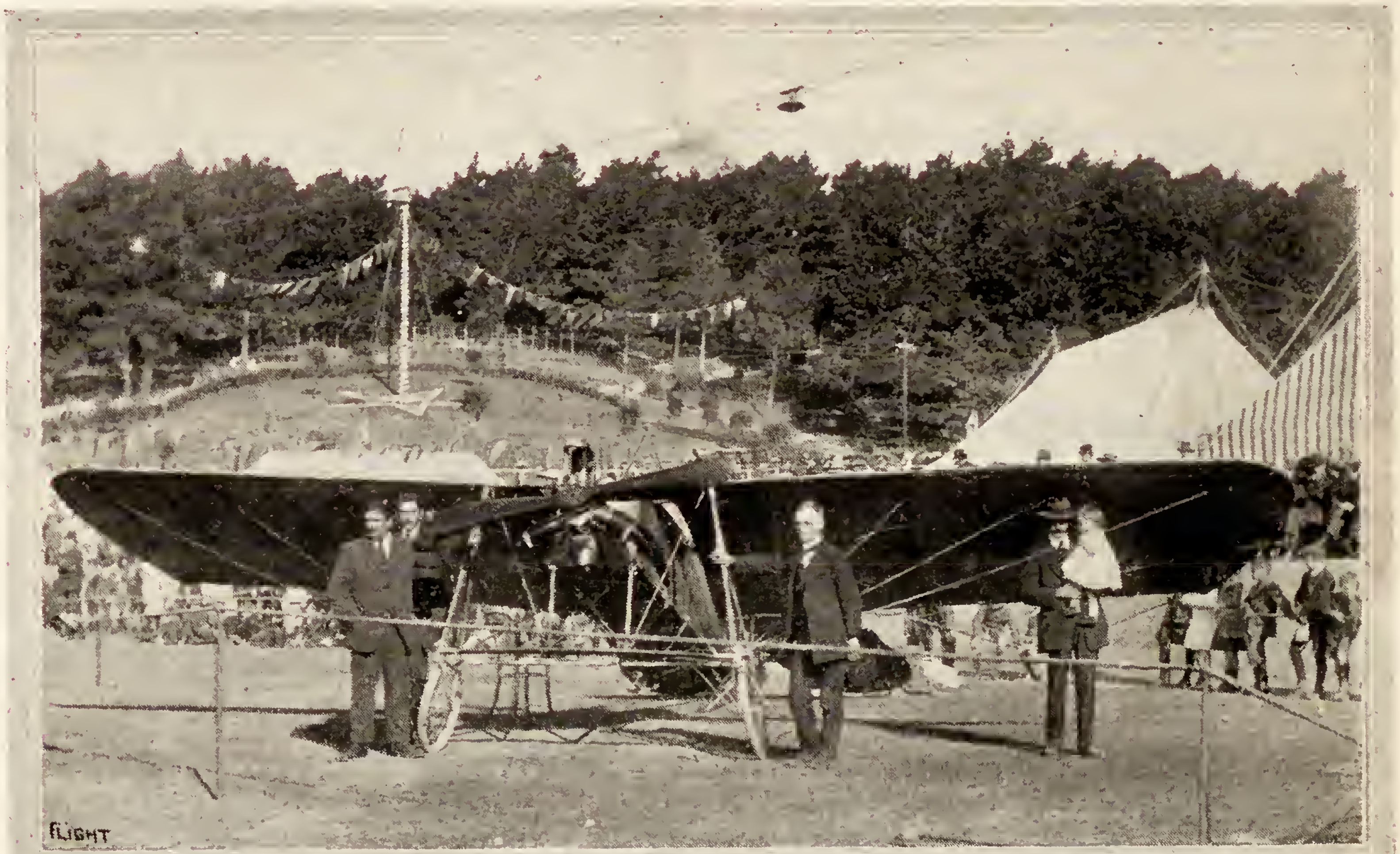
Byfleet, 1,000 ft. up, as seen from the 100 h.p. Sunbeam-engined Maurice Farman, piloted by Mr. J. Alcock.

AVIATION IN NEW ZEALAND.

JUDGING from some details which are to hand from Mr. J. W. H. Scotland, who has been flying a 45 h.p. Anzani-Caudron out there, New Zealand is anything but an aviator's Paradise. In spite of many difficulties, however, Scotland, on March 6th, succeeded in making a splendid flight of about a hundred miles from Timaru, South Canterbury, to Christchurch. After a preliminary flight at 6.30 a.m. at Timaru, Scotland effected a few adjustments and got away on his journey at half-past eight, the machine quickly rising to a height of 2,500 feet. When passing over Temuka a parcel was delivered by being dropped from the aeroplane, and then, as the conditions were very bumpy, the machine was elevated to 5,000 ft. There was no improvement, however, and Scotland decided to come down at Orari, where several adjustments were made to the machine, and it was not until 3.20 that the re-start was made. Then owing to the gusty wind Scotland went up to 6,000 ft. Finding no improvement he came down to an altitude of about a thousand feet, where the atmosphere was calmest. He reached Christchurch at 5 o'clock, and after circling round the town made a fine landing at Addington. During the journey both the Caudron biplane and the Anzani engine performed



Mr. Scotland, the New Zealand aviator who has been making such good headway in introducing flying at the Antipodes, with his 45 h.p. Anzani-Caudron at Athletic Park, Wellington, on March 21st.



Mr. A. W. Schaef's 35 h.p. Y Anzani monoplane (built by himself) at Newton Park (New Zealand) Aviation Meeting on March 24th. This machine, it will be remembered by our readers, was shown in flight in these pages some months ago.

splendidly in spite of having to fight their way through most trying conditions. Interviewed after the flight, Mr. Scotland said that if he had not been mounted on such an excellent combination, he would have come to grief several times, as the wind from the hills seemed to form funnels and whirlpools which tossed the little Caudron about like a cork on the sea. On March 21st Scotland was at Wellington, and arranged to give an exhibition at the Athletic Park. The weather, however, was too bad, and the crowd which assembled were given tickets for the following Tuesday. On Sunday and Monday the weather was comparatively calm, but in view of the arrangement made with the ticket holders Scotland was asked not to go up. On Tuesday the weather was bad again, and it was decided to postpone the flying until the following afternoon. Then there was an improvement, although the the wind was still very gusty. At half-past three Scotland decided to make a start, and after running for a short distance across the ground, the machine rose into the air. The ground was very restricted, however, and it was necessary to turn, and then it was that the utter unsuitability of the ground as an aerodrome was seen. The wind from the surrounding hills, which was broken into descending currents, eddies and puffs, made it practically impossible for any progress to be made. Realising that it was impossible to go on, Scotland very pluckily, by a great deal of exertion, got the machine over Newton Park, and eventually landed between the branches of two pine trees, the machine being suspended about 20 ft. from the ground. The *nacelle* and engine were practically undamaged, but, of course, the ends of the planes were crumpled up. Scotland himself climbed down one of the trees, and barring one or two rather severe cuts and bruises, was not very much the worse for his adventure. It was an unfortunate end to what promised to be a most successful tour of the country, and it is to be hoped that some patriotic New Zealanders will come forward with financial assistance to enable Scotland to continue his very useful work for the cause of aviation in New Zealand. In the meantime, Mr. A. W. Schaef, who, as our readers will remember, has built a monoplane, fitted with a 35 h.p. Y Anzani, which was illustrated in these pages some months ago, has made one or two short flights at Lyall Bay and at Newton Park, Wellington, New Zealand. On March 16th, three flights of about 100 yards each at a height of 20 ft. were made over the beach at Lyall Bay, but unfortunately in landing on the last one a part of the chassis gave way with the result that the wings and propeller were damaged. Mr. Schaef, who, it will be recalled, is the representative of General Aviation Contractors, Ltd., in New Zealand, immediately set to work to get the machine repaired, and hopes that it will not be long now before he is able to make some really long flights.

Mr. Scotland's machine in the trees after his mishap at Newton Park, N.Z., on March 24th.

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Flying at Shoreham.

MR. CECIL PASHLEY and Mr. Elliott contributed a good deal of flying during the week-end on their respective Farmans, and quite a good crowd of people witnessed the exhibitions. Many passengers were taken. On Sunday morning the Cedric Lee circleplane was out under Gordon Bell's pilotage, but unfortunately an accident marred the experiments. The machine was flying about 100 ft. up, when an eye bolt came out of one of the elevators, the machine partly side-slipping and diving. Gordon Bell was cut about and the machine was smashed.

For Special Engineering Work.

A SOMEWHAT unique business is that of the Monk Engineering Co., Ltd., of High Street, Coventry, for the firm makes a speciality of special engineering work, such as the building of experimental engines or the replacement of broken parts, &c., and, by reason of their experience and the facilities which they have, are in a position to carry out such work at a reasonable cost and in a minimum time. The firm is noted for the extreme accuracy of its workmanship, and also for the high quality of the materials employed. Although it is impossible to give names, it may be stated that the *clientèle* of the firm include some of the leading engineering concerns in Great Britain, so that work such as we have outlined, however large or however small, may be entrusted to the Monk Engineering Co. with confidence.

Mr. Noel, at Hendon, flying on the Maurice Farman with Miss Kitty Kent, who is so prominent in "The Girl from Utah."

BRITISH NOTES OF THE WEEK.

ROYAL FLYING CORPS.

THE following appointment was announced in the *London Gazette* of the 24th ult. :—

R.F.C.—Military Wing.—Capt. Frederick St. G. Tucker, Worcestershire Regiment, from a Flying Officer, is appointed to the Reserve. April 13th, 1914.

The following appointments were announced by the Admiralty on the 24th ult. :—

Sub-Lieut. G. R. Bromet to the "Pembroke," additional, for course at Central Flying School, May 12th. Engineer-Lieut. H. M. Cave-Browne-Cave to the "Pembroke," additional, for the Isle of Grain Naval Air Station, April 23rd. Artificer Engineer H. Dearman to the "Pembroke," additional, for the Farnborough Naval Air Station, April 23rd.

Royal Naval Reserve.—F. M. Lll. Barr, H. G. Wanklyn, J. M R. Cripps, B. F. Bainsmith, and L. B. Hay have been appointed to the "Pembroke," additional, as Probationary Sub-Lieutenants, for course of instruction at the Central Flying School. To date May 12th.

The following appointments were announced by the Admiralty on the 10th ult. :—

Lieut. A. Gaskell, lent to the Central Flying School as Assistant Instructor. To date May 6th. Sub-Lieut. R. Peirse, R.N.R., lent to the Central Flying School as Assistant Instructor. To date May 6th.

Looping at Farnborough.

AT Farnborough, on Wednesday, Mr. G. Pratt, one of the pilots at the Royal Aircraft Factory, made two loops on a B.E. biplane, and a similar flight was subsequently made by Lieut. G. de Havilland, also on a B.E.

The Navy's "Parseval" over London.

A BRIEF visit was made to the Metropolis by the Airship No. 4 (Parseval) on Monday afternoon. After circling round St. Paul's Cathedral a course was set for the Crystal Palace, from whence after rounding the North Tower the vessel returned to Farnborough.

Mr. Churchill's Seaplane Trips.

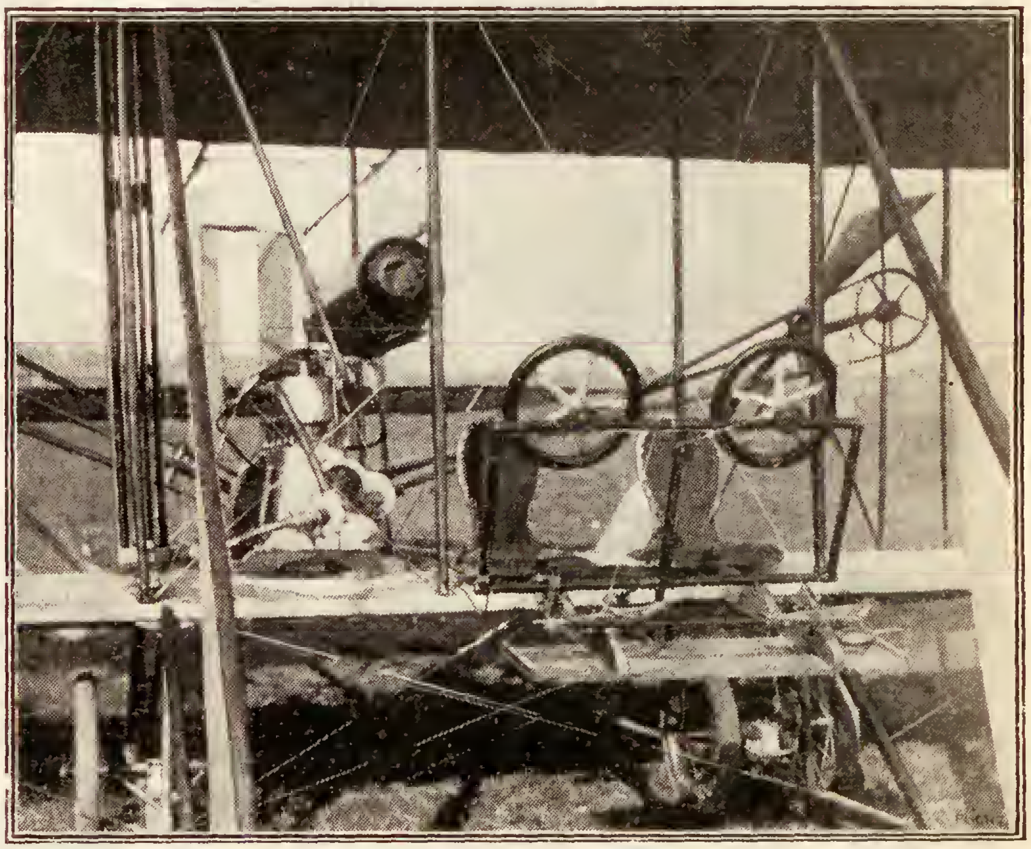
ON Friday of last week, the First Lord of the Admiralty, Mr. Winston Churchill, started from the Isle of Grain Naval Air Station on a seaplane piloted by Com. Seddon on a trip to Harwich. When the machine was off Clacton, however, engine trouble developed, and after coming down the machine was taxied on to the beach. In response to a message another seaplane was flown over to Clacton and took Mr. Churchill on to Harwich.

The Aerial Derby.

ARRANGEMENTS are well in hand for the third Annual Aerial Derby Race, which will be held on Saturday, May 23rd, 1914. The race will be held over the same 95 miles circuit as last year, the start and finish being at Hendon with turning points at Kempton Park, Epsom, West Thurrock, Epping, Hertford. For the fastest time there is the *Daily Mail* Gold Cup and a cash prize of £200 presented by the distributors of Shell Motor Spirit, while there will be a sealed handicap in which the prizes will be Shell Trophy and £100, £75, and £25, all presented by the distributors of Shell Spirit.

The Desoutter Fund.

FROM Mr. Bernard Isaac, the hon. sec., we learn that the Desoutter Benefit Fund now amounts to £119 7*s*. 9*d*. Owing to the rain, the attendance at the Desoutter Meeting at Hendon on March 19th was not so large as had been anticipated, and the gate receipts, which were given to the fund, were only a little over £100. It is hoped, therefore, that visitors to the aerodrome will support the fund as much as possible, and any donations, however small, will be gratefully received by the honorary treasurer, Mr. T. K. Walton, the London Aerodrome, London, N.W.

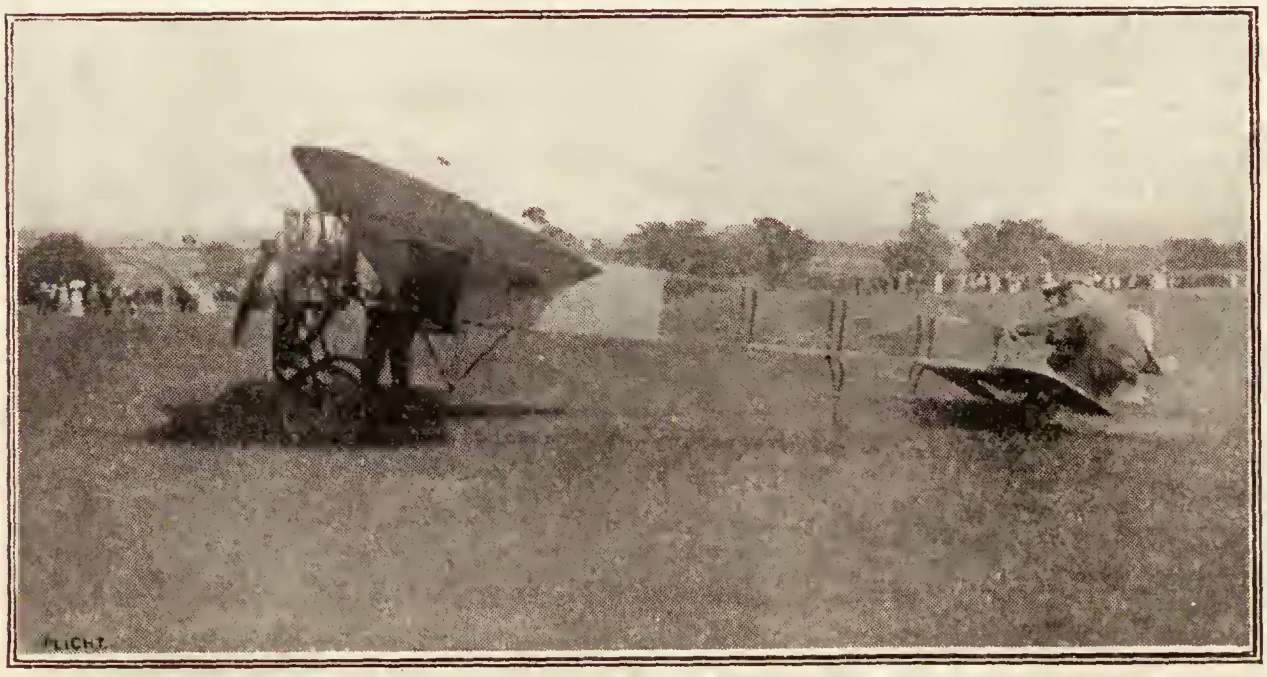

The dual control and power plant of the Wright flyer at the Beatty School, Hendon Aerodrome.

Flying in South Wales.

ON Monday, of last week, Mr. H. H. James, one of the James Brothers, made a trial flight of 20 mins. duration, at Narberth in South Wales, on a 45 h.p. Anzani-Caudron type biplane, which is said to be the first aeroplane to be built in Wales. The following evening J. H. and H. H. James each made cross-country flights of half an hour. The next day, J. H. James was out for a high flight, reaching 3,000 ft., but only remained aloft about 20 mins., as the air was choppy.

Mr. B. C. Hucks at Bradford.

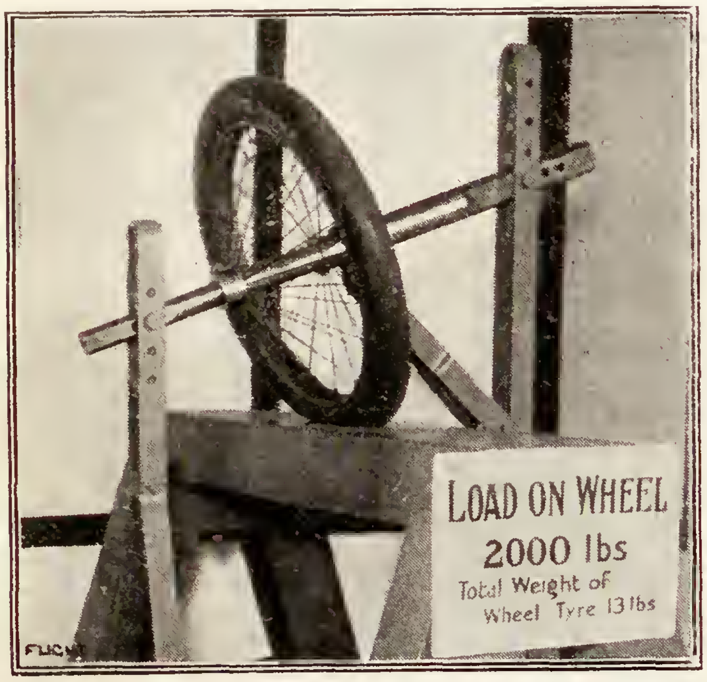
AFTER his memorable flight across the Channel on Tuesday of last week, Mr. Hucks' machine was packed up at Hendon and on the following day at Bradford he commenced a demonstration of fancy flying on it at 3 p.m. There was a lot of wind, but Mr. Hucks was able to do some of his vertical banks. When starting on his second flight with this machine, one of the hangers-on fouled the tail plane, straining it slightly, and making it unsafe for passenger work. On the 50 h.p. looper Mr. Hucks accomplished nine loops and remained upside down for over a minute. The Lord Mayor and Lady Mayoress of Bradford were present, and had


Mr. S. Summerfield about to start on a flight at Melton Mowbray on his Blériot. Note the little mascot cat above the wings.

an interesting trip with Mr. Hucks. On Thursday, Friday and Saturday Mr. Hucks again demonstrated at Bradford. On Thursday he reached an altitude of 4,500 feet and circled Bradford on the "eighty," and on the other machine he made six loops. The weather was appalling on Friday, the wind gusts averaging 45 miles an hour, but Mr. Hucks succeeded in making two loops, and also flew the two-seater, but no passengers could be carried. On Saturday a tremendous crowd turned up, and in glorious weather witnessed a wonderful afternoon's flying. Mr. Hucks carried two passengers and looped the loop five times.

A Pilot's Portrait.

WITH reference to the photograph of Sub-Lieutenant J. C. Spencer-Warwick, R.N.V.R., which appeared in our issue of April 11th, we are asked to make it clear that this gentleman actually secured his *brevet* on Feb. 26th, at the Vickers' School at Brooklands.



"Flight" Copyright.

The Palmer aero wheel and tyre bearing a lateral load of 2,000 lbs.

The Palmer Aero Tyre and Wheel.

SOME little time back we gave a description of the tyres and wheels specially designed for aero work by the Palmer Tyre, Ltd., of 119, 121 and 123, Shaftesbury Avenue, London, W.C., and we drew attention to the remarkable manner in which severe side strains and shocks were successfully contended with by means of the special method of construction of both tyre and wheel. In the accompanying illustration will be found a graphic demonstration of how these wheels and tyres withstand lateral strains. The wheel is inclined at an angle of about 70° whilst it is bearing a downward load of 2,000 lbs. or nearly one ton, and yet it will be seen that the tyre is still secure in the rim. The total weight of the wheel and tyre is only 13 lbs.

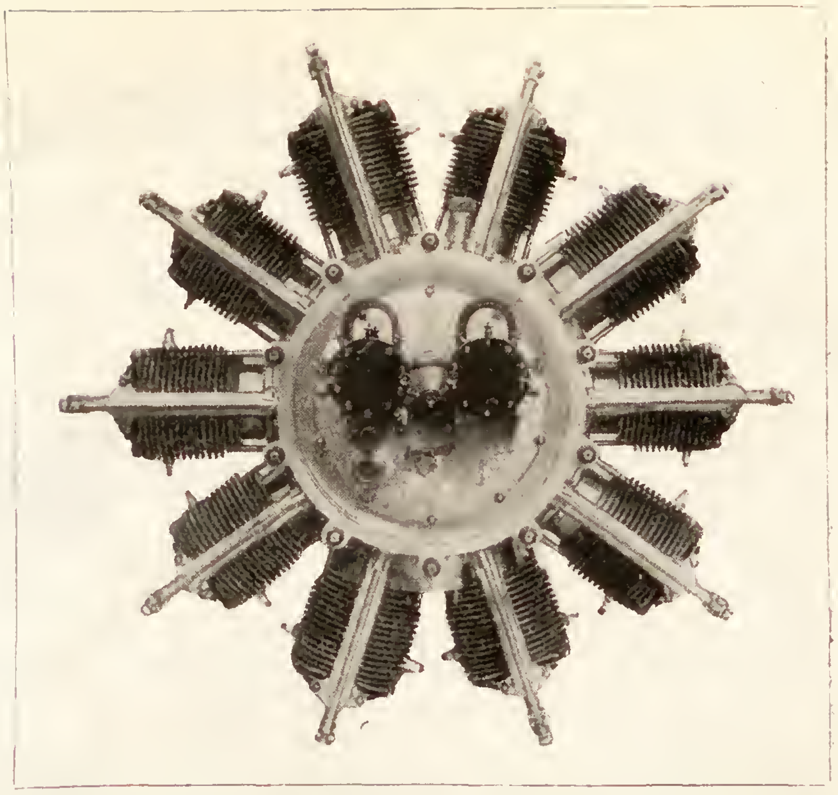
Looping in Australia.

THE exhibition tour of Maurice Guillaux opened at Sydney, N.S.W. on the 20th ult., when he looped the loop, &c., on his Blériot. This being the first time that the feat had been accomplished in Australia it naturally aroused a good deal of enthusiasm, more especially as it followed on the revival of interest in aviation following on the fine display of flying recently given by Hawker on the Sopwith machine. On Monday last Guillaux made similar exhibition flights at Newcastle, N.S.W.

The G.A.C. in Australia.

FROM time to time we have recorded the extraordinary way in which the business of the General Aviation Contractors, Ltd., is spreading itself all over the world. We now learn that Mr. A. Delfosse Badgery has been appointed agent for Australia for the various G.A.C. Specialities, Anzani engines, Emaillite dope, &c. It may be recalled that Mr. Badgery was recently in this country, and in the early part of January qualified for his R.Ae.C. certificate on a 35 h.p. Anzani-Caudron biplane at Hendon.

It is Mr. Badgery's intention to actively engage himself in his country with the aviation industry. He arrived in Australia two weeks ago, and has commenced to construct a biplane of his own design, for which he has just ordered a 1914 45 h.p. 6-cyl. Anzani engine, "Rapid" propellers, "Gnomol" castor oil, "Emaillite" dope, &c.



A rear view of the 125 h.p. 10-cylinder engine, British-built Anzani, to which reference was made on page 448 in our issue of last week. Previous to being sent to Farnborough for the Naval and Military Aeroplane Engine Competition, the engine made a non-stop of eleven hours at Coventry, running in a highly satisfactory manner and keeping remarkably cool the whole time, although only subjected to the test of the draught propeller. For the British engines, of which this is the first, Bosch magnetos with K.L.G. plugs have been adopted, and in the above model two magnetos are fitted.

If the first machine is successful, Mr. Badgery proposes to build three or four more larger machines, designed to take the 60-65 h.p. 10-cyl. Anzani engine and the 80 or the 100 h.p. 10-cyl. types.

The Handley Page Biplane.

SOME good trial flights on the Handley Page biplane, which is fitted with a 100 h.p. Anzani motor, were made at Hendon on Wednesday by Mr. Rowland Ding, who only qualified for his ticket on Monday last at the Beatty school. During his first flight of about a quarter of an hour, Mr. Ding took the machine up to 2,500 feet and found it remarkably stable, while we understand that the speed was about 70 miles an hour.

Cellon on the Sopwith Waterplane.

IT is interesting to note that the Sopwith waterplane which won the Schneider Cup at the Monaco meeting, attaining a speed of 140 kilometres per hour, was doped with Cellon.

A consignment of Cellon dope leaving the Cellon works for delivery to the War Office, being a portion of the last batch ordered.

FOREIGN AIRCRAFT NEWS.

More Records Secured by Garaix.

ON the three-seater Paul Schmitt biplane, fitted with 150 h.p. Gnome motor and Integral propeller at Chartres on the 22nd ult., Garaix established a number of new records for pilot and six passengers and incidentally beat the existing records for two, three and four passengers. The new speed records are :

Distance.	Time.	Distance.	Time.	Distance.	Time.
	m. s.		m. s.		m. s.
10 kils. ...	5 35	30 kils. ...	16 48⅘	50 kils. ...	28 5⅖
20 ,, ...	11 12⅕	40 ,, ...	22 28⅕	100 ,, ...	56 44

In addition, Garaix made the following time records ; ½ hour, 50 kiloms. ; 1 hr., 104·141 kiloms. ; greatest speed, 107,462 k.p.h. ; duration, 1 hr. 2 mins. 25⅗ secs. ; distance, 110 kiloms.

Duration Record Regained by France.

ON a 60 h.p. Rhone-Caudron, Poulet on the 27th ult., succeeded in regaining the world's duration record for France. With his machine carrying 425 litres of fuel and 80 litres of oil he started from Etampes at 5.8 a.m., and flew over a course from Etampes to Arthenay and back. Twelve rounds of this 72 kilom. course were made, and then, as it was getting dark, Poulet continued to fly over a circuit of 10·4 kiloms. at Etampes. Seven rounds of this were covered before Poulet descended, after well beating Langer's world's record of 14 hrs. 7 mins. His time in the air was 16 hrs. 28 mins. 56⅘ secs., while the distance covered was 936·8 kiloms.

An Italian Height Record.

IN the course of a flight lasting 2 hours 20 mins. on a Farman biplane, Lieut. Salomone beat the Italian height record by going up to 4,700 metres.

The Schicht Prize.

DURING last week the competition for the Schicht prize of £5,000, one of the most important contests yet held in Austria, was decided. The course was a round trip of 700 kiloms. from Vienna to Prague, Teplitz and Brunn, returning to Vienna, followed by a trip to Budapesth and back, representing an additional 500 miles, and this had to be completed by Sunday last. Six machines started from the Aspern Aerodrome on Sunday week, including two Etrich monoplanes and four Lohners. The competition was marred by the fatal accident to Pitschmann on the 24th, which is recorded elsewhere, when making a belated start for the first stage. The winner eventually proved to be Viktor Wittmann who was flying a Lohner monoplane fitted with a 90 h.p. Austro-Daimler engine.

Flying Over the Jungfrau.

A SECOND flight over the Jungfrau, which is 4,167 metres high, was made by Oscar Bider on the 22nd ult. This time he used a Morane-Saulnier monoplane, and starting from Berne at 5.40 a.m., he landed at 7.18 at Brigue, just by the spot from which Chavez and Bielovucic started on their flights over the Simplon.

Buc to Mourmelon on a Voisin.

ON a Rhone-engined Voisin biplane, Rugere on the 23rd ult. flew from Buc to Mourmelon, the machine making a good passage in spite of having to fight its way against a strong wind.

High Flying on a Waterplane.

DURING a flight which lasted 1 hr. 19 mins. at Monaco on the 22nd ult., Burri on the F.B.A. flying boat attained a height of 2,300 metres, which it is claimed is a height record for hydro-aeroplanes.

Some New Loopers.

AT the Blériot school at Buc on the 21st ult., looping was carried out by a Russian pupil, Alexandre Raewski, as well as by Maccavei, a pupil hailing from Roumania. At the Morane school another Russian, Eugene Spilzberg, succeeded in looping the loop last week.

Looping on a Farman.

DURING a series of exhibition flights at Yvetot on the 21st ult., Poiree, on his Henry Farman, looped the loop and flew upside down with a passenger. He also looped the loop with a lady passenger.

Combined Manoeuvres in France.

ON Monday of last week an important series of manœuvres, in which aeroplanes, infantry, cavalry and artillery are taking part, commenced at Belfort. Although it is practically impossible to get any information as to the operations, it is stated that they are being carried out with a view to obtaining data as to the way in which aerial tactics affect strategy.

A Busy Day on a Farman.

FROM Epinal on the 24th ult. Sergeant Quennehen on his Maurice Farman flew to Chalons-sur-Saone and back, to Nancy and back, to Rambervilliers and back, and to Mirecourt and back. Altogether he covered a distance of 650 kiloms. in 9 hrs. 20 mins.

An Aerial "Pique-Nique."

FOR the end of this month the French Aviators' Friendly Society is arranging a meeting for its members, which, it is proposed, shall take the form of a "pique-nique" in the neighbourhood of Paris.

French Flying Officer for Turkey.

IT is stated that Capt. Joseph de Goys de Mereyac, who was secretary to General Hirschauer, and is now in command of an escadrille at Chalais-Meudon has been selected to take charge of the organisation of military aviation in Turkey.

Chevilliard Tests New H. Farman.

HAVING returned to Paris after a long tour in Austria, &c., Chevilliard on the 24th ult., made some tests at Buc with the Henry Farman biplane, with the *fuselage* placed just under the top plane, which was shown at the last Paris Salon. The machine climbed very rapidly and almost vertically, while Chevilliard demonstrated that it was very well adapted for looping the loop and upside-down flying.

"Beaumont" Leaves the French Navy.

IN order that he may be able to devote more time to the business of the F.B.A.Co., First Lieut. Conneau, better known by his *nom de vol* of "Andre Beaumont," has resigned from the French Navy.

From Paris to Brussels.

ON a Morane-Saulnier monoplane and accompanied by Lieut. Ask, Dr. Teulin on the 25th ult. started from Villacoublay at 4.45 a.m., and at 10.10 landed at the Berchem aerodrome at Brussels. They had made a stop at St. Quentin at 6.50 for petrol, &c., and did not restart till 8.5 a.m. Both pilot and passenger belong to Sweden.

Racing at Buc.

A LARGE crowd assembled at Buc on Sunday afternoon for the meeting which had been arranged for the benefit of the families of those involved in the catastrophe of the previous Sunday. Three events had been arranged : a 3 kil. race for *taxi-pingouins* or school machines, a 5 kilom. race and a handicap over a similar distance. The taxi race was won by Besille, a Blériot pupil, who covered the 3 kil. in 5 mins. In view of the strong wind it was decided to turn the race into speed trials and time each competitor separately. The result was a win for Jupin on a Bathiat-Sanchez, who did the 5 kil. in 3 mins. 39 secs., while Barault on a Blériot was second in 4 mins. 59 secs. The winner flew a very fine race, but the other competitors went a great deal too wide at the pylons. The handicap was won by Cuendet on a Blériot, his time for the 5 kil. being 3 mins. 41 secs., with Barault second. During the afternoon exhibition flights were made by Chevilliard, Bill and Poiree on Farmans, Legagneux on a Nieuport, Baron Paspuier, Maccavei and Guinard on Blériots, the Marquis de Larienty Tholozan on his Maurice Farman, &c.

Long Flight on a Farman.

ON a Henry Farman biplane, Lieut. Riquet, accompanied by his mechanic as passenger, arrived at Vienne (Isere) having flown from Verdon, a distance of 450 kiloms.

Aero and Motor Boat Exhibition in Italy.

ORGANISED by the Italian Aeronautical Industry Syndicate, and under the patronage of the Aero Club of Italy, an international aero and motor boat show is to be held at Turin from the 16th to the 24th inst.

Fatalities in Austria, Russia, Italy and Japan.

WHILE making a flight in connection with the Schicht prize on the 24th ult., Pitschmann was killed through the fall of his biplane at Zwettl in Lower Austria, and his brother who was with him as passenger was seriously injured.

The same day two Italian officers, Lieut. Napolis and Lieut. Battaglioni were killed at the Mirafiori aerodrome near Turin. Apparently one wing of the machine piloted by the former broke when they were flying at a height of about 200 metres.

It was announced in St. Petersburg on the 22nd that Lieut. Vetchinin and his mechanic had lost their lives in an accident which occurred at Lidy. Apparently the machine when making a steep *vol plané* capsized at a height of 100 metres.

On Sunday, a military pilot, Morris or Monis, met his death at Tokio. His biplane fell from a height of 500 metres and the wreck caught fire.

On Tuesday, a non-commissioned officer of the Austrian Army, named Wally, was killed as the result of a fall at the Wiener Neustadt aerodrome.

First Aid on German Aeroplanes.

FOLLOWING a conference between representatives of the German Army and Navy departments and flying officers it has been decided that all German military aeroplanes are to carry a "First-Aid" outfit which will be arranged in a pocket at the back of the pilot's seat. Messrs. Burroughs Welcome and Co. should be able to assist in this direction.

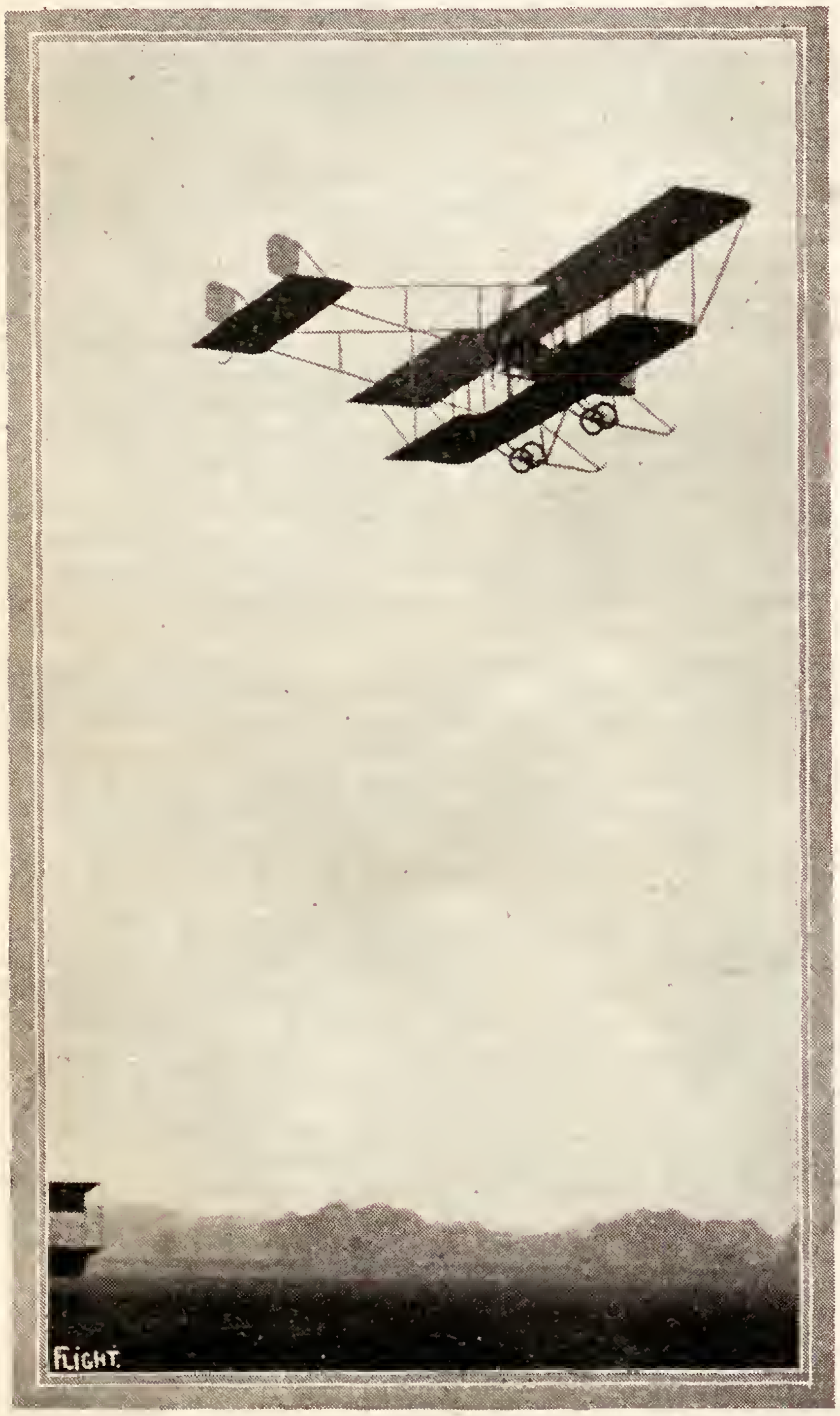
Flights in Tripoli.

ON the 22nd ult., Lieut. Tappi, who is stationed at Tripoli, set out on his aeroplane at 6.55 a.m., and at 8 o'clock landed at Tarhuna. After a stop of about an hour he started back and, having circled for some time above Gefara, landed at the Tripoli aerodrome, at 10.40 a.m.

The Burgess-Dunne Hydro-aeroplane.

WRITING under date of April 2nd from Boston, Mass., U.S.A., Mr. Charles M. Chapin sends us the following interesting account of the doings of the Burgess-Dunne hydro-aeroplane :—

"The Burgess-Dunne, equipped as a hydro-aeroplane, has made some splendid flights, and has shown a remarkable degree of inherent stability. The writer was taken up for fifteen minutes on Tuesday, and had an excellent opportunity to observe the stability features and ease of control. The pilot, Clifford L. Webster, who taught himself to fly the Dunne, during the entire flight of fifteen minutes did not touch his control levers for any purpose except to correct direction. The wind was blowing at fifteen miles off shore, and was very 'bumpy' in spots, especially as we flew over the land. In spite of the side gusts to be felt from time to time in flying across the wind, the writer detected no heeling tendency whatever, even when the gust was to be felt very noticeably, nor could any tendency toward a side-slip be detected.



"Flight" Copyright.

M. Verrier flying the Maurice Farman at Hendon.

"In an earlier flight, solo, Mr. Webster stopped his motor dead at 800 ft. without turning down. The machine at once took its proper gliding angle, and the pilot had his hands off the levers from first to last until just ready to flatten out for alighting. Last week he made three complete and successive circles at an angle of approximately 75° with his control levers locked, and with his hands off most of the time. On the same day he tested for stalling, and pulled up both *ailerons* to their utmost extent, holding them there for more than a minute. Although the machine assumed an apparently impossible flying angle it refused to stall. Apparently the *aileron* area, sufficient to give control in ordinary flying positions, is overcome at such high angles by the high proportionate increase in the lift of the swept-back wing-tips.

"In all the Burgess-Dunne has made between thirty and forty flights, and without a sign of loss of balance. Some difficulty was experienced at first with the float, which was set at too high an angle, making landing very difficult. The Burgess-Dunne was found to fly at an angle of 4 degs., whereas Mr. Burgess had expected that the ordinary flying angle would be about 8 degs., which was the reason why the first adjustment of the float was incorrect.

"As constructed by Mr. Burgess, with float and all, the Dunne weighs, empty, 1,529 lbs. In a weight-carrying test it recently took up an additional load of 558 lbs., made up of pilot 176 lbs., passenger 197 lbs., ballast 34 lbs., water in radiator 40 lbs., gasolene 91 lbs., oils 20 lbs. The engine used was a Curtiss water-cooled 90–100, turning 1,312, and delivering a thrust of 640 pounds. Over a measured triangular course the Burgess-Dunne, with this load, made 58·5 miles, with a minimum of about 53 and a maximum of 64. With the power, which figures down to about 70 h.p. on its actual performance, and with a wing area of about 500 sq. ft., the speed wasn't bad."

"Eugene Montgolfier" Over Paris.

WITH ten persons on board, the Clement-Bayard airship, "Eugene Montgolfier," started from Issy at 7.30 a.m. on the 21st ult., and made a cruise which occupied an hour and a half, a good deal of which was taken up with manœuvring above Paris.

Long Tests with the Schutte-Lanz.

ON the 21st ult. the new Schutte-Lanz airship "SL. II" started from her hangar at Cologne at 6 a.m., and after passing over Mannheim went along the valley of the Rhine to just by Carlsruhe. She then returned, and made a safe landing at Cologne, after being in the air about 5 hours. The same day another voyage was started at 11 p.m., and the airship cruised over the Black Forest for six hours through the night.

The following day some tests were made, and with sixteen persons on board, together with sufficient supplies for a voyage of ten hours she went up to a height of 2,100 metres, then came down to 70 metres in 8 mins., and regained a height of 2,000 metres in 9 mins.

On Tuesday, at 9 p.m., she left Mannheim and made a cruise of 20 hours' duration, passing Bremen at 3 a.m. on Wednesday, Hamburg at 5.30, Berlin at 9 a.m., and Jena 1 p.m.

Night Cruise by "Z I."

STARTING from Cologne at 2 a.m., on the 21st ult., the German military airship "Z I," escorted for part of the way by two monoplanes, made a four hour cruise along the valley of the Rhine, and then in the Ruhr valley to beyond Dusseldorf.

Balloon Voyage Across France.

BY way of training for the Gordon-Bennett balloon race, Hugo Kaulen, accompanied by two friends left Barmen on Saturday evening, intending to voyage to Spain. Owing to contrary winds, however, they were blown across France and eventually dropped in the sea off Angoulins-sur-Mer, near Rochelle.

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CORRESPONDENCE.

A Suggestion.

[1856] I thought I might make the following suggestion through the medium of your columns.

That, an interesting and appropriate item for the forthcoming Naval and Military Tournament would be the following :—An aeroplane (dismantled) should be brought into the arena in its packing-case on an R.F.C. motor-lorry, then erected, and if possible, the engine run for a minute or so, but as petrol would probably not be allowed in the arena, this part would have to be omitted, though a small electric motor would run the propeller for effect. Then the machine would be dismantled and put into its crate and removed on the motor-lorry.

A little excitement might be added by having a party of Naval erectors to compete against a party of Army men.

I think this item would bring the subject of aviation before the public to a greater degree than has hitherto been the case.

I must apologise for the length of this letter, and I hope my suggestion may prove to be of some good.

Wimbledon. H. C. NEWTON.

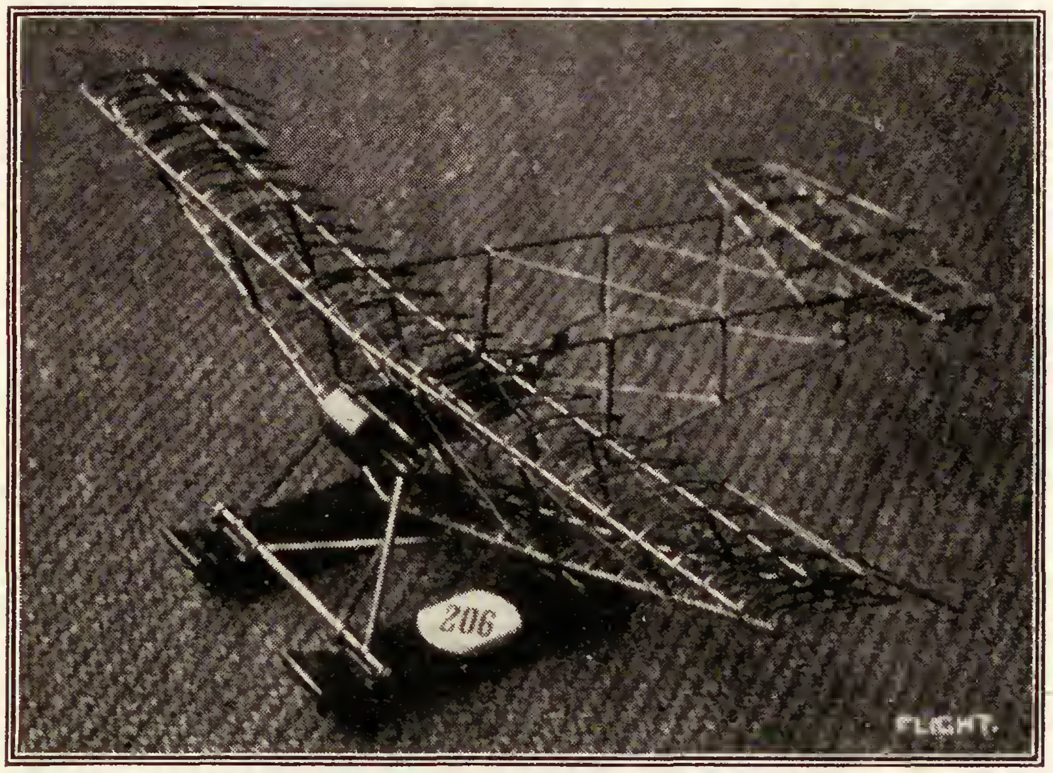
Models

Edited by V. E. JOHNSON, M.A.

Aero Models at Olympia.

Mr. W. H. Nosworthy's Exhibits.

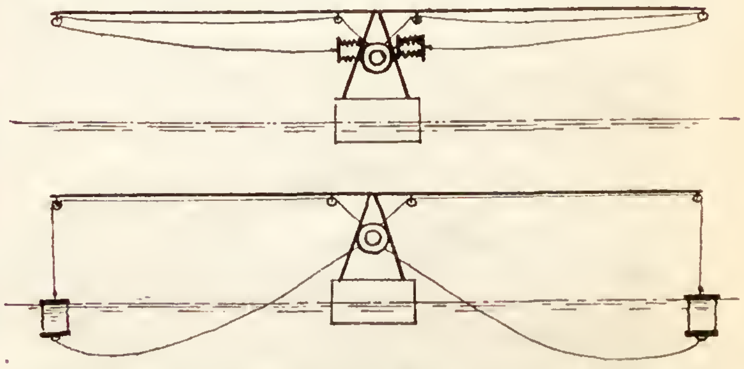
Amongst the eight classes under which models could be exhibited at Olympia was one for models embodying new designs applicable to full-sized machines, a prize of £3 being awarded, at the discretion of the judges, for the model which embodied the most original and practicable ideas. This prize was awarded to one of Mr. Nosworthy's several exhibits, viz., No. 206, a model embodying several new ideas, and which is described in detail below. All Mr. Nosworthy's exhibits, which have been previously referred to in this section, were on sound *practical* lines, and there is no doubt his exhibits well deserved the reward they received; as to which was the best is, of course, a matter of individual opinion, but there can be no question as to the merits of his exhibits as a whole. With these few preliminary remarks, we pass on to consider them individually more in detail, taking first the particular exhibit for which the prize was more especially awarded.



Mr. W. H. Nosworthy's dihedral biplane model, fitted with dihedral angled floats.

Variable Angle Monoplane Amphibian.

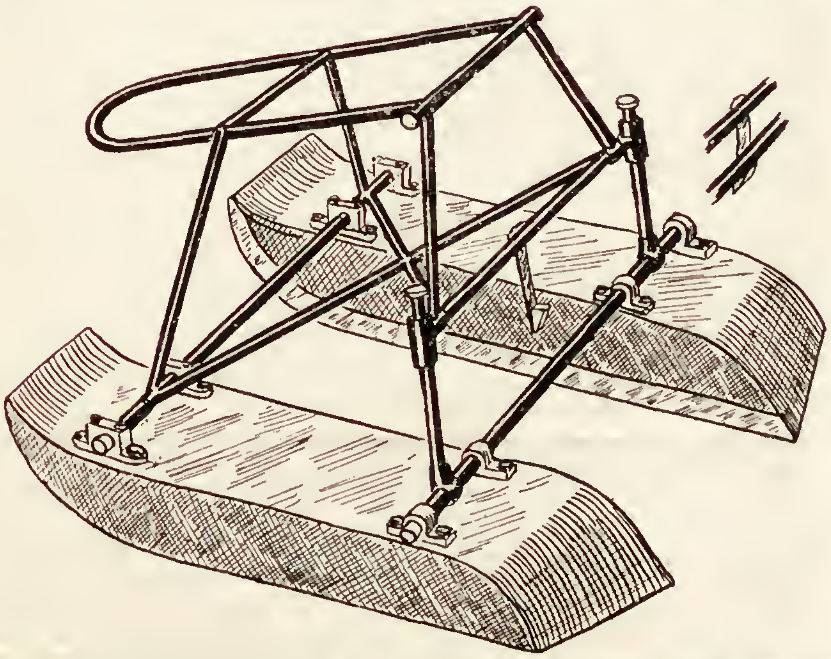
In this model both wings are swivelled on the horizontal, and are moved by specially devised bevelled wheels and a worm gear, all working on a shaft which is rigidly connected to the *fuselage*. The two wheels to be operated by the aviator are movable only when desired, thus preventing accidents by slipping on the rudder bar, or falling over when holding the ordinary control, both of which we know have caused more than one fatal accident. The constant strain on the aviator is thus done away with, as the wheels may be set at any angle at will. The wings are connected to this control, and are movable, either together or separately, to increase or diminish the angle of incidence; this can be done as minutely as may be desired, or to the full extent of the rise and fall. The rear portion of the machine consists of a stabilising tail, which, when moved in conjunction with the wings (this is done by the stabiliser being connected to the above control), provides for the turning movements and also assists in a slow descent. The propeller is driven from the *centre of gravity* through a gap in the wings, which gap, when alighting with the propeller stopped, acts similarly to a parachute. A pair of floating wheels give considerable support to a central float. These wheels are connected or released from the engine at will, and when connected are rotated in the water, thus giving greater speed when rising. They are pneumatic tyred and sprung for alighting on land.



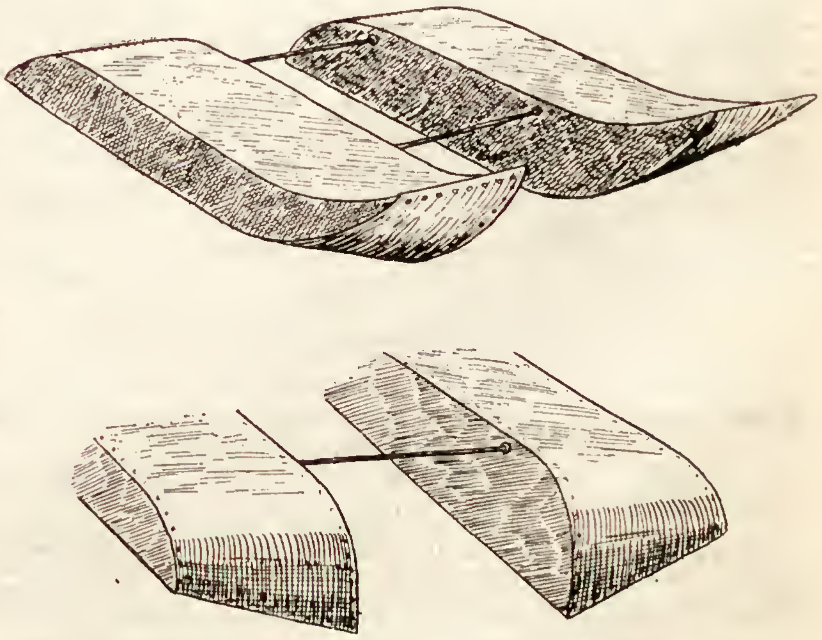
The collapsible anchor buckets on the Nosworthy model. At top, starting to run out, and below, in the water.

Referring to the above description, kindly supplied us by the inventor, the model exhibited was not a practical flying model, and if we understood Mr. Nosworthy correctly, he has not tested his ideas in actual practice; we refer more especially to the gap and propeller position and the floating wheels.

So far as we are aware, no flying model has been constructed with the gap and propeller position as here advocated. But the experiment is one well worth trying by a practical aeromodellist, and its effect on the longitudinal stability of the machine carefully noted. Should any reader care to try the experiment, and send us along the



Showing how the angle of inclination of the floats can be altered at the will of the flyer on the Nosworthy model.



The dihedral angled floats on the Nosworthy model.

results, we shall be pleased to publish them. With respect to the floating wheels, the writer has had some practical experience, and they are more hindrance than help. When left free to rotate they offer more resistance than when fixed. What happens if they are rotated by the engine at the same speed of travel as the machine over the water I do not know from personal experiments, but a "roller" boat constructed years ago and tried, if I remember correctly, on the Seine, was an absolute failure, as was only to be expected. The skin friction in such cases can become very high indeed, the water tending to follow the shape of the body and travelling round the rim. The same thing can be seen when holding bodies of varying shape under a steadily flowing tap.

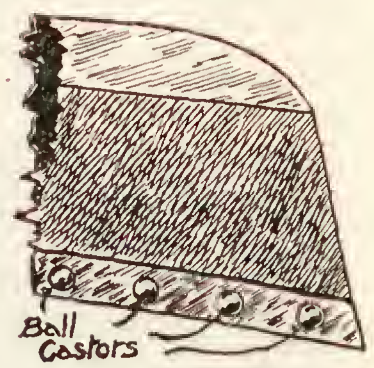
The Dihedral Biplane.

This machine has been devised to give inherent lateral stability when flying. The top wing has a dihedral of some 2·75 degrees, and the lower one is set at an angle of about 22 degrees. When turning, one side of the lower plane is brought more into the horizontal position, giving greater support and preventing side slipping; whilst the other side prevents the machine from drifting. The tail planes are similar to the front, and when turning they present such surface to the air that the machine is equally balanced. Negative end tips are provided, and a rudder is dispensed with. This model is fitted with the new dihedral angle floats. Trials with a flying r.o.g. model have always shown an easy landing on the wheels, and the model has not met with a mishap of any kind.

Referring to this model, shown in the photograph, the dihedral principle there shown is not original, and has often been suggested to the writer, and tried by numerous aeromodellists. It was, as a matter of fact, originally tried by Mr. G. P. Bragg-Smith, but given up by him for his present well-known design, partly owing to the air choking effect produced where the lower and upper planes meet. The dihedral angle principle has now very largely been given up by aeromodellists in favour of the upturned wing tips. No tail type model that the writer knows of can fly successfully without a vertical fin at the rear; it is, however, true that I have not seen the problem attempted with a dihedral angled tail.

Dihedral Angled Floats.

These floats, the shape and construction of which are clearly shown in the drawings, are constructed with the idea of giving the minimum resistance to water travel, whilst the inventor claims that the suction lift is nearly one half that of the ordinary floats. Trials of three floats (in pairs), one dihedral, one stepped, and one flat, of exactly the same length, width, and weight, were made on a course of 65 ft., with a movable weight on pulleys as motive power, the weight used was one of 6 lbs. The results showed that the dihedral shaped floats proved more than two-thirds faster than either of the other floats. Three tests were made with each set of floats, one test with a direct pull and the other two with a lifting pull. Ball castors are fitted to the floats to enable the machine to be easily moved in any direction, on shipboard, in hangars, &c. The rear portion of these floats can easily be dropped, so as to present an inclined angle to the waves when alighting and to take up the shock of concussion, also to prevent nose dipping and overturning. The above idea is undoubtedly in some respects a very good one, and one certainly worth well and thoroughly testing in full size as well as model form. What is wanted is a series of tests at different speeds with machines carrying their own motive power.



The ball castors fitted to the bottom of the floats on the Nosworthy model.

A Waterplane Stabilising Device or Surface Anchor.

This consists of two collapsible floating buckets, which are run out one to each end of the wing spars. They are immediately and simultaneously dropped into the water, and although they become filled they will not sink. Each bucket would contain about one hundredweight of water; this leverage on either side of the wings would act on the float or floats when rocking in rough water and so prevent the overturning of the hydro-aeroplane. The model shown at Olympia would not float upright with the buckets housed, but when run out to the water, it can be disturbed to any extent and the model will not capsize. The buckets can be quickly stowed inside the chassis or floats, and can (by special means) be instantly run out together. They weigh but little, and being housed inside the machine, they offer no such resistance as is offered by the usual side floats now in use. The emptying of the water is quickly done, whilst they are being wound in, simple valves and openings are provided for this purpose. They are, however, useless for steadying the machine whilst *travelling* over the water.

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver	85 secs.
Twin screw, do.	Distance	R. Lucas	590 yards.
	Duration	G. Hayden	137 secs.
Single screw, rise off ground	Distance	W. E. Evans	290 yards.
	Duration	W. E. Evans	64 secs.
Twin screw, do.	Distance	L. H. Slatter	365 yards.
	Duration	J. E. Louch	2 mins. 49 secs
Single-tractor screw, hand-launched	Distance	C. C. Dutton	266 yards.
	Duration	J. E. Louch	91 secs.
Do., off-ground	Distance	C. C. Dutton	190 yards.
	Duration	J. E. Louch	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter	60 secs.
Engine driven off grass	Duration	D. Stanger	51 secs.

Affiliation.——All clubs wishing to become affiliated should send in the applications at once in order that they may be printed in the official programme which is now being arranged, and also so that they shall be eligible to compete in the Inter-Club Competition for the Farrow Shield.

Official Observers.—All club secretaries should send in the names of gentlemen nominated by their committees for official observers for year, and also suggest dates on which their grounds will be vacant for trials. All official observers' names will appear in programme, and they will from time to time be called upon to assist in competitions.

Engine Bench Tests.—The last of the tests or competitions in connection with the Aero Exhibition took place at the East London College, Mile End Road, E., under Dr. A. P. Thurston, D.Sc., and Professor Morris. Full details will be published later.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Bristol and West of England Aero Club (Model Section) (42, ROYAL YORK CRESCENT, CLIFTON, BRISTOL).

Monthly Report.—Model flying meetings at the Sea Walls were recommenced on April 4th, and will for the present be continued every Saturday at 3.30 p.m. Mr. R. M. Haines has kindly presented first and second prizes for a single-plane competition, and this event will be contested at the weekly meetings. Excellent flights have been made by single and twin-screw models of the canard and tractor types. A distinct improvement in design has been noticeable in the models which have been constructed recently. They have been larger and of larger proportionate span and some effort has been made to make the construction of even the duration machines less elementary and more detailed. The annual general meeting of the model section was held in the clubroom on April 7th, when Mr. P. A. Thompson, the hon. secretary of the Aero Club, took the chair. The chairman remarked on the energy which had been shown by the model section during the year and on the various ways in which this energy had been displayed, viz., in meetings, competitions, gliding, &c. The secretary's report and the balance-sheet were adopted. Mr. R. V. Tivy was re-elected hon. secretary and Mr. N. Gordon Stephens was elected asst. hon. secretary. Messrs. R. T. Howse and W. A. Smallcombe were re-elected and Mr. J. B. Allen was elected to the committee. Messrs. T, W. Egerton, P. A. Thompson and, *ex officio*, the secretary and asst. secretary of the model section were elected official observers (subject to the confirmation of the K.M.A.A.). The secretary reviewed the progress of the year with relation to the carrying out of the objects of the model section and made various suggestions for the furtherance of these objects. The subject of competitions was discussed and a number of events were suggested for the consideration of the committee. The chairman said that he would be pleased to give a prize for a competition to be held on the lines proposed by the secretary, the details to be settled by the committee. A vote of thanks for his valuable services was accorded to Mr. R. M. Haines, who was unfortunately unable to stand for re-election as asst. hon. secretary. The meeting concluded with a hearty vote of thanks to the chairman. April 8th, 10th and 11th, members attended Mr. B. C. Hucks's demonstration of looping the loop and flying upside down at Horfield, a special enclosure being reserved for the Aero Club. April 25th, members competed by invitation of the Bath and Somerset Aero Club in their spring competition at Lansdown racecourse, and were awarded the following prizes:—R.f.g. duration contest: First prize, R. T. Howse, 66 secs. H.l. distance contest: First prize, W. A. Smallcombe, 1,280 feet. H.l duration contest: Second prize, R. T. Howse, 70 secs. Mr. N. Gordon Stephens unfortunately smashed a very promising-looking model in the first event. The arrangements made by the Bath and Somerset Aero Club in connection with the competition were in every way excellent. The visitors were conveyed to Lansdown in a private 'bus and a good tea was provided at the racecourse. Bristol was reached late in the evening after a very enjoyable day.

Croydon and District Ae.C. (82, CLARENDON ROAD, CROYDON).

MEMBERS are hereby notified that the competition for the Cup presented by Messrs. Hart and Finnigan, will take place at Mitcham on May 3rd, at 3.30 p.m. sharp. This competition promises to be a great success, as every member has entered.

Monthly Report.—In view of the excellent weather experienced during April, a great deal of valuable work has been done with all types of models. Messrs. Carter, Pavely, H. Smither and Hart have been out with their show models. Mr. Carter's monocoque tractor biplane has made some nice flights but requires further adjustment. Mr. Pavely has obtained some splendid flights with his tractor monoplane with which he secured third place in the Aero Show competitions at Hendon. One of the star performances of the month has been the consistent flying of Mr. Harold Smither's hydro. mono. He has repeatedly obtained durations of between 40 and 50 secs., the model terminating its flights with fine glides. Mr. Hart's floating-tail mono. (13¾ ozs.) was too heavy for any great duration, but it has made some good flights from the ground, the well-sprung double-skid landing chassis enabling it to make very realistic landings.

Great credit is due to Mr. W. Taylor, who though practically a beginner, has had some fine flights with a geared motor tractor mono. of his own design. His best duration to date 40 secs. Messrs. Bell, Mullins, Carter and Hart have been out with r.o.g. monos. with good results. Mr. Mullins has had some of the finest flights yet seen at Mitcham his model being very stable and finishing its flights with fine glides with propellers stationary. Mr. Bell has had very big durations off ground—his best flight officially timed so far is 78 secs. Mr. Carter with a new model has been flitting about the Common, his model showing a decided tendency to go across country. Mr. Pavely has also obtained big distance and duration flights with an r.o.g. mono. Mr. C. Smither, with his well-made A-frame models has been giving exhibitions at Mitcham, Duppas Hill, Carshalton, Purley, &c., during the month. Mr. Bell has had some successful flights with a model fitted with a compressed-air motor. It is with the greatest pleasure the secretary reports that Mr. Jannaway, the well-known model maker, has visited the club on several occasions, and with his show machines has had some excellent flights.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

Monthly Report.—During the month hard work has been done by all club members' Section A in particular. Eight meetings were held during holidays, April 10th, although rather windy several models were out 1-1-P2 being in evidence; after practice W. Hersom, Ludow, Bedford and Bond adjourned to club-room and had bench tests with Hersom's two-cylinder compressed air engine. Although speed on engine was not quick enough, a great amount of knowledge was gained from it. April 11th proved to be too windy for models, Ludow's Olympia 'bus coming to grief on tuning up. Others out were Wood, A. Wharmsby, W. Hersom, Bedford and Bond. April 12th, some good durations were obtained, and W. Hersom some good altitudes with his 9½ oz. hydro. Others were Ludow (1-1-P2), Bedford (1-1-P2), McCulloch (hydro.) h.l., Grattan (double surface 12-oz. tractor), Bond (1-1-P2 Olympia model) he obtaining 60 and 89 secs., F. and C. Hawthorn (Canard types r.o.g.), A. Wharmsby, a new member (h.l. 1-1-P2) obtained durations 40, 42, 45, and Towers, Piggott, Wood, Bedford, Boyl and Pitt also out. April 13th, W. Hersom, h.l. 65, 85, r.o.g. 77, 60. Bond 4-oz. tractor, best durations 48, 51, 53, C. S Hersom r.o.g. 78, 83, 90 and 77, Wharmsby canard h.l. 45, 35 and 44, Ludlow r.o.g., Piggott h.l., McCulloch h.l., 55 and 50, Bedford and Grattan with 1-1-P2 on altitude. April 19th, W. Hersom hydro. and r.o.g. obtained 73 secs. Sweepstake was held near Sand hills for duration r.o.g., H. G. Bond winning with 50, 67, 118 average, 76⅔ secs., second, S. C. Hersom 54, 60, 83, average 65⅔ secs., third, F. Hawthorn, 62, 63, 60, average 62. The half-yearly general meeting was held on 23rd inst. at club-room, and after election of officers a discussion on Farrow Shield and season competitions was held. April 26th, further good work in good weather. Mr. Louch flying his old record machine made a flight of 5 mins. 5 secs. out of sight; several members explored the district but could not see any sign of model. The distance estimated for this particular flight was ¾ of a mile.

N.E. London Model Ae.C. (47, JENNER RD. STOKE NEWINGTON, N.)

Monthly Report.—Competition programme for the year was commenced by a successful, unrestricted distance competition on April 25th, the first prize, won by W. A. Dore with 609·5 yds., duration 93 secs., a club record; W. Greffett, second. F. Burton flying single and twin "canards," also a 5 ft. span tractor. S. Lewin, with geared "canard" single-screw obtained 58 secs.; Longstaffe making tractor experiments, also 15-oz. hydro. on River Lea. Competition programme will be forwarded on request to all interested. May competitions are as follows: 9th, single screw r.o.g. duration; 23rd, tractor screw r.o.g. duration, no weight limitations. Prizes will take the form of silver trophies. Entrance fee for non-members, 1*s.*, subject to alteration by the committee meeting, to be held May 2nd. Committee meetings are held after the flying, the first Saturday in each month.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

MAY 2ND, flying at Sudbury for silver and bronze medals.

Monthly Report.—On April 11th the competition for 6-oz. twin-screw models, average of three flights, was won by D. Driver, whose performances were very consistent with an average of 66⅓ secs. W. Evans was second with 64⅗ secs. average, and H. Woolley third with 47⅗ secs. Prizes were 3*s.*, 2*s.*, 1*s.* R. Bird was close up fourth with 47⅕ secs, J. Barrett fifth, 43 secs. On Easter Monday, April 13th, the single-screw competition, average of three flights, was won by M. Levy, 50 secs., D. Driver, 43⅕ secs., second; H. Woolley was third. Prizes 2*s.* and 1*s.* The twin-screw handicap on the same day was won by R. Bird, 71 points, F. Johnson was second with 61 points, and T. Carter third with 59 points. Prizes 2*s.* 6*d.*, 1*s.* 6*d.*, and 1*s.* H. Woolley was fourth with 55 points, and J. Barrett, 52 points, fifth. Mr. C. C. Dutton had several good flights with a light twin-screw model, his best times being 70, 80, 82, and 86 secs. The twin-screw handicap arranged for April 18th, was postponed until April 25th on account of the east wind, which owing to the nature of the surrounding ground causes gusty down currents, making it impossible to get good flights with models of the pusher type. It was found, however, that tractor models were not adversely affected to the same extent, T. Carter's machine making some really good flights. On April 25th the east wind again prevailed but was not so strong, but sufficiently so to make the durations rather poor. However, F. Johnson won the handicap comfortably with an average of 50⅕ secs. and scoring 70 points, H. Woolley was second with 63 points, and J. Barrett third, 50 points, W. Evans 44 points, fourth, R. Bird 35 points, fifth, and T. Carter 30 points, sixth. The latter was again having good flights with his tractor. The handicap prizes were 2*s.* 6*d.*, 1*s.* 6*d.*, and pocket knife presented by M. Levy.

Reigate, Redhill and District (THE COTTAGE, WOODLANDS AVENUE, REDHILL).

Rawson Cup Competition arranged for June 6th, twin r.o.g's., minimum weight 6 ozs., minimum loading 4 ozs. to 1 sq. ft., average of three trials to be taken. Winner to hold cup, also be presented with silver medal (gold centre), second silver medal, entrance fee 9*d.*

Monthly Report.—There has been a good deal of flying during the month. Members did well in tuning up for Olympia trials but the club was very unfortunate, as most members were unable to get away to attend; nevertheless, 4 members turned up with the club's models, on the whole they did not do what the club was entitled to expect of them owing to there being soaked *fuselages* carrying more water than the wooden models, but it is some consolation to find that the club did so well for "design and construction." Several hot models are already under way for the next Rawson Cup Competition. During the "pre-Olympia" tuning up Mr. Sutton did a flight of about 40 secs. with his h.p. tractor and 45 to 50 with r.o g. Mr. Key 32 with tractor and 43 with floating tail r.o.g. Mr. Morton good flights with Etrich, which were not timed. Messrs. R. G. and M. H. Wilson 45 and over with their floating tail r.o.g's. Messrs. Hoyle, Hooton, Funnell and Greenhead were all showing promise. On Good Friday a competition had been arranged but postponed owing to very high and gusty winds; anyway 17 machines turned out and some good wind flying was done, Mr. Sutton getting very high flights with his F.T. h.l. Mr. Hoyle 35 secs. with h.l. and 347 yds. 45 secs. with his Olympia r.o.g., this seems to be quite a good thing. Mr. Morton looping with h.l. mono. also fast and high flights with same. Messrs. Funnell and Greenhead were flying Olympia r.o.g's. In evening Mr. Key's Olympia tractor was going A1, a pleasure to watch; during Easter most members were out, since then Mr. R. G. and S. G. Wilson have been out with a 6 oz. r.o.g. floating tail. They have also been doing 50 with Olympia r.o.g's., Mr. R. G. making trials with floats on water. Mr. Hoyle has been doing fine flying with his Olympia r.o.g. and a new 6½ oz. r.o.g., which promises to be good. Mr. Norton has altered Olympia r.o.g. and lengthened same, now undergoing tests, have had 40 secs. so far. Mr. Hooton has also been out with 3-oz. h.l., which is still "durating" on the top of a high tree. On 21st Mr. Norton had his Etrich tractor flying to perfection, getting 173 yds. and 32 secs. Mr. Sutton has been tuning a J.W.B. tractor slightly altered, a dihedral having been given it is certainly much more reliable than when in the hands of its previous master. Mr. R. G. Wilson has been declared the winner of Messrs. Bonn's prize. Messrs. Greenhead, Kennard and Young have also been out. Mr. Kennard, a new member, has built a floating tail machine which does him credit. On Saturday, 25th, Messrs. Sutton and Hoyle were flying Olympia machine, Mr. Sutton getting 50 secs. and Mr. Hoyle over 60, a very fine and high flight.

Sheffield Ae.C. (41, CONISTON ROAD, ABBEYDALE, SHEFFIELD).

MAY 2ND, Colver Cup contest for r.o.g. machines at Standhouse Aerodrome, Intake, 3.15 p.m. (weather permitting).

Monthly Report.—April 4th, competition for duration h.l. machines. Mr. Harold Blackburn acted as judge between intervals in his flights. Prize (British Empire Universities Dictionaries, given by the *Sheffield Independent*) for longest flight won by Mr. W. H. Bagshaw with 110 secs. Mr. E. W. Colver, the president, and Mr. C. F. W. Cudworth acted as timekeepers. The machines had great difficulty in combating with the cross and down air currents. Each member was allowed three trial flights, Mr. Bagshaw doing in his first 1 min. 15 secs.; C. Dewsnap, on his second, 1 min. 5 secs. The youngest member of the club, Master C. E. Worrall, about ten years of age, did 52 secs. This being the close of the *Sheffield Independent* Aviation Week at Owlerton there were about 80,000 people who witnessed the flights in addition to those "outside." Mr. Blackburn was greatly interested in construction part of the models also highly delighted with the satisfactory way the proceedings had taken place.

Stony Stratford and District Kite and Model Ae.C. (OLD STRATFORD).

STONY STRATFORD.—May 6th, meeting at Wolverton; subject, "The Ding Sayers Model." May 20th, building evening. May 16th, May competition. Buckingham.—For times and days of meetings see branch secretary. Will all members please note that owing to the wretched support our last open competition received, it was unanimously decided not to hold any open competitions this season.

Monthly Report.—Stony Stratford.—April 1st, meeting at Wolverton; subject, Mr. Handley Page's address to the K. and M.A.A., and an excellent discussion followed. Mr. Lawson has kindly presented a machine for a novice's competition. Major Hooker, of Buckingham, has accepted a vice-presidency. The chairman has produced a "looper," as also the secretary, who has made a total number of 20 loops as a start. April 4th, March competitions at Old Stratford and looping. Results: Mr. Brown, 1st, average 23 secs.; Mr. Williams, 2nd, 20½ secs.; Mr. Brown, 3rd, 20 secs. Mr. Brown had a shot at the record in Classes 1A and 1B, and the following figures are the result: Class 1A, 409 yds. 1 ft.; 1B, 62 secs., and also opened Class 2B with 17 secs. with a single-screw. April 16th, lantern lecture. April 18th, April competition at Buckingham, very gusty and rough. Results: Mr. W. Palmer, 1st, average of 26⅓ secs.; Mr. Brown, 2nd, 23⅔ secs.: Mr. Williams, 3rd, 22 secs. April 21st, at Flitwick, Mr. Matson successfully raised the figures in Classes 4A and 4B with his twin r.o.g. to 117 yds. and 43 secs. Buckingham Branch.—April 8th, members meeting, discussion on duration. Mr. Palmer during the Easter Holidays successfully obtained a flight of 277 yds. and 40 secs., the best figures as yet put up by a branch member. April 11th, Branch competition: Mr. Cherry, 1st; Mr. Sturgess, 2nd; W. Palmer, 3rd.

Wimbledon and District (165, HOLLAND ROAD, W.).

FLYING as usual May 2nd and 3rd.

Monthly Report.—April 3rd and 4th members were flying in Olympia trials at Hendon. In Class 2B, Mr. Boniface took 2nd place, his tailed machine showing great stability. In Class 6, Mr. D. Easdale's 30-oz. tractor took 1st place, the stability being excellent, while Mr. L. Slatter and A. Houlberg, flying canard type machines, took 2nd and 3rd place respectively. Mr. Houlberg made one very fine flight of 67 secs. duration, constituting a record for this class of machine. In Class 2A, Mr. G. Hayden and A. F. Houlberg tied for 1st place, Mr. F. Powell coming 3rd, and Mr. Slatter 5th. In this class the Wimbledon Team, consisting of Messrs. Hayden, Houlberg, Powell, Slatter, Laing, and Chown, took 1st place, with a total of 1,095 mark. In Class 5, Mr. D. Laing took 2nd place. In the hydro trials at Welsh Harp, Mr. Slatter took 1st place. Good Friday there was a very strong wind, but Mr. Whitworth, flying his Olympia hydro with the floats removed, obtained a fine flight of 145 secs., but unfortunately the machine passed out of sight over trees, and up to the present has not been recovered. On the Saturday and Sunday following the fine weather brought out a great many machines. Mr. Easdale's tractor was flying very steadily at a great height, doing 80 secs. Mr. Powell's 0-1-1-0P2 machine was also flying very high, finishing all flights with a splendid glide. Mr. Hayden had out his Olympia machine, intending to make an attack on the duration record, but could not get more than 110 secs. On Easter Monday a sealed handicap for r.o.g. machines of all classes was held, the results being as follows:—1st Mr. Slatter, twin-screw canard (start 47) 140; 2nd, Mr. A. F. Houlberg, twin-screw canard (start 37), 138; 3rd, Mr. D. Easdale, single tractor (start 52), 134. Mr. Boniface, single-screw pusher, tail type (start 77); Mr. D. Laing, twin-screw canard (start 73); and Mr. F. Powell, twin-screw tail type, start (36), all tied for 4th place with 132. Mr. Hayden (scratch) made a flight of 95 secs. out of sight. 15*s.* cash was distributed amongst the first three. Mr. Laing with his new tractor has got 74 secs. Mr. Slatter (Olympia single-screw canard) on April 12th broke all records for duration with a flight of 3 mins. 50 secs., the machine passing out of sight over the trees in the direction of Southfields. It has not been recovered. Several heavy machines have been flying lately, including Messrs. Slatter's and Easdale's Olympia weight-lifters. The latter, without weights, has been flying very high, doing durations of 45 secs. Mr. Easdale, however, was unlucky enough to smash his spar owing to a bad landing after a good flight. Mr. Tucker's big "Martinsyde" monoplane was flying very well, having been tuned up to flying at 60 ft. for 30 secs., when an unfortunate collision with a motor put an end to its activities, the spar being smashed in the middle. Mr. Boniface has been flying his Olympia single-pusher getting it tuned up, and on the 19th he excelled all his previous efforts with a flight of 100 secs. at a height of over 80 ft.

Windsor Model and Gliding Club (10, ALMA ROAD.).

Monthly Report.—The models used last month were of a very varied nature. The public generally have evinced great interest, a fact which augurs well for the coming season. The following members have taken part in the flying:—Messrs. L. Spicer, F. Camm, E. Stanbrook, S. Dandridge, S. Camm, J. E. Starnes, while Master O. Allen has made a large number of flights at Datchet. At the trials at Hendon three members flew, Messrs. E. A. Dowsett, E. Stanbrook and S. Dandridge, who flew the secretary's model. E. Stanbrook had the misfortune to wreck his model before the start of the competition, and so did not compete. E. A. Dowsett made an average of 53 secs. in Class 2a, and S. Camm one of 25 secs. in the tractor class, coming in sixth. Messrs. W. Rogers would have entered, but unfortunately his model was carried away by an express during tuning up and has not been heard of since. Mr. J. Rogers is tuning up his enormous Olympia biplane with the idea of creating records later, it being about the biggest rubber-driven model in England, if not the world. The plans for the full-size machine remain in abeyance, but it is practically certain that work will be begun within two weeks. Opinion seems divided as to the merits of the tractor and propeller machines, but the fact that in a propeller machine the engine being behind makes a bad landing more dangerous has led to the majority being in favour of the tractor type It is certain that in a tractor machine one may emerge from accidents unscathed, which in a propeller machine might easily end fatally. It is doubtful whether there is any great difference in the efficiency of the two systems; at any rate the tractor type lends itself to a cleaner design. Local enthusiasts are urged to join, as the membership is not up to full strength.

UNAFFILIATED CLUBS.

Bath and Somerset Aero Club (199, WELLSWAY, BATH).

Monthly Report.—A very successful model competition was held on the Racecourse at Lansdown on Saturday last, the programme attracting 14 entries. Event 1, r.o.g. duration, was won by Mr. R. T. Howse with a very fine flight of 66 secs.; Mr. R. C. Cross being second with 39 secs Event 2, speed, was won by Mr. C. Brampton's twin-screw, the 100 yds. being covered in 6½ secs.; Mr. C. Jennings took second place, his time being 7 secs. The large number of spectators were greatly interested in this miniature Gordon-Bennett race. Event 3, distance h.l., fell to Mr. W. A. Smallcombe with a flight of 1,280 ft., Mr. Jennings being second with 1,220 ft. Event 4, h l. duration, was won by Mr. R. C. Cross with a flight of 85 secs. (club record), Mr. R. T. Howse being second with 70½ secs. The special prizes for members of this club were won by Mr. R. C. Cross and Mr. C. Jennings for duration and distance respectively. The club hopes to organise some more competitions at a later date.

Dundee Aero Club (4, FORESTER STREET).

MAY 7TH usual monthly meeting, Clubrooms, Y.M.C.A. Buildings, 8 p.m. May 16th, competition for members not having won a prize in club competitions. H.L. any type. Tractors to have a handicap, to be decided later. May 30th, next competition for Luis Trophy. Members unable to be present on April 25th to compete for Luis Trophy, can do so before May 9th.

Monthly Report.—The Club has been in a bit of a difficulty this month owing to the public parks being closed to us, matters are now arranged and full use of all the parks is allowed except one. April 4th, Messrs. Robertson and Powrie exhibition flights in Lochee Park. April 23rd, a meeting in the clubroom, Mr. Robertson presided. Draft of rules, &c., *re* Affiliation Scheme of Scottish Aeronautical Society, Model Aero Club were read and discussed, and seeing that it will help forward the Model Aero Club movement in Scotland the meeting decided to affiliate. April 25th, 2nd competition for Luis Trophy r.o.g. Lochee Park, declared off, owing to most of the members being unable to compete. Messrs. Stuart, Hall, Robertson, Maxwell and Powrie, however, visited the park to save disappointing the people who knew of the competition. Hall and Stuart's best average was about 40 secs.

Edinburgh Ae.S. (Model Section) (41, DRUMSHEUGH GARDENS).

Monthly Report.—The first annual report, presented at the first annual general meeting, on April 15th, after detailing the work done during the year, states that during the year 22 ordinary members joined the society. A glider is being constructed by members and will be available during the summer for gliding. It is an interesting fact that ten at least of the society's members have had practical experience either in building or in flying aeroplanes. The accounts show a small balance to be carried forward; the expenditure of the society covering fifteen months for only one year's income. The committee wish to thank all those who, by giving prizes for the model section or books to the library, have helped on the work of the society.

Edinburgh Aero Club (13, HERMAND TERRACE, EDINBURGH).

As most of the members have or are making hydros., a hydro meeting has been arranged for May 9th, at Inverleith Pond.

Monthly Report.—April 4th, Messrs. Watt, Hubbard, Clark, Fiddes, Hogg, Calder, Ross, Nesbitt and Ramsay at Inverleith Park. Messrs. Calder and Fiddes out with their first hydros. Saidler. r.o.g. twin-tractor mono., Clark and Ramsay A-frame models. April 9th, at night flying meeting at the Meadows, good flights were made by Messrs. Hogg and Nesbitt. 11th, meeting at the King's Park, St. Leonard's Gate, with good attendance of members. Messrs. Hubbard, Watt, Nesbitt, Fiddes and Ramsay all with A-frame models. The latter broke Mr. Hubbard's club record with a flight of 22⅖ secs. 16th, another night flying meeting in Meadows. Mr. Harrison, the president, made a welcome reappearance (he having been at Hendon for six weeks) with a large-span A-frame mono. and got some very fine high flights. Mr. Ramsay succeeded in again breaking the club record with a flight of 25⅘ secs. 18th, meeting was at Inverleith. Mr. Fiddes lost his hydro. which came to rest well out in the pond. In the higher part of the park before a large attendance the rest of the members gave a very fine display of h.l. models, and there was keen competition for the record. Mr. Ramsay raised his record to 30 secs., as also did Mr. Saidler. The former afterwards got a flight of 38 secs. Mr. Clark was out with a new model which flew quite well. Mr. Watt had a very promising machine, which unfortunately was broken early in the afternoon. Mr. Geddes, a new member, was also flying well. Mr. Harrison's machine showed remarkable stability and late in the afternoon broke all club records by a flight of 50 secs., including a glide of nearly 20 secs. Mr. Saidler was also flying a very small r.o.g. tractor mono. 25th, meeting at the King's Park. Messrs. Watt, Clark, Nesbitt and Ramsay out with A-frame models, Mr. Hubbard with a T-frame and Mr. Fiddes with an original bow-frame; although there were some good flights nothing was done in the way of records.

Finsbury Park and District (32, ASHLEY RD., CROUCH HILL, N.)

Flying May 2nd, Finsbury Park, from 3 p.m., r.o.g. duration contest 4 p.m. Secretary's change of address to 32, Ashley Road, Crouch Hill, N.

Monthly Report.—During month good flying by Mr. R. Mullin (Blériot mono.), B. H. Barnard (Blackburn mono. and 4-bladed screw Blériot), S. Gibbs (Deperdussin), H. Mullin (Blériot), A. Richards (Handley Page and Nieuport monos.), all tractors, Mr. S. Gibbs (tractor Deperdussin), S. Pratt (Blériot type with upturned tips), F. Steer (tractor biplane, Farman type), R. Barnard (Deperdussin with "B.E." adjustable tail), S. Pratt (Blériot), A. Richards (Antoinette mono.).

Ilford Model Ae.C. (83, ENDSLEIGH GARDENS, ILFORD).

MAY 3RD, flying as usual, 9.30 a.m., Hainault Forest, Chigwell Row (weather permitting). There has been an alteration in the competition, No. 4 (senior section). The minimum length for tractors has been altered from 40 ins. to 36 ins. Preliminary trials take place on May 3rd for competition on May 10th. Members please note, machines should be tuned up on Sunday, May 3rd.

Liverpool Aero Research Club (62, CEDAR GROVE, LIVERPOOL).

May 2nd, Model Aero Exhibition, Y.M.C.A. Hall, Mount Pleasant, 11 a.m till 10 p.m., admission 3*d.*

Monthly Report.—Although to a certain extent flying has been held back on account of work on exhibition machines, still good progress has been attained over the preceding month. Stanley Park, March 28th, saw B. Tear and T. W. Bennett first at ordinary flying and afterwards looping, the latter having two of his graceful kites, which drew considerable attention. G. H. Kilshaw with twin racer doing very steady flights. April 4th, at Stanley, T. W. Bennett, E. Kilshaw, W. Beale, B. Tear and G. H. Kilshaw keeping a good audience interested with 1-1-0-P2 machines, the fine banking and turns of Bennett and Tear's models being superb, it being extremely noticeable how readily the two machines climb during small circuits. Good Friday morning at Sefton Park, W. Beale with 1-1-0-P2, G. H. Kilshaw 1-1-0-P2 and his tractor, the spectators, however, made flights with the latter impossible, for on two occasions after getting to about a foot high, some over-anxious person brought her down by getting in her flight path, W. T. Bennett experiencing the same trouble at Stanley with his large r.o g. Canard, heavy showers stopping proceedings. Afternoon at Stanley, Bennett, Tear, Beale and Kilshaw flying racing canards before a great crowd, looping by Tear and Bennett being an item much appreciated. April 11th, W. Beal's racer excelled itself, doing loops and sideslips in good style. Easter morning at Sefton, B. Tear 1-1-0-P2, E. Kilshaw 1-1-0-P1, W. Beale 1-1-0-P2, G. H. Kilshaw 1-1-0-P2 and r.o.g. canard 33 ins. span. This machine rising first time out, off ground anything from smooth. Heavy showers in the afternoon kept many members from turning up, W. T. Bennett nevertheless braving forth and amusing an appreciative crowd at Stanley, having two bird kites 8 ft. 6 ins. and 4 ft. 6 ins. hovering over Everton Football Ground during the match, about 1,000 ft. high, also flying 1-1-0-P2.

Scottish Ae.S. Model Ae.C. (5, DOUNE QUADRANT, GLASGOW).

MAY 2ND, Arthur Corbett Cup Competition, h.l. distance and duration, 9th, 16th, 23rd, 30th, h.l., r.o.g., tractors for records, Paisley Racecourse. Trains 1.45 and 3 p m. Central. June 6th, Arthur Corbett Cup Competition, r.o.gs. distance and duration.

Monthly Report.—April 18th, a sealed handicap for duration was held at Paisley Racecourse. The handicap was a plus one, the results being as follows:—1. Ian S. Ross, 47 secs. + (30); 2. T. Graham, 64 secs. (scratch); 3. Jas. C. Balden, 42⅘ secs. + (3). During a trial Mr. T. Graham had a splendid flight at a great altitude, being lost to sight by the observer at 95⅕ secs. The distance of this flight when measured came out at 3,049 ft. beating the present record of 2,006 ft. handsomely. Both duration and distance are official Scottish records, and also club ones, for twin-screw h.l. Mr. Jas. C. Balden's best in trial flights were 60⅖ and 67, with single-screw mono. April 25th at Paisley Racecourse, Mr. T. Graham was testing a single-screw r.o.g. off a very rough ashpath, his best duration being 23 secs. and 31 secs., the latter being a new official Scottish record, also a club one. It should be noted that all club records for r.o.g. are done without the use of starting boards. Mr. Jas. C. Balden had out a model for looping, &c., which it did on several occasions "*à la* Hucks" and Mr. T. Graham also did three or four side loops. Mr. A. M. Muir had out a neat twin-screw mono. which made several good flights.

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CONTENTS.

Editorial Comment: PAGE
"The Flying Machine from an Engineering Standpoint" 481
Men of Moment in the World of Flight: The Schneider Cup Victory ... 482
Flying at Hendon ... 484
The Sanchez-Besa Biplane (with scale drawings) ... 488
Royal Aero Club Official Notices ... 491
From the British Flying Grounds ... 492
Eddies. By "Æolus" ... 494
British Notes of the Week ... 496
The Naval and Military Engine Competition, 1914 ... 497
The Measurement of Air Speed. By A. P. Thurston, D.Sc., F.R.Met.S. ... 498
Foreign Aircraft News ... 500
Models. Edited by V. E. Johnson, M.A. ... 502

EDITORIAL COMMENT.

"The Flying Machine from an Engineering Standpoint." A most valuable contribution to the science of aeronautics was made by Mr. F. W. Lanchester in a paper entitled "The Flying Machine from an Engineering Standpoint," which was read before the Institution of Civil Engineers on Tuesday last—the paper being the "James Forrest" Lecture for 1914. Owing to the pressure upon our space, it has been necessary to defer the publication of the paper until a later date, but we hope to insert the first instalment next week.

The value of the paper is not due to the fact that much new ground has been broken, although the author's able examination and treatment of Catastrophic Instability, to which he was the first to draw attention, may be regarded as coming under this heading, but he has indicated and correlated the results of experimental observation and careful study that have either already been, or are likely, in the near future, to be published. Especially is this true of his references to the forthcoming Report of the Advisory Committee for Aeronautics for 1912–13, and to Memorandum No. 96 of this Committee, which will not be included in the next Annual Report. We consider that the publication of the results of the N.P.L. tests in this manner is highly desirable, for it gives designers a lead as to what they can expect to occur in practice, and may provide a solution of the difficulty of issuing official reports at more frequent intervals. In the Memorandum to which we refer, for example, the extreme probable values of the computed dynamic load factor under certain contingencies, such as, in gusts, when banking, when flattening out and in looping, are given, and it is much more satisfactory to have some more or less definite values assigned to the probable variation in the loading than for each designer to speculate on his own account, even though the factors given may subsequently be discovered to be as much as 20 per cent. out. And we are fully in agreement with the author when he states that "the aeronautical designer must bear clearly in mind that, in his particular case, his factor (of safety) has a double function, namely, both to give the margin of strength and durability needed under ordinary conditions of flight and to provide for abnormal conditions of stress, occasionally even almost to the theoretical limit of the strength of the structure." It is the fact that the factor of safety employed in some cases, when the "*abnormal conditions*" are considered, is so small that it would not be tolerated for one instant in any other branch of engineering work. Designers and constructors should endeavour to obtain such a factor of safety in every part as will be sufficient to meet any contingency, quite independent of skill or attention of the pilot—the difficulty at present is to achieve this end, but this will be overcome in time.

At the ouset in his paper, Mr. Lanchester considered the path of flight of a hypothetical machine through the air, giving a diagram showing a number of phugoids of varying amplitude, and similar to those he has published in his book on Aerodonetics. He then proceeded to show that although these curves are plotted from a mathematical expression, they do actually bear a close relation to experimental observations of models and of machines in actual flight. This was followed by an examination of catastrophic stability and of the laws of resistance. Many data are given respecting the aerodynamic and direct resistance of an aerofoil of varying aspect ratio and section, from which he concludes that the tractive effort required to overcome the resistance encountered in flight need not exceed 1 in 12 to 1 in 14, that is 7 or 8 per cent., using an aspect ratio of about 6, and that values less than this are to-day reached in existing machines; while if it be found practicable to employ really high aspect ratios, the resistance coefficient may be as low as

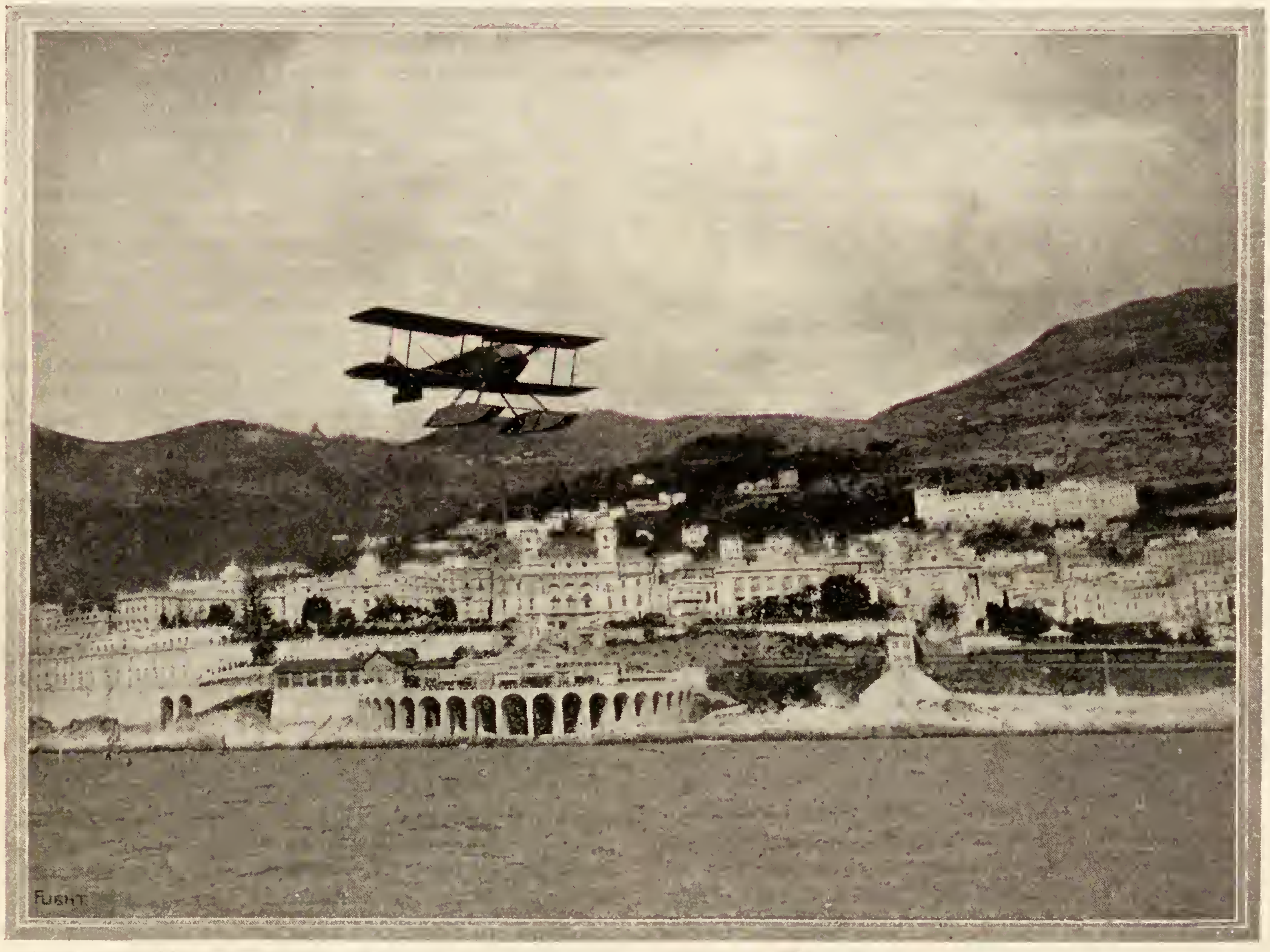
6 per cent., or even 5 per cent. may prove to be attainable. Body resistance was then dealt with, and under the heading of total resistance it was shown diagrammatically how soon with increased flight speeds the question of body resistance becomes a disproportionate factor; but, as will be readily understood, with increasing weight and power of the machine, the effect of such body resistance may be rendered less important, since an increase in weight and power does not require a proportionately serious increase in the size of the members to which the body resistance is due. The author calls attention to an important matter in this sub-division of his paper, as it illustrates the extent to which theory can anticipate the results attainable in actual practice. As far back as 1907 he tabulated the results of calculations for gliding angles as ranging for complete machines from 12° (approximately 1 in 5) to 6° (1 in 10), and the worst gliding angle recorded in the Military Trials was 1 in 5·3, while in present day practice the smaller angle is gradually being reached.

The questions of Propulsion and the Motive Power Installation next received attention, after which the design of the aerofoil and the arrangement and structural features of the machines were discussed, and two methods of calculation of stresses in the aerofoil members were outlined—one in which the aerofoil struts are treated as being pin jointed members, and the other in which the theory of continuous girders is applied to the main longitudinals. A memorandum on the latter method, which has been developed by the staff of the National Physical Laboratory and adopted by the Royal Aircraft Factory and various manufacturers, will be included in the Advisory Committee's Report for 1912–13. This memorandum should be of value because, as the author remarks, while the pin-joint hypothesis usually gives results that are on the safe side, the extent of the factor of safety so introduced cannot be relied upon.

Reference was made to the vertical fin effect of the propeller, from which it appears that the "propeller equivalent in terms of vertical surface is a very large and serious factor, and one that under no circumstances should be ignored." This will also be published in the Advisory Committee's Report and is the result of an investigation carried out by Mr. T. W. K. Clarke.

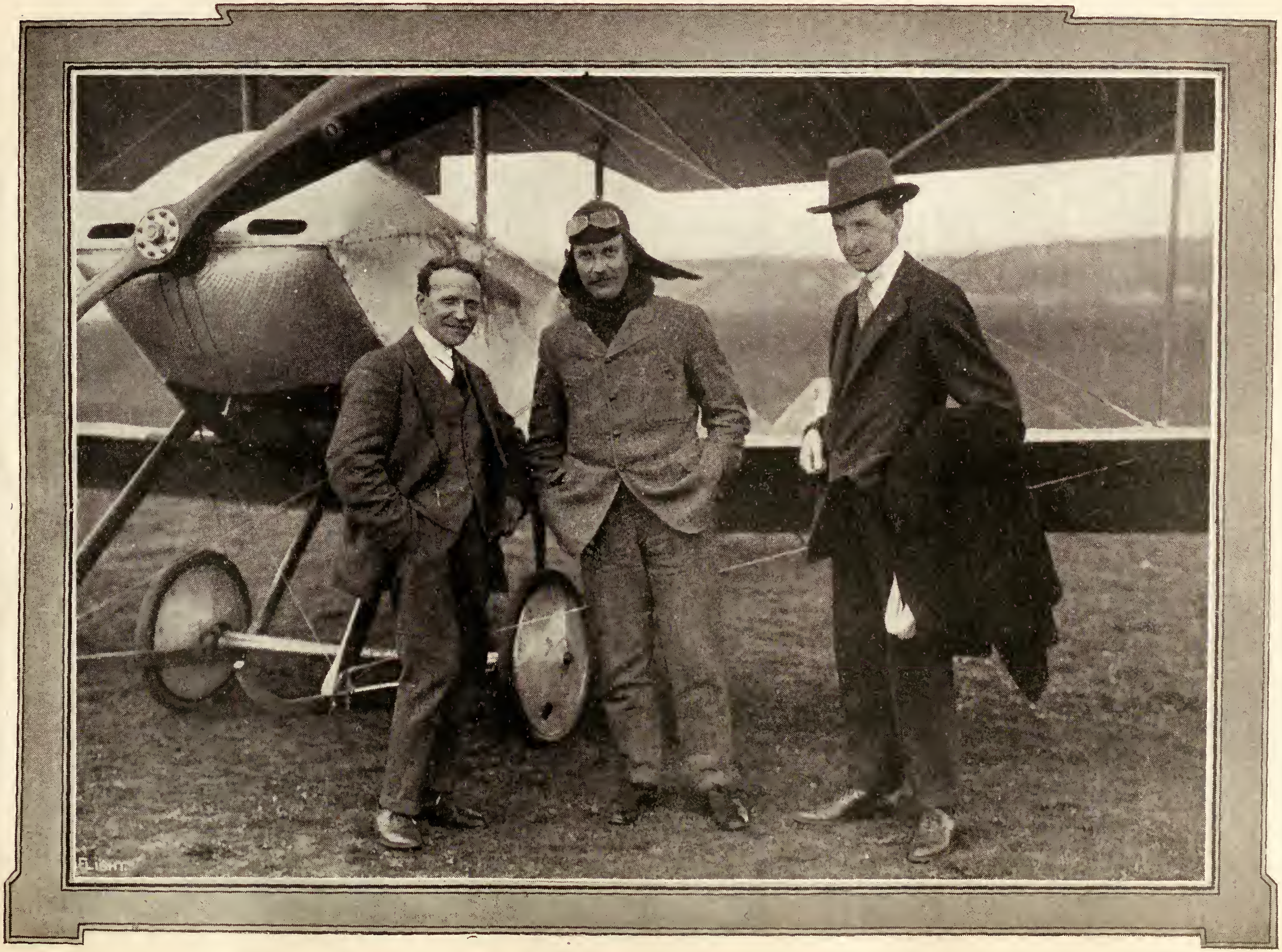
Attention was then directed to the dynamic loading of the planes and the factor of safety that should be employed; and after various types of landing gear had been discussed, the Acentric type of machine, that is, one in which the line of propeller thrust is situated considerably above the centre of gravity and probably above the centre of resistance, and its behaviour in flight under certain conditions was considered. The paper concluded with a reference to stability and control, which is more or less merely an index to the various literature that has appeared dealing with this question, but an appendix is added relating to skin friction.

We feel confident that our readers will, when it is published in our pages, read this paper, which is copiously illustrated by diagrams, with great interest, and it should stimulate the desire for an early perusal of the forthcoming report of the Advisory Committee, which, as is now well known, will contain much valuable and useful information.



A snap of Mr. C. Howard Pixton flying the Sopwith seaplane at Monaco during his successful flight for the Schneider Cup.

MEN OF MOMENT IN THE WORLD OF FLIGHT



THE SCHNEIDER CUP VICTORY.—From right to left: Mr. T. O. M. Sopwith, the designer and builder of the winning seaplane; Mr. C. Howard Pixton, the pilot; and that important "accessory," the expert mechanician, Mr. Victor Mahl.

FLYING AT HENDON.

A BOMB-DROPPING competition was the principal event at Hendon last Thursday week. A circular target 100 ft. in diameter was marked out in white near the centre of the aerodrome, the "bull's eye" being indicated by a small flag. Each competitor was allowed two attempts, and the best average score was awarded the first prize. The result of this event was as follows:—

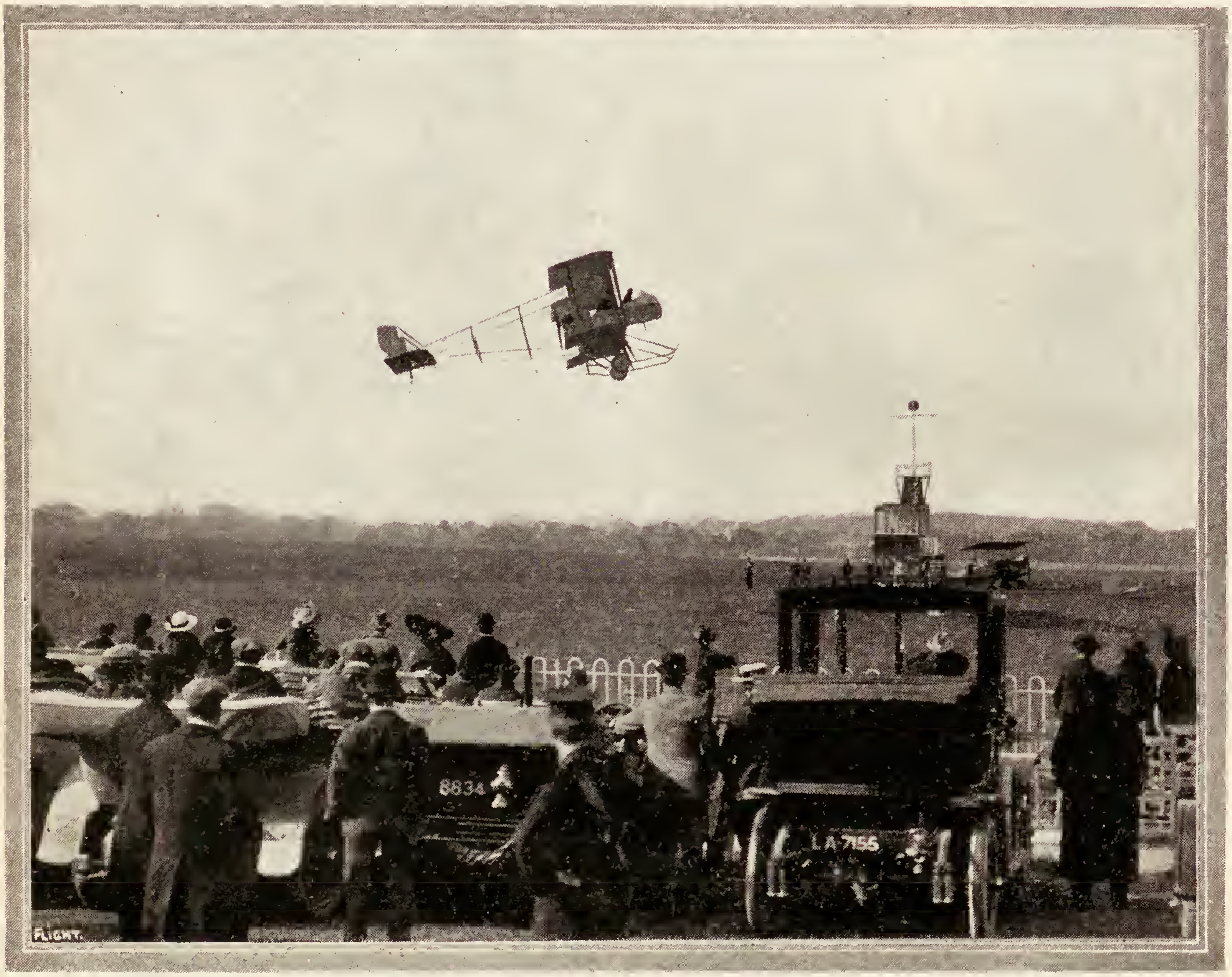
	1st Throw.	2nd Throw.	Average.
1. L. A. Strange (50 h.p. G.-W. biplane) ...	11 ft.	39½ ft.	25¼ ft.
2. R. J. Lillywhite (50 h.p. G.-W. biplane)	58 ,,	74½ ,,	64¼ ,,
3. W. Birchenough (50 h.p. G.-W. biplane)	22 ,,	146 ,,	84 ,,
4. R. H. Carr (50 h.p. G.-W. biplane) ...	194 ,,	143 ,,	168½ ,,

Strange's attempt, it will be seen, was remarkably good, both shots being well within the target. In addition to this event numerous exhibition and passenger flights were made throughout the afternoon. The flyers included Pierre Verrier on the Aircraft Farmans, W. Birchenough on the G.-W. bi-rudder 'bus, whilst R. H. Carr and L. A. Strange both took turns on the 50 h.p. G.-W. tractor biplane "Lizzie."

There was a gusty 30-35 m.p.h. wind blowing on Saturday afternoon last, which once again necessitated the postponement of the 12-mile speed handicap for the "Shell" Trophy—the principal event down on the programme. There was, nevertheless, a splendid afternoon's flying, R. H. Carr, F. W. Goodden, and Pierre Verrier being busy at it from 3.15 p.m. until dusk. Carr opened the proceedings with a 15-min. fight with the wind on the G.-W. tractor "Lizzie," Verrier coming out shortly after, and making two passenger flights on the new-type 70 h.p. Maurice Farman. Goodden then gave a looping demonstration on the 60 h.p. Caudron. After this Verrier made about ten more passenger flights, on one occasion piloting one of the old-type Maurice Farmans. Carr also went up again on "Lizzie," and later in the evening Goodden gave another looping demonstration on the Caudron.

As is generally the case, Sunday's show was very good, the weather being fine and the attendance large. The proceedings opened shortly after 3 o'clock with flights by R. H. Carr on "Lizzie," W. Birchenough on the bi-rudder 'bus, and L. A. Strange with a passenger on the 80 h.p. Blériot. A little later, R. J. Lillywhite went up on the bi-rudder 'bus, and Pierre Verrier took up a passenger on the new-type Maurice Farman. Carr then made a test flight on the G.-W. five-seater aerobus, whilst Birchenough and Strange made passenger flights on the bi-rudder 'bus and the Blériot respectively.

F. W. Goodden next made a magnificent flight on the 60 h.p. Caudron, ascending to an altitude of 3,500 ft., where he flew among the clouds. In descending he executed five loops one after the other. Carr then started a regular service of passenger flights on the aerobus, which took up as many as three passengers at a time, in addition to the pilot and mechanic. About eight trips were made, Claude Grahame-White piloting the machine himself on one or two occasions. Just before 5 o'clock, M. Delaporte brought out the 80 h.p. (Salmson) Sanchez-Besa biplane, which had arrived from France *via* Eastchurch that morning, M. Sanchez being the passenger. Delaporte put up a wonderful exhibition, making the machine perform some very weird evolutions. Perhaps the most interesting of these was the way in which the machine turned, or rather spun round, almost within its own length, whilst another feature was the effective manner in which the brakes fitted to the main running wheels pulled the machine up on landing. On one occasion the pilot flew with his hands off the control lever, and did not hold the latter with his legs. The machine



"Flight" Copyright.

Pierre Verrier on the "Shorthorn" Maurice Farman just starting at Hendon.

itself is full of interesting points, but as we give a detailed description of this new arrival in this issue we will not refer any further to it here. Later in the evening Louis Noel went up on "Lizzie," and Goodden made two more very clean loops at about 1,000 ft., bringing his total number of loops to 106. At 6.30 p.m. E. Baumann made a very pretty high flight on the 40 h.p. Wright, remaining aloft for about half an hour. Just as it was getting dark, at 7.30, a Blériot suddenly came into view over the far end of the aerodrome, and making for the enclosures landed in the slip way. The late visitor turned out to be Marcel Desoutter on Lord Edward Grosvenor's 50 h.p. Blériot. Desoutter had left Brooklands shortly after 6 o'clock, but never having flown from

Photo by Capt. J. C. Halahan.

Seaplane flying at St. Raphael, the French Mediterranean aviation station.—Levasseur flying a Nieuport.

Brooklands to Hendon before, he had lost his way soon after leaving the former place. He had to land twice to inquire his whereabouts, and it was not until he had left Hadley Woods that he found familiar country. He was immensely pleased to be flying again, which, thanks to the artificial leg he has made himself (only two pounds in weight), is now possible.

* * *

TO STONEHENGE.

Just an open stretch of desolate hill—
  And the afterglow from the sinking sun.
Everything shadowy, quiet, and still
  As the moon comes up, when the day is done.

Down in the hollows the tropical marsh,
  With its tangled growth and steamy fume,
Is silent, save for occasional harsh
  Weird cries that pierce the breathless gloom.

The years are old, but the world is young,
  And yet there are creatures that glide on wings
Down over the hill where the moon is hung:
  Vast and uncouth, but they glide upon wings.

II.

Ages have passed, it is Midsummer morn,
  And there in the Temple the priests of the Sun
Are gathered to wait for the coming of dawn
  And to hail the approach of the Light-giving One.

Out on the desolate side of a hill
  Perfect and new stand those circles of stone.
And the priests have an innocent victim to kill
  As a sacrifice to the Life-giving One.

When the sun is up, and the sacrifice made,
  A bird from the sky glides down upon wings.
The birds have been since Man was made;
  They are gentle and timid, but fly, with wings.

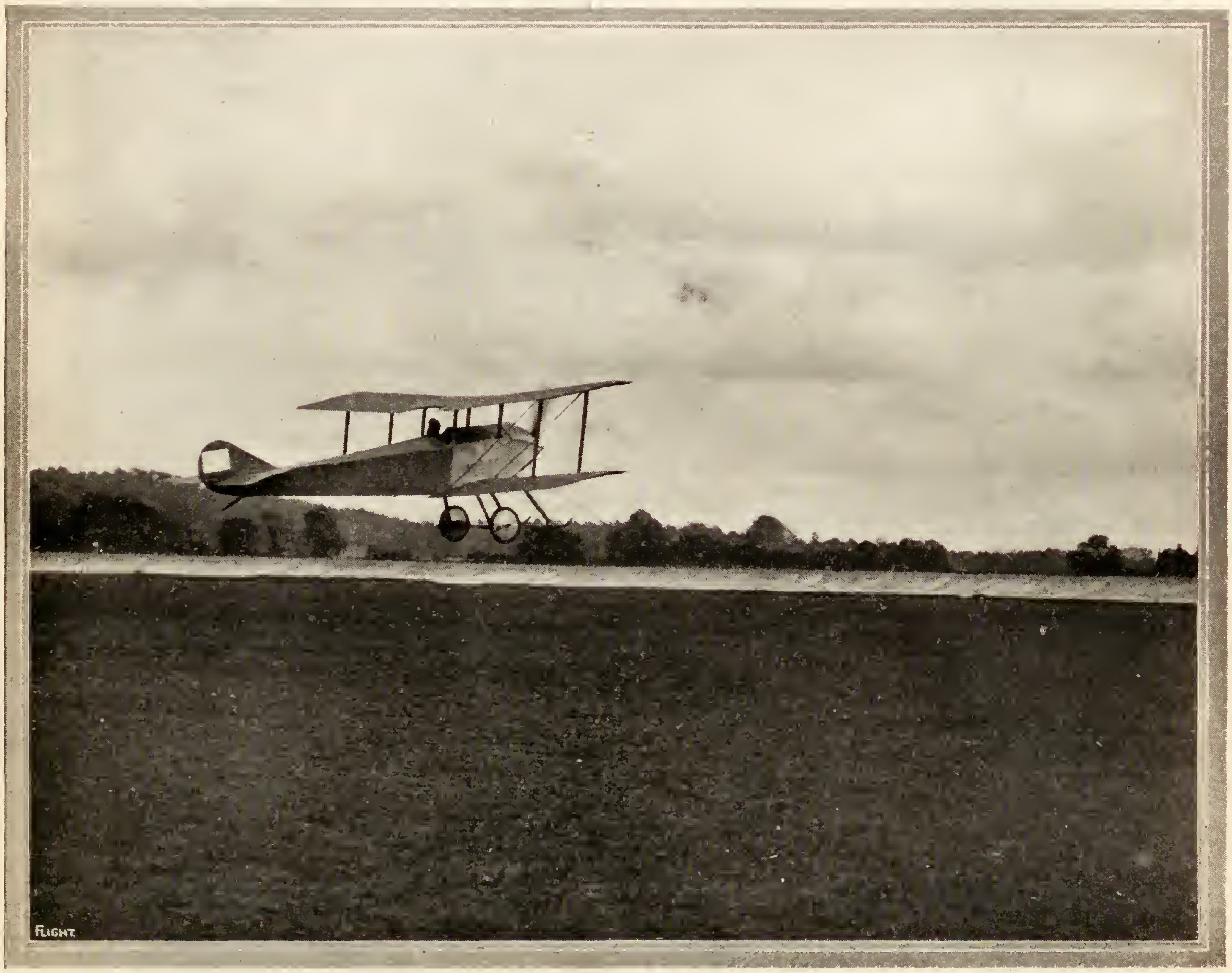
III.

Just an open desolate stretch of hill—
  And the afterglow from the sinking sun.
Everything shadowy, quiet, and still
  Save for one thing—nay, more than one.

Out over the hollows now green and dry
  Soars a Thing that says in a whirring hum:
"Now are the days when Man can fly
  After thousands of years. Now *I* am come!"

Out on the desolate side of a hill—
  Ancient and ruined those circles of stone
Stand in the sunset—a temple still:
  A link with the past and the priests of the Sun.

ANONYMOUS.



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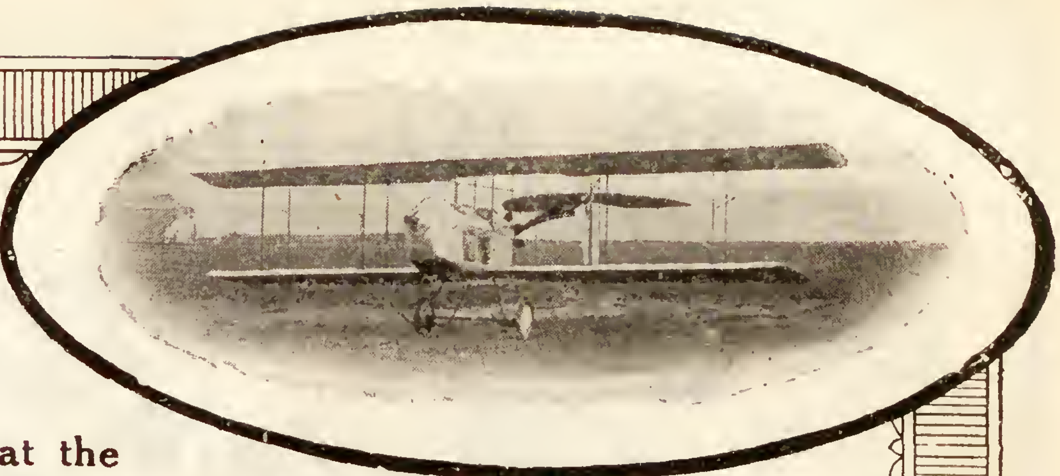
Mr. C. Howard Pixton on the Sopwith "tabloid" just getting off at Brooklands.



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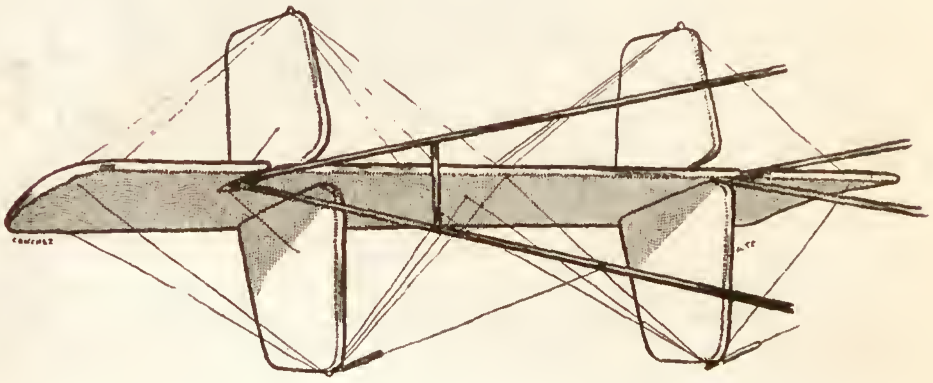
THE SANCHEZ-BESA BIPLANE.

THE subject of our scale drawings this week, the Sanchez-Besa biplane, which paid a brief visit to Hendon aerodrome during last week-end, is similar in its general arrangement to the machine exhibited at the last Paris Aero Show, when it was fully described in these columns. The chief alteration appears to be that this machine is fitted with an 80 h.p. Salmson engine, whereas the one at the Paris Show had a Renault engine. Also the tail planes have been slightly altered, so that now the rudders are mounted on and move with the elevator. The machine is built of steel almost throughout, and is mainly characteristic on account of its rather unusual type chassis, which consists of two stub axles universally pivoted to the rear end of the very long ash skid, and carrying two large diameter wheels which are sprung by means of rubber shock absorbers attached to telescopic tubes running from the outer end of the stub axle to the rear end of the lower *longerons* of the *nacelle*. The front end of the skid is supported on a structure of three steel tubes. Two smaller wheels mounted on a short tubular axle, prevent the machine from turning over on her nose on landing.

The *nacelle* is built up in the usual way, and provides accommodation for pilot and two passengers, the latter being seated side by side between the pilot's seat and the leading edge of the wings. A wind shield in the nose of the *nacelle* deflects the air above the heads of the occupants. Behind the passengers' seat and inside the *nacelle* is mounted a large petrol tank, containing a supply sufficient for a flight of 4½ hours' duration.

The engine, an 80 h.p. Salmson, is mounted between double bearings in the rear of the *nacelle*, and drives through a spur reduction gearing the large diameter propeller which is situated behind the main planes. The propeller-shaft, which is mounted some seven or eight inches above the upper *longerons* of the *nacelle*, is supported on a structure of steel tubes, and has at its rear end a combined thrust and journal ball-bearing. The engine can be started from the passengers' seat by means



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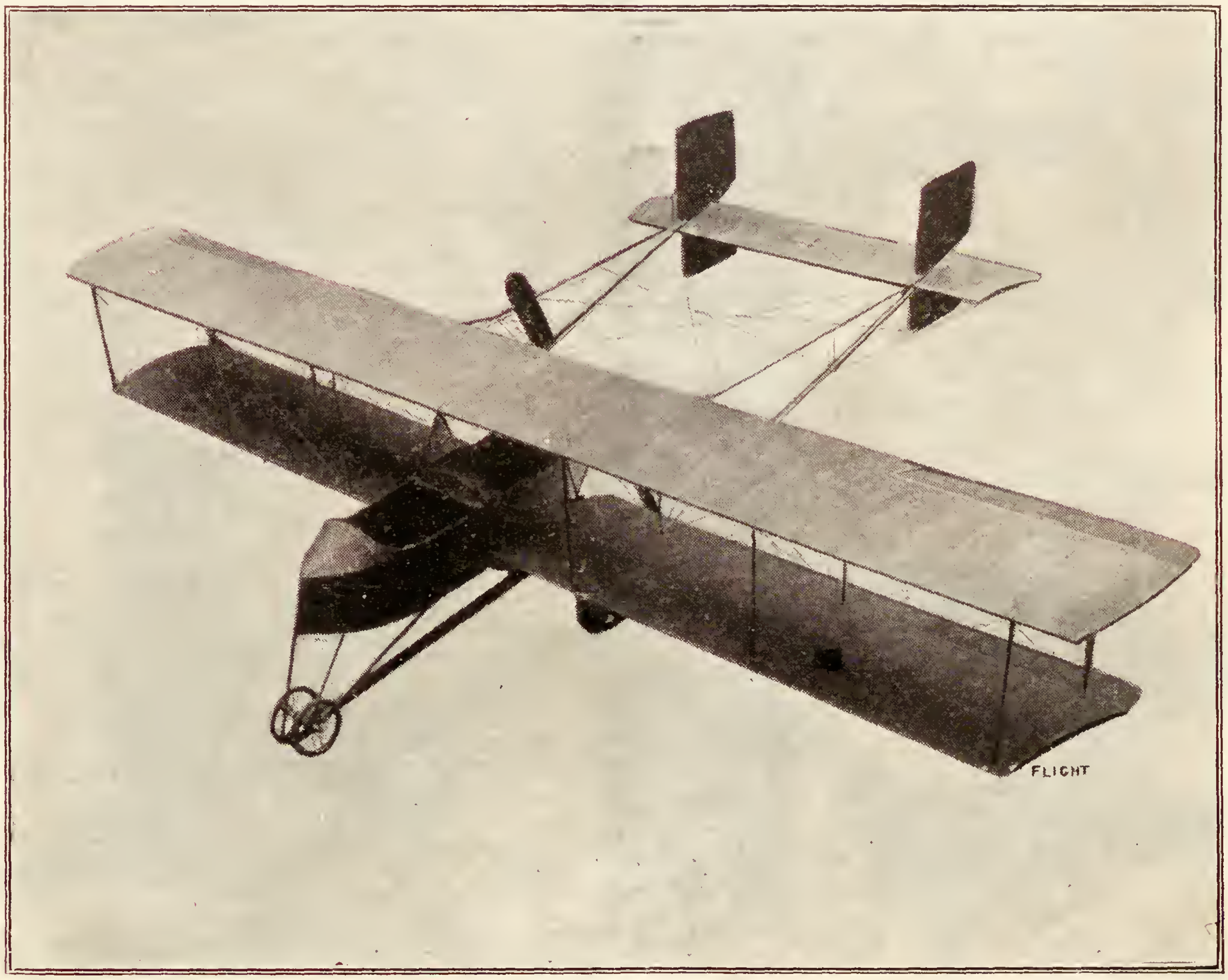
Tail planes of the Sanchez-Besa biplane.



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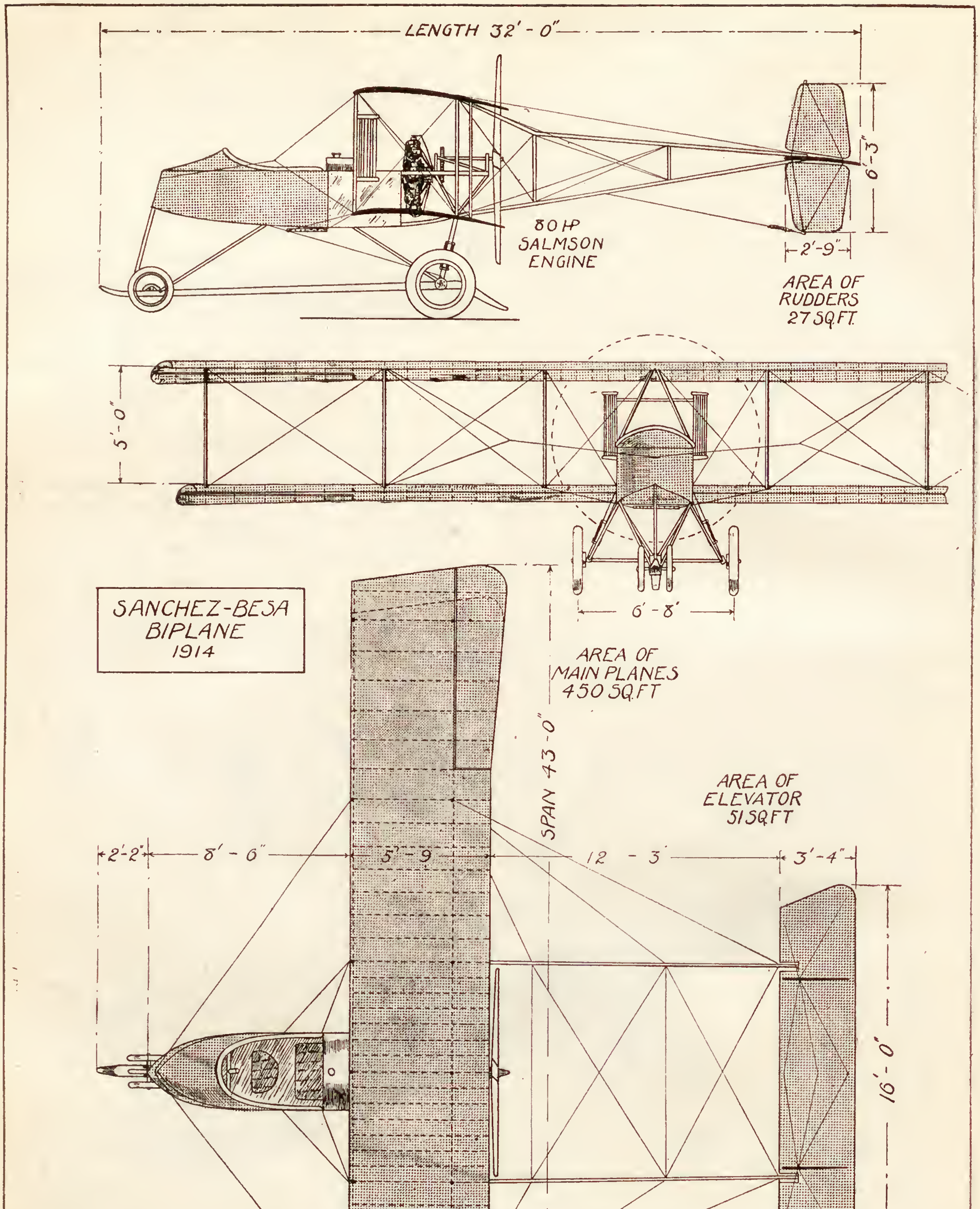
A view from above of the Sanchez-Besa biplane.



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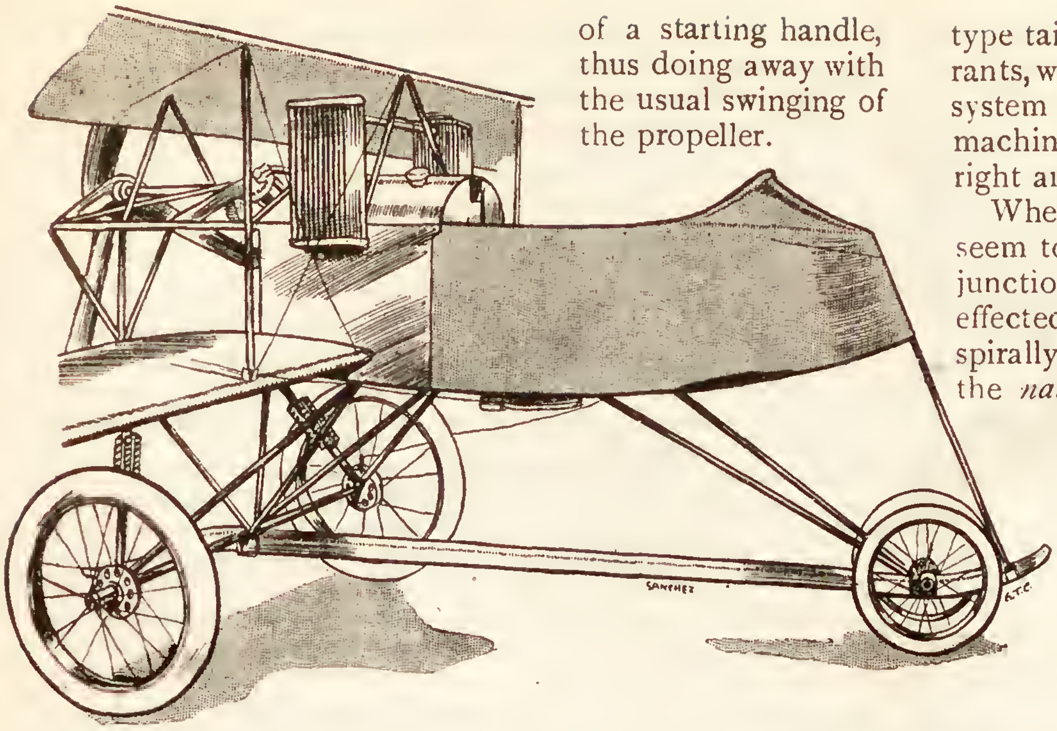
SANCHEZ-BESA BIPLANE.—Plan, side and front elevation to scale.

of a starting handle, thus doing away with the usual swinging of the propeller.



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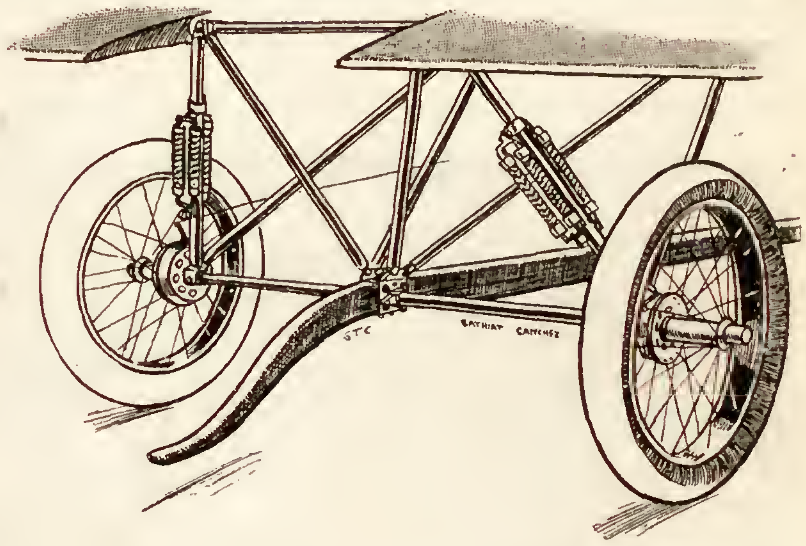
Nacelle and chassis of Sanchez-Besa biplane.

The main planes, which have a comparatively small gap in relation to the chord, are built up of wooden ribs over steel tube spars. Inter-connected *ailerons* are fitted to both upper and lower planes, and the chord of the *ailerons* is greater at the tip than at their inner ends in order to render them more efficient. The tail planes are carried on an outrigger formed by four steel tubes, and are unusual in that the two divided rudders are mounted on and move with the elevator, so that when the latter is moved up or down the rudders move backwards and forwards with it. This arrangement necessitates a rather unusual control gear, which consists of the usual central universally pivoted hand lever which operates the elevators through a series of quadrants underneath the *nacelle.* By means of these quadrants the movement of the elevator is geared up so that for a small movement of the hand lever the elevator is rotated through a comparatively large arc. The whole control gear seems unnecessarily complicated, and it is a question whether a different type tail, which would do away with the use of the quadrants, would not be an improvement. However, the present system appears to work quite satisfactorily, and the machine certainly answers the controls very well, doing right angle turns in apparently less than her own length.

When doing a turn with the rudders only these do not seem to be any too large, but by using the *ailerons* in conjunction with the rudders exceedingly sharp turns can be effected. The machine appears to be perfectly stable spirally, in spite of the comparatively large side area of the *nacelle* in front of the centre of gravity, and last Sunday, at Hendon, the pilot—Delaporte—flew the machine in a high wind with both hands off the controls.

A refinement worth noticing in the machine, and one illustrated by the accompanying sketches, are the wheel brakes fitted on the rear wheels. By means of these brakes, which are operated from the pilot's seat, the machine can be held back by the pilot whilst running the engine all out, so that it is possible, by the aid of these brakes, and the starting handle behind the passengers' seat, to start the machine without any outside assistance whatever, a feature which should prove useful for cross-country work where, after having made a forced landing *en route*, experienced assistants are not always available, and where the help of inexperienced, though willing, assistants may easily cause considerable damage to the machine. Another advantage of the wheel brakes is that on making a landing



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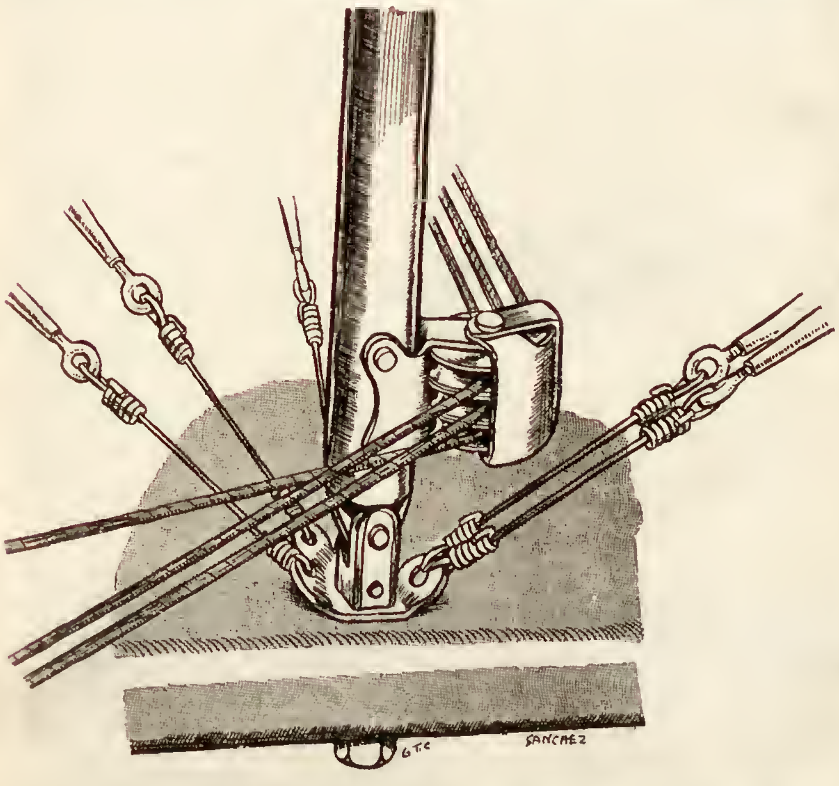
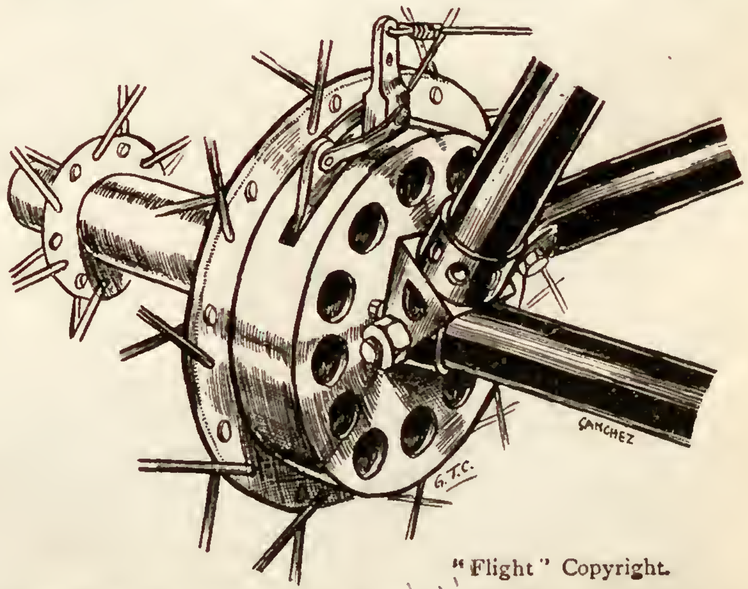
Rear portion of the Sanchez-Besa chassis.





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Left: Inter-plane strut attachment and control-cable pulleys on Sanchez-Besa biplane. On the right: Detail sketch of wheel brake.

in confined areas the machine can be stopped after a very short run along the ground; in fact, it appears to be possible to bring it to a standstill after a run of about twice its own length.

The weight of the machine empty is 1,750 lbs., her maximum speed is 65 m.p.h., and the minimum flying speed about 35 m.p.h.

The machine described above has already gone back to France, but we understand that a similar machine, fitted with a 130 h.p. engine, will be coming over here shortly.

THE FATAL ACCIDENT TO MARTY.

IN connection with the accident which resulted in the death of Philippe Marty on Sunday week, an inquest was held at Hendon on the 29th ult.

John Stanton Chapman stated that Marty had given an exhibition of trick flying, and just before the accident he had been making some small circles with the engine off. The machine was about 100 ft. from the ground when the engine was shut off, and the machine fell head first to the ground.

Harold G. Carpenter also gave similar evidence.

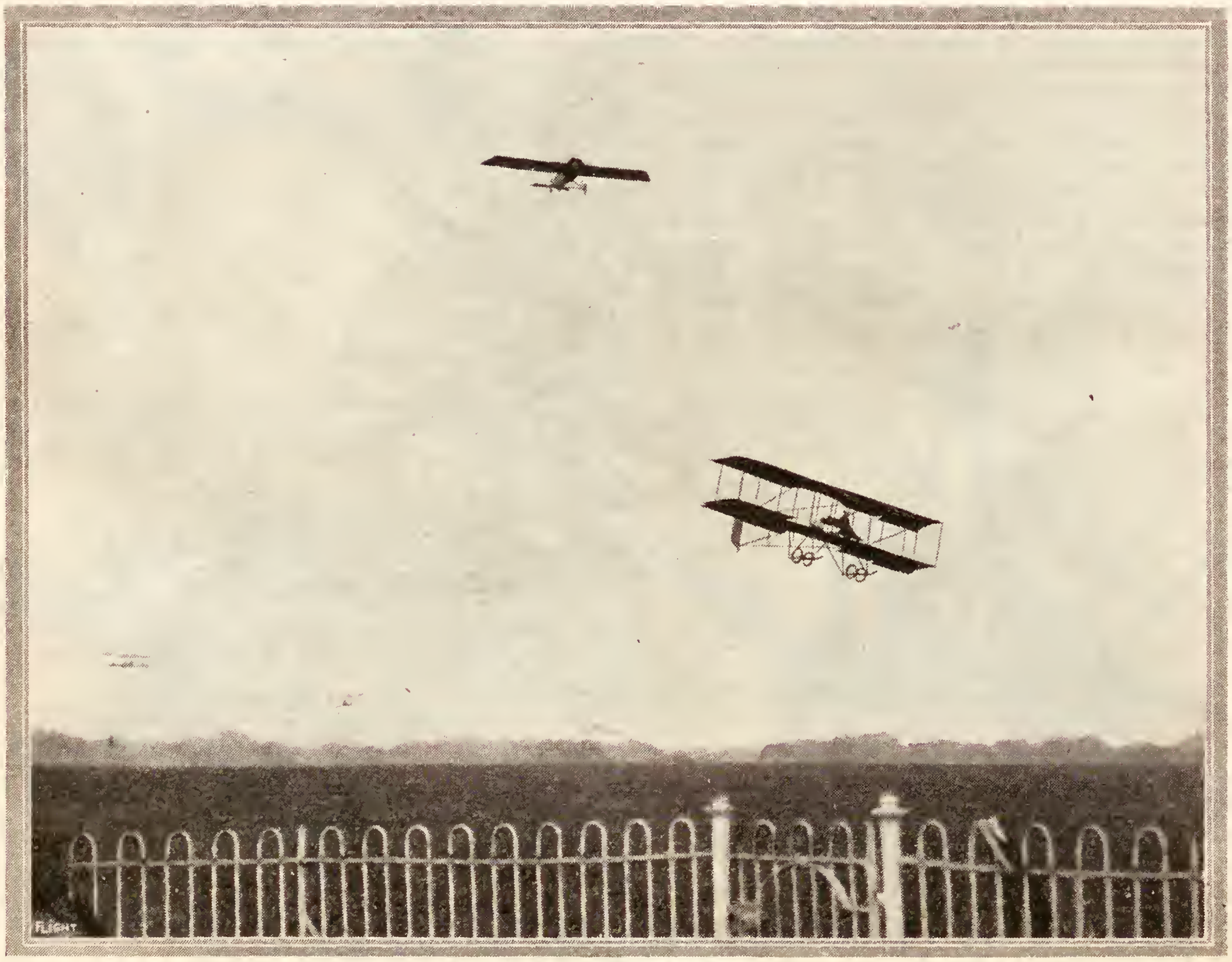
Louis Noel said he tried Marty's machine earlier in the afternoon and found it all right. After the accident he examined it and ascertained that the controls were in order.

Richard T. Gates, general manager of the Grahame-White Aviation Co., said that in his last flight Marty flew several times round the course, and while doing so switched his engine on and off. That was done in order to reduce the speed of the machine—to try to fly at a slow speed. Marty was descending when he began a spiral. He did not do many circles, but those he did were very small and were not banked. Apparently Marty's intention was to go round and round and land, and when he was 40 ft. or 50 ft. from the ground the machine was perfectly straight. It seemed to bank a little, then stay motionless, then tip on its nose and dive to the ground. Witness thought that was brought about by the fact that Marty lost his speed, consequently bringing the machine round at a slow turn. If he had had another 250 ft. to drop he would probably have been able to operate his elevator successfully. Mr. Gates said he had no doubt that Marty was endeavouring to straighten the machine out as it came down, but it had not sufficient velocity to enable the elevators to act efficiently. The machine was passing too slowly through the air for the elevators to act efficiently and control the machine. Marty was an experienced aviator, and had a wonderful record for one so young. Possibly the accident was due to the fact that Marty left his motor switched off too long.

Mr. Grahame-White said that he did not see the accident, but from inquiries he had made he formed the opinion that Marty got into a steep spiral with his engine switched off, and there was a possibility that he switched on again and his motor would not go. Such a thing did happen sometimes. Failing that it might have been an error of judgment. Aviators, however skilled, did make such errors sometimes. Mr. Grahame-White said that he had just given permission to Marty to go to France for a week, and there was no necessity for him to have gone up again that evening.

The jury returned a verdict of "accidental death."

The remains of Philippe Marty were taken to France for interment on Thursday evening, and the coffin was borne to the funeral compartment in the boat express at Charing Cross by a party of men, under Superintendent Muller, from the 56th division of the St. John Ambulance Association. In the procession which followed were M. Maurice Marty (brother), Mr. H. E. Perrin (secretary, Royal Aero Club), Mr. Richard T. Gates (General Manager of the London Aerodrome), Mr. B. Isaac (secretary), Messrs. Louis Noel, W. Birchenough, Beatty, Howarth, Baumann, Carr, and Strange, with about a score of mechanics also from the aerodrome. Among the many floral tributes was one in the form of a monoplane "From Hendon Aviation Pupils and the Staff of the Aerodrome."



A MEMORY.—The late Mr. Philippe Marty flying in a race at Hendon. "Flight" Copyright.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

JACQUES SCHNEIDER INTERNATIONAL MARITIME RACE.

Luncheon to Mr. T. O. M. Sopwith and Mr. Howard Pixton.

To celebrate the British victory at Monaco on April 20th, 1914, the Royal Aero Club will entertain Mr. T. O. M. Sopwith and Mr. Howard Pixton to luncheon at the Royal Automobile Club, Pall Mall, S.W. (by kind permission) on Tuesday, May 12th, 1914, at 1.15 p.m.

The Marquess of Tullibardine, M.V.O., D.S.O., M.P., the Chairman of the Club, will preside.

In order to facilitate the arrangements, Members are requested to notify the Secretary as early as possible, if it is their intention to be present.

Tickets, inclusive of wines, 10s. 6*d*. each.

Members are notified that on this occasion they may be accompanied by one guest only.

HAROLD E. PERRIN, Secretary.

Royal Aero Club,
166, Piccadilly, W.

LONDON AERODROME, HENDON.

The Directors of the Grahame-White Aviation Company, Limited, have kindly granted free admission to the London Aerodrome, Hendon, for the remainder of the year 1914, to all Members of the Royal Aero Club on presentation of their Club Membership Card (motor cars must be paid for).

Death of His Grace the Duke of Argyll.

The sad news of the death of the Duke of Argyll on Saturday, the 2nd inst., was received at the Club with great regret. His Grace had been Honorary President since 1908, and on many occasions assisted at the Club's functions. A message of sympathy was immediately sent to H.R.H. Princess Louise by Lord Tullibardine, the Chairman of the Club.

At the Memorial Service held at Westminster Abbey yesterday, the Royal Aero Club was represented by the Marquess of Tullibardine, M.V.O., D.S.O., M.P.

Third Aerial Derby, Saturday, May 23rd, 1914.

The Third Aerial Derby, being a 95-mile circuit of London, will take place on Saturday, May 23rd, 1914, at 4.15 p.m. The start and finish will be at the London Aerodrome, Hendon, and the following turning points have been fixed:—Kempton Park, Epsom Race Course, West Thurrock, Epping, Hertford.

Prizes.

Fastest Time ...	... ...	*Daily Mail* Gold Cup and £200.
Sealed Handicap	1st Prize...	"Shell" Trophy and £100.
	2nd ,, ...	£75.
	3rd ,, ...	£25.

Daily Mail £5,000 Prize, 1914.

Circuit of Great Britain.

(*Under the Competition Rules of the Royal Aero Club.*)

PRELIMINARY ANNOUNCEMENT.

The proprietors of the *Daily Mail* have offered the sum of £5,000 to be awarded to the entrant of the aeroplane which shall first have completed a prescribed circuit round Great Britain in flight within a period not exceeding 72 hours, under the following regulations:—

Regulations.

Date of Contest.—It is proposed that the race shall take place during the first fortnight in August.

Sunday Flying Prohibited.—There shall be no flying in the Competition between midnight on Saturday and midnight on Sunday, and the period shall not count in the 72 hours.

Qualification of Competitors.—Both the entrant and pilot or pilots must be British subjects and duly entered on the Competitors' Register of the Royal Aero Club. Pilots must hold an aviator's certificate issued by the Royal Aero Club or other club affiliated to the International Aeronautical Federation.

A passenger must be carried throughout the flights, and the combined weight of the pilot and passenger must be not less than 264 lbs., any deficiency in weight being made up by means of ballast. Pilots and/or passengers may be changed during the contest.

Qualification of Aircraft.—The complete aircraft and all its parts, including the motor, must have been entirely constructed within the confines of the British Empire, but this provision shall not be held to apply to raw material.

Entries.—The Entrance Fee is £100 per aircraft, and entries will be received up to 12 o'clock noon, May 30th, 1914. The Entrance Fee of £100 is payable either in one sum or as follows:—

£50 by noon on May 30th, 1914.
£50 by noon on June 20th, 1914.

Late entries will be received up to 12 noon, June 30th, 1914, in which case the Entry Fee will be £150.

The Entry Form, which must be accompanied by the Entrance Fee, must be sent in to the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

No part of the Entrance Fee is to be received by the *Daily Mail*. All amounts received will be applied towards payment of the expenses of the Royal Aero Club in conducting the competition. Any balance not so expended will be refunded to the entrants.

Course.—The course will be a circuit of Great Britain, and the official starting-place and controls will be announced later. Competitors may make the circuit starting in either direction.

Controls.—The controls will be situated at or near each of the towns selected for the official controls, and competitors must alight at each of these controls for purposes of identification.

The aircraft must remain one hour in each control. During the first 30 minutes it must be entirely at the disposal of the officials for examination; the last 30 minutes may be utilised for replenishments and repairs. This period of one hour will not count in the 72 hours.

There is no restriction as to the number of starts made by a competitor, but in every case the start must be made from the official starting place.

Stoppages.—Stoppages between the controls are not prohibited, but all alightings must be effected on the sea, an inlet of the sea, an estuary, or a harbour. An alighting on land or inland water will terminate the attempt. (For the purpose of this contest the Caledonian Canal will be considered as the sea.)

Towing.—Towing is not prohibited, but the finishing line must be crossed in flight.

Repairs.—Individual replacements and repairs to the aircraft and motor may be made *en route*, but neither may be changed as a whole. The aircraft may be taken ashore for such repairs and replacements. Any time thus spent on repairs will count in the 72 hours.

No repairs or replenishments may be effected during the 30 minutes' allowance for official inspection in controls.

Five parts of the aircraft and five parts of the motor will be stamped or otherwise marked, and at least two marked parts of each of these five must be in place on arrival at each control.

Safety Appliances.—Competitors and their passengers must be equipped with life-belts or other appliances for keeping themselves afloat.

Shed Accommodation.—Accommodation for the aircraft will be provided at or near the official starting place free to each competitor for one week prior to start of the competition till the closing date.

General.

1. A competitor, by entering, thereby agrees that he is bound by the regulations herein contained or to be hereafter issued in connection with this competition.

2. The interpretation of these regulations or of any to be hereafter issued shall rest entirely with the Royal Aero Club.

3. The competitor shall be solely responsible to the officials for the due observance of these regulations, and shall be the person with whom the officials will deal in respect thereof, or of any other question arising out of this competition..

4. A competitor, by entering, waives any right of action against the Royal Aero Club or the proprietors of the *Daily Mail* for any damages sustained by him in consequence of any act or omission on the part of the officials of the Royal Aero Club or the Proprietors of the *Daily Mail* or their representatives or any fellow competitor.

5. The aircraft shall at all times be at the risk in all respects of the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself, or his passenger, or his aircraft, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the Royal Aero Club and the proprietors of the *Daily Mail* in respect thereof.

6. The Committee of the Royal Aero Club reserves to itself the right to add to, amend or omit any of these rules should it think fit.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Monday, last week, fine, rather windy. The following machines were up:—No. 34 Short, 2 Short, 104 Sopwith, 40 Caudron, 49 B.E.

Tuesday, fine, rather windy. No. 2 Short, 40 Caudron, 65 Short, 36 Deperdussin.

Wednesday, fine. The following officers were up scouting:—Com. Samson, 50 B.E.; Lieut. Davies, 66 Short gun machine; Lieut. Marix, 104 Sopwith; Lieut. Osmond, 49 B.E.; Capt. Courtney, R.M.L.I, 36 Deperdussin; Sub-Lieut. Pierce, 16 Avro; also No. 34 Short and 31 H. Farman.

For the first time in Sheppey looping the loop was performed, "causing great excitement amongst the natives," from the Eastchurch Aerodrome. The airman claiming the honour of this distinction was Mr. Goodden, the Hendon pilot. He performed the feat five times on a Caudron before handing the machine over to the Admiralty.

Thursday, fine. Quite a lot of scouting was done. The following taking part:—Com. Samson, 50 B.E.; Capt. Courtney, R.M.L.I., 36 Deperdussin; Lieut. Clark, 40 Caudron; Lieut. Finch-Noyes, 31 H. Farman; Lieut. Osmond, 49 B.E., Lieut. Marix, 104 Sopwith; Sub-Lieut. Pierse, 16 Avro; P.O. Edmonde, R.M.L.I., 34 Short.

Friday very windy, no flying.

Saturday, windy. The following officers left for Brooklands. Com. Samson, 50 B.E., Lieut. Briggs, 39 Blériot Le Rhone, Lieut. Marix, 104 Sopwith.

Civilian Flying.—Tuesday, the Hon. M. Egerton made a fine flight on his 50 h.p. Short.

Wednesday, Mr. Ogilvie was out on both his machines, 50 N.E.C. and 25 Wright.

Saturday, M. Doumerque and passenger left France for Hendon on Thursday morning on a Bathiat-Sanchez, crossing over *viâ* Boulogne. On reaching Dover he had to descend where he stayed until Saturday afternoon then left. He arrived at Eastchurch safe and put up until Sunday morning.

A trio of pupils at the Vickers Flying School, Brooklands, who have obtained their *brevets* on the Vickers biplane on the 16th of last month. From left to right these pilots are Comte FitzJames, Mr. Mark Dawson and Mr. Victor Wilberforce.

Sunday, the French airman left about 9 a.m. for Hendon. Mr. Ogilvie was out during the morning on both his machines, 50 N.E.C. and 25 Wright, and evening on his 50 N.E.C. making some good flights. Prof. Huntington made one short flight on his 70 h.p. Huntington-Dunne biplane.

Brooklands Aerodrome.

On Monday morning, last week, both Bristol and Vickers pupils were at work, and Mr. Barnwell with a passenger was testing the new 100 h.p. Vickers gun-carrying biplane. Lieut. Collett was also out on the Albatros biplane. In the afternoon, Mr. Barnwell made a couple of flights on the Vickers gun 'bus. Major Becke (with Lieut. Chinnery as a passenger) came in on B.E. 239 from Farnborough, afterwards returning there. Lieut. Collett was testing the climbing speed of the Albatros biplane. Lieut. Stoddart came over from Farnborough on M.F. 389, and circled round the aerodrome for half an hour. The Sopwith "scout" biplane was also being further tested.

Further good work was done Tuesday by the pupils at the Vickers and Bristol schools.

Mr. Merriam was first out Wednesday on a Bristol biplane. Capt. Picton Warlow (with Sergt. Wilkinson as passenger) came in from Farnborough on B.E. 234, afterwards returning there. Lieut. Lawrence (with Capt. Brownrigg as passenger) also came over from Farnborough on B.E. 239, and returned after a short stay. In the afternoon Lieut. Collett (with Mr. Dukinfield Jones as passenger) was flying on the D.F.W. biplane, and the Bristol and Vickers schools were also at work.

Mr. G. Carruthers, who has just secured his *brevet* on a 35 h.p. Caudron at the W. H. Ewen School, Hendon.

Thursday afternoon Mr. Barnwell was testing the new 100 h.p. Vickers gun-carrying biplane.

Mr. Merriam made a solo flight on Friday on the Bristol biplane. In the afternoon, Lieut. Collett was out on the D.F.W. Mr. Hunt was doing straights on his Blériot monoplane; and the Blériot mechanics were putting a new 80 h.p. through its engine tests.

On Saturday the Vickers and Bristol Schools were at work. The Blériot mechanics were testing the engine of another new 80 h.p. Lieut. Briggs and Commander Samson arrived from Eastchurch on Blériot 39 and B.E. 50 respectively. Lieut. Collett was out on the D.F.W.

There was some fine exhibition flying on Sunday in a brisk wind by Mr. Pixton (before a French Commission) on the Sopwith "scout" biplane, and Mr. Barnwell on the new 100 h.p. Vickers gun-carrying machine, the latter taking up a number of passengers for cross-country trips, including the winner of the ballot for the free passenger flight, Mr. T. H. Condell, of Brunswick Lodge, Brunswick Hill, Reading. M. Marcel Desoutter flew to Hendon on a 50 h.p. Blériot. Mr. Hunt was out on his Blériot monoplane. Mr. Merriam was testing a new Bristol biplane.

The Bristol School have now shifted their pilots, pupils, and machines to Brooklands from Salisbury.

Bristol School.—On Sunday afternoon, last week, Merriam took the Brooklands passenger for a flight on the biplane and also another passenger, and then gave a trip to Lieut. Mills.

Monday, Merriam gave three tuition flights to Lieut. Mills, pupil having control. No other pupils turned up in the morning, and tuition was impossible in the evening owing to the strong wind.

After making several tests Tuesday, Merriam took Mr. Lucas for tuition and then sat behind Lieut. Mills on straights and circuits; he then took Mr. Lucas as passenger but the weather was too bad for further tuition. Merriam made a test later, taking Lieut. Mills, but the conditions were still unfavourable.

Merriam made a test flight Wednesday, and then took Mr. Eastwood twice, Lieut. Mills twice, Lieut. Smithies and Mr. Racine Jacques.

Thursday and Friday, impossible for tuition. Saturday, passenger tuition was given to Lieut. Smithies and Mr. Lagrange, but no further tuition was possible owing to the high wind.

Vickers School.—Instructors during past week Messrs. Barnwell, Knight, Elsdon, Webb. On Monday, Major Phillips, Lieut. Wood-Smith and Messrs. Liddell and Collins all with pilot. Lieut. Underhill and Mr. Liddell solos.

Tuesday, Major Phillips, Lieuts. Wood-Smith and Leighton with pilot. Mr. Murray and Mr. Steinbach (new pupil) with pilot. Lieut. Underhill and Mr. Liddell with pilot.

Wednesday, Lieuts. Wood-Smith and Underhill, and Messrs. Murray, Liddell and Collins with pilot. Lieuts. Leighton and Underhill and Mr. Liddell solos. Barnwell on gun-carrying biplane with passengers.

Thursday, Barnwell on gun-carrying biplane with two passengers.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Messrs. Robinson, Peck, Cowley, Lowe straights with Instructors Lillywhite, Howarth and Strange. Mr. Wiles (new pupil) rolling with instructor, Mr. Moore solo straights. Mr. Parker and Mr. Smiles circuits, figures of eight, &c.

Tuesday, Messrs. Robinson, Peck, Cowley, Moore, Lowe, Boyesen, straights with Instructors Lillywhite, Howarth and Strange in passenger seat. Messrs. Parker, Smiles, and Major Piercy solo circuits, &c.

Wednesday, Mr. Parker circuits, figures of eight, &c., afterwards going in for and passing *brevet* tests. Mr. Smiles and Major Piercy solo circuits, &c. Messrs. Robinson, Boyesen, and Peck straights with Instructors Howarth and Strange in passenger seat.

Beatty School.—Monday last week Messrs. Bentley, 7 mins. ; Ruffy, 7 mins. ; Allen, 7 mins. ; Banks-Price, 7 mins. ; A. Cheung (new pupil), 5 mins. ; Hodgson, 7 mins. Mr. W. Rowland Ding then took machine and passed for his pilot's certificate in good style, afterwards reaching an altitude of 1,150 ft. in his test flight, planing down from this height with his engine cut off.

Afternoon school : Watts, 12 mins. ; Ruffy, 10 mins.

Tuesday, Watts, 8 mins. and 7 mins. alone ; Stewart, 7 mins. and 6 mins. alone ; Garvin, 8 mins. and 5 mins. ; Major Piercy, 3 mins. ; Edridge-Green, 10 mins. ; Allen, 15 mins.

Wednesday, Edridge-Green, 15 mins. ; Ruffy, 10 mins. ; Garvin, 10 mins. ; Cheung, 5 mins. Then Mr. Baumann took Mrs. Allen up for a joy ride.

W. H. Ewen School.—The weather last week was too windy for school work, and the only day pupils were able to go out was Saturday, when they started at 5 a.m. After a test flight by Mr. W. T. Warren, Mr. Curtis did figures of eight and circuits in a ten-mile wind, and Mr. Garvin circuits.

Hall School.—At 5.30 a.m. Monday last week, A. F. Arcier four half circuits at 40 ft. L. Edgecombe Palmer three circuits at 100 ft., followed by three good figure eights at 200 ft. Miss d'Elsa later on in day did several good straights on "Penguin," 25 h.p. Anzani.

Too windy for pupils alone, Tuesday. L. Palmer had a lengthy passenger ride on Avro with J. L. Hall. In afternoon J. L. Hall took up several lady passengers, including a Miss Hutton.

Thick mist Wednesday morning prevented practice, but in evening the wind dropped and machines were brought out. A. F. Arcier, who is showing good progress, made several good half circuits at 35 ft. Then L. Edgcombe Palmer, mounting No. 1 Caudron, made six figure eights at varying altitudes, but seemed to have trouble in landing on the mark. Gearing did two straight flights at 10 ft., flying steadily. Messrs. J. Rose and A. F. Arcier had flights with J. L. Hall on Avro. Toward dusk J. L. Hall, accompanied by Dennis Ware, of the R.F.C., made a wide detour of surrounding country, ultimately reaching 2,600 ft., afterwards descending in long spiral *vol plané*, lasting several minutes.

No practice Thursday owing to the high wind, and Friday, Saturday and Sunday a gale blowing.

Shoreham Aerodrome.

Pashley School.—Very little work was done last week owing to the strong winds. Straights, alone, Messrs. Wey, Nichole. Circuits and eights, Mortimer and Hale.

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Wilbur Wright Memorial Lecture.

THE second Wilbur Wright Memorial Lecture before the Aeronautical Society will be delivered at the Royal United Service Institution, Whitehall, S.W., on Wednesday, the 20th inst., at 8.30 p.m. Dr. R. T. Glazebrook, C.B., F.R.S., will be the lecturer this year, and is taking as his subject "The Development of the Aeroplane." The Right Hon. Lord Sydenham, G.C.M.G., F.R.S., will preside.

The *Daily Mail* Round Britain Flight.

THOSE who contemplate taking part in the Circuit of Britain competition next August for the *Daily Mail* £5,000 are reminded that the entries close on the 30th at the ordinary fee of £100, but late entries at the fee of £150 will be accepted by the Royal Aero Club up to June 30th. The entry fee may be paid at once or in two instalments. The rules and conditions of the event will be found in full under the Royal Aero Club Official notices on page 491.

"Flight" Copyright.

THE SOPWITH "TABLOID" AT BROOKLANDS.—Mr. Howard Pixton banking for a turn.

EDDIES.

It is not the privilege of every pilot to get a view like that enjoyed by Norman Spratt some time ago, when he took the 120 h.p. Austro-Daimler engined R.E. 5 biplane up to a height of 18,900 ft. as recorded by his barograph. From this height the view obtained was simply magnificent, for the day was one of those exceptionally clear ones which occur so rarely in our climate, and the height was one not reached every day. In fact it must constitute a record for this country—subject to official notification. Mr. Spratt informs me that to the east he could see the estuary of the Thames, whilst to the south could be seen the whole south coast, including the Isle of Wight, the hills of which were plainly visible. The mist which hung over the mouth of the Severn prevented him from seeing the Bristol Channel, otherwise he would have been able to see right across the southern part of England, from sea to sea.

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The atmosphere at this height must have been pretty chilly, for Mr. Spratt stuck his gauntlet outside the *fuselage* for a few seconds, and when he drew it back it was covered with frost. Inside the *fuselage*, however, it was quite comfortable, owing to the warm air from the engine, and the only discomfort he experienced was due to the pressure of air inside his knee joints, which caused him pains similar to rheumatism. At no time did the rarefied air make breathing difficult. Asked if he did not have a feeling of loneliness, his emphatic reply was: "No, not at all. You have to be watching the climbing angle of your machine all the time, and you are so busy fiddling about with your engine controls that you don't have time to feel lonely."

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Some of our readers may have received the impression that members of the R.F.C. have been smitten by the looping fever, since it has been reported, as recorded in FLIGHT last week, that Mr. Spratt and Mr. de Havilland have both looped the loop on B.E's. There is no immediate danger, however, of the fever spreading to the services, for the few loops which were accomplished were in the nature of a scientific experiment, recording instruments being carried for the purpose of ascertaining the various stresses set up in the different parts of a machine when looping, and one gathers that some very interesting results were obtained.

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Developments at Brooklands promise to be well worth watching during the coming season, as, in addition to the various firms already established there, others are coming along before long. The British and Colonial Aeroplane Co., having had to vacate their hangars at Lark Hill, have transferred their Lark Hill School to the one now in operation at Brooklands, which will, of course, increase both *personnel* and *materiel* at the latter school considerably.

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The new Blériot works at "the bowl" are now practically finished and several machines are nearly completed, in fact three tandem two-seaters ordered by the Government will in all probability be delivered during the latter part of this week. All three of these machines are of the new type, having the seats placed close together in order to allow of flying them with or without a passenger. If desired a large petrol tank can be fitted in place of the passenger's seat so as to increase the radius of action of the machine. The operation of substituting the tank for the seat, or *vice versa*, can be carried out in the short space of 15 minutes. Several school machines are to be put in hand shortly, including two or three with 50 Gnomes, one with a 45 Anzani, as well as several of the usual 35 "Y" type Anzanis. And last, but not least, there are the *pingouins*.

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With such a variety of machines at the disposal of the pupils, and with its facilities for repairs in case of smashes, the Blériot school should soon become very popular. One of the hangars is being rebuilt, and will when finished, form a spacious lounge, where pupils can have a smoke while discussing events of the day, whilst at the back of this lounge will be some ten or twelve small cabins for the use of pupils who wish to have their own room in which to change, &c. Pupils who are anxious to take advantage of the morning calms will thus be able to sleep in their room over night, so as to be on hand in the morning without wasting time in getting down to the aerodrome.

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Mr. Barnwell has been carrying out alterations to the Vickers gun-carrying 'bus which has now had the side area of the *nacelle* considerably reduced, and a larger tail fin has been fitted. It was found that, as the propeller revolved anti-clockwise as seen from the rear, the air thrown back by the upper blade struck the right-hand side of the tail fin whilst that deflected by the lower blade did not strike any vertical surface, and the result was that the machine had a tendency to turn to the right. Mr. Barnwell hopes that by reducing the side area of the *nacelle* and bringing the tail plane more in line with the propeller this difficulty will be overcome.

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A new and very interesting biplane of the pusher type is nearing completion at the Brooklands works of Messrs. Martin and Handasyde. This machine is built almost entirely of steel and is expected to be very fast. She will be fitted with an Antoinette engine of 65 h.p. It must not be concluded from the fact that they are building a biplane that the Martinsyde firm have forsaken their old love, the monoplane, for a new and much larger monoplane is due to leave the stocks within the next two months. The wing bracing of this machine will be on rather novel lines in order to provide the necessary strength for a machine of so large a size as this one will be. It is probable that a Sunbeam engine will be fitted. I learn from Mr. Martin that there is a possibility of a Martinsyde mono. being entered for the Circuit of Britain Waterplane race. We shall look forward to seeing the Martinsyde firm on the list of entrants, for besides wishing them big success, the more machines competing the keener will naturally be the interest taken in the race by the public.

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It appears that M. Louis Breguet is at last discarding the old system of wing construction, to which he has adhered so consistently since the days of his first successful machine, for the machine flown by Moineau at Monaco recently was fitted with a double row of struts instead of the single row of struts in previous machines. I cannot help thinking that if M. Breguet could have been induced to effect this alteration a little sooner the English Breguet firm would possibly still have been a going concern, for the Breguet machines certainly have a lot of good points in their favour, and this latest alteration should go a long way towards regaining their popularity.

That the aeroplane should figure very largely on the films is but what might be expected owing to the interest taken by the public in flying, and it is more exciting to watch a man drop from an aeroplane on to a moving train than to see him change from one motor to another at full speed. It is, of course, impossible that some of the scenes demanded by an excitement-loving public, could really take place without grave danger of injury to the actors, and so they have to be "pretended" to a great extent. I suppose an aeroplane is somewhat of a difficult beast for the manager of a cine firm to handle and he is liable to overlook small matters of detail which will catch the critical eye and label it as a fake.' But surely someone at the "aerodrome" studio might just look to things technical a little. I saw a picture in one of the papers the other day which showed a man dropping from the bottom wing of a biplane on to a moving train, and the *aileron* was hanging straight down, with the control wire quite slack. Even in "Through the Clouds," good as it was, there were one or two little things that did not seem to "work." I know it is very difficult but some of the things overlooked are quite bad.

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Evidently the 200 h.p. Salmson engined Wight seaplane, designed by Mr. Howard Wright, which was shown at the last Olympia Aero Show, has proved even more successful than were its predecessors. Mr. Gordon England tells me that the machine behaves splendidly both in the air and on the sea. With a useful load of 950 lbs., including a wireless set, she climbed to a height of 3,000 ft. in 8½ minutes, in spite of the fact that for the first thousand feet or so considerable difficulty was experienced in getting her to climb owing to the peculiar state of the air. According to Mr. England, this machine is as nearly fool-proof as one can reasonably expect a machine to be. In fact, I understand that directions for handling her are mounted on the dash in front of the pilot, and that if he follows these directions he cannot possibly go wrong. The longitudinal stability of the machine is particularly good, and she flies absolutely on the throttle, so that from the last twenty or thirty feet all that is necessary is to throttle down and the machine will come down gently on an even keel without any bumping whatever.

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Quite recently cinematograph pictures were taken from the machine, particularly of the effect on the floats when alighting, the operator sitting on the nose of one of the floats. In spite of the weight of the operator and photographic apparatus being placed so far out in front and on one side, the machine flew beautifully. Mr. England tells me that the machine gets off the water in seven seconds, and that she has, for a seaplane, the very good speed range of 78–40 miles per hour. I understand that the Navy is particularly well pleased with the machine, and that sufficient orders have been received by Messrs. J. Samuel White and Co. to keep them very busy for a long time to come, whilst it looks as if Foreign Governments will have to bid against each other for first deliveries.

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It appears that the new Howard Wright double-cambered propeller is very efficient, for it has been found by experiments that for a certain power the diameter of this propeller can be kept much smaller than that of the ordinary type of propeller.

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Marcel Desoutter, the young pilot who, it will be remembered, had his leg injured in a smash on his monoplane last year, made a cross-country flight from Brooklands to Hendon on Sunday last. Starting from Brooklands at 6.10 p.m., on Lord Edward Grosvenor's Blériot monoplane, he set his course for Hendon, after first having made one or two preliminary flights round the Brooklands aerodrome. Owing to a slight ground mist he lost his way, however, and came down in a field

"Flight" Copyright.

Marcel Desoutter, who is now flying again, about to leave Brooklands on Sunday last for Hendon on Lord Edward Grosvenor's Blériot.

to ascertain his whereabouts. As he was afraid to stop his engine he kept switching on and off whilst shouting to some people who had rapidly gathered in the field when they saw him come down, to tell him in which direction lay Hendon. It was very amusing, Desoutter tells me, to see the nervousness of the people. Whenever he switched off his engine the people drew a little closer, but every time he switched on again they scattered like a flock of chickens, and he had the greatest difficulty in getting one of the men to come close enough to hear what Desoutter wanted. He was then told to follow the railway line, which would take him right past the Hendon aerodrome, where he did not arrive until 7.30, owing to the delay caused by having to come down and enquire his way.

It appears that Desoutter is going to profit in a somewhat unexpected way by his mishap last year, in which he lost one of his legs. When he got well he had a wooden leg made, but finding this a bit too heavy for his liking, and being of an ingenious turn of mind, he set to work to make one himself, and a very good job he has made of it. The leg is made of a framework of a special aluminium alloy covered with leather, and he has succeeded in getting down the weight as low as 2 lbs. Since it became known how successful Desoutter has been in making this leg, he has had a great number of letters from people who have lost one of their legs asking him to furnish them with legs of a similar construction to that which he has made for himself, and he has now patented the process of making artificial legs. "Æolus."

BRITISH NOTES OF THE WEEK.

ROYAL FLYING CORPS.

The following appointment was announced by the Admiralty on the 4th inst. :—

Sub-Lieut. R. Wright, R.N.R., to the "President," additional, for course of instruction at the Central Flying School, to date May 12th.

ROYAL FLYING CORPS (MILITARY WING).

War Office summary of work for week ending May 1st, 1914 :—

No. 2 Squadron. Montrose.—All three "flights" were out most days during the week engaged in reconnaissance training. Two machines were flown from Farnborough to Montrose. The Squadron is busy preparing for the move southwards to the Concentration Camp at Netheravon.

No. 3 Squadron. Netheravon.—Numerous cross-country reconnaissance flights were made by the pilots of this Squadron and observation of artillery fire was carried out on April 28th and 29th.

No. 4 Squadron. Netheravon.—The pilots of each "flight" were out daily, the work consisting chiefly of cross-country reconnaissance and observation of artillery fire. Some night flying was also carried out.

No. 5 Squadron. S. Farnborough.—The pilots of this Squadron were out daily and numerous cross-country reconnaissance flights were made.

No. 6 Squadron. S. Farnborough.—Flying took place daily over the country round Aldershot.

Aircraft Park.—Repair work on aircraft and M.T. and technical instruction of recruits were continued.

Headquarter Flight.—Experimental work on various lines was carried out. Several kite ascents and free balloon runs were also made.

General News.—Two more aeroplane squadrons commenced forming at Farnborough on May 1st. The Squadrons will be commanded by Capt. Longcroft and Capt. J. Salmond, who are being transferred from No. 2 Squadron and the Central Flying School.

R.F.C. Developments.

It will be seen from the weekly summary of the official doings of the Military Wing of the Royal Flying Corps that two new squadrons are now in process of formation. One will be under the command of Capt. Longcroft, who is being transferred from No. 2 Squadron, while Capt. Salmond, from the Central Flying School, will command the other.

In the Army Orders for May, it is notified that in future the "Flying Depôt, Lines of Communication," will be designated the "Aircraft Park."

Mr. B. C. Hucks at Chesterfield.

As the chief attraction in connection with the Chesterfield Shopping Festival, Mr. Hucks demonstrated there on Wednesday, Thursday, Friday and Saturday of last week. On the first day Mr. Hucks commenced by manœuvring his "80" Blériot in strange and wonderful ways. On the looper, Mr. Hucks started with a triple, and completed 7 loops in the flight. Afterwards on the 80 he flew to Brimington in response to the special request of an invalid gentleman who had never seen an aeroplane. On Thursday, 6 loops were made, in addition to stunts on the two-seater, but the wind was too tricky for passengers. On Friday, Mr. Hucks circled Brimington Church spire, and looped 9 loops. An immense "gate" turned up on Saturday. The thrill of the afternoon was an upside-down flight, during which Mr. Hucks took one hand off his controls and waved it in the air. In all 9 loops were made, and Mr. Hucks also gave a splendid exhibition on the 80.

This week Mr. Hucks is at Leicester. Norwich will be visited on May 14th, 15th and 16th. Mr. Hucks' new 50 h.p. looper arrived at Hendon last Thursday, and will have been used for the first time at Leicester on Wednesday of this week.

The Schneider Cup Competition.

In our account of the flying for the Jacques Schneider Cup at Monaco, it was stated that Lord Carbery retired as he was not used to a Deperdussin. It will be remembered that owing to a mishap to his own Morane-Saulnier, Lord Carbery arranged to use Janoir's Deperdussin. Writing to us on the matter, however, Lord Carbery states that the real reason why he abandoned the race was that the sparking plug wires got crossed, as happens sometimes with a two-group motor. This resulted in back-fires at intervals, and although the trouble was attended to by the mechanics, it recurred after another round. Lord Carbery adds that although he had not flown either a Deperdussin or a machine of 160 h.p. before, let alone in a 30-mile wind, he never was more at home.

Models at Burton Water Carnival.

A model waterplane competition is to be a feature of the Water Carnival which is to be held on the River Trent at Burton, on Saturday, August 20th. The competition will be open to model makers in the Midlands, and among the prizes will be a valuable challenge vase offered by Lord Anglesey.

Approaches to Shoreham.

In commenting upon the flying at Shoreham at Easter time our correspondent referred to the inaccessibility of the aerodrome. This was not meant to imply that there was not a sufficient number of approaches, but rather that after the continuous rains the approaches were in such a muddy condition that it was not too pleasant for cars and motor cycles to reach the flying ground. However, since then this matter has been attended to, and we learn that all the aerodrome roads are now in real good order.

Volk's Seaplane Hangar at Brighton.

Aviators who are thinking of paying a flying visit to Brighton should note that Volk's Seaplane Hangar has been re-erected on the front and is now ready to accommodate any machine at short notice.

Simplicity and Success in Photography.

The merits of the "Tabloid" system of photography are too well known to need any lengthy reference to them here, but, in view of the fact that the ranks of amateur photographers are continually being added to, attention may be drawn to a little brochure entitled "Simplicity and Success in Photography" which has just been issued by Messrs. Burroughs Wellcome and Co. Among the many useful hints which it contains, not the least interesting are those dealing with up-to-date colour toning methods. The booklet, which will be sent to any amateur applying to Messrs. Burroughs Wellcome at Snow Hill, London, E.C., is illustrated by several reproductions of toned prints, including one secured by Mr. H. G. Ponting of Capt. Scott's expedition.

The Fabbri Photographic Apparatus.

We are informed that the Integral Propeller Co., Ltd., have been appointed sole agents for Great Britain and the Colonies for the Fabbri Photographic Apparatus, which, it may be recalled, was exhibited at the last Olympia Show on the Bristol Stand. All enquiries regarding the apparatus should be addressed in future to the Integral Propeller Co., 1b, Elthorne Road, Upper Holloway, N.

NAVAL AND MILITARY ENGINE COMPETITION, 1914.

ON the occasion of our visit to the Royal Aircraft Factory at Farnborough on Saturday last, six engines, all of which are water-cooled, were to be seen erected upon the fixed test beds—the 130 h.p. Argyll, a 100 h.p. E.N.V., a 95 h.p. Dudbridge Ironworks Salmson, the 135 h.p. Sunbeam, the 130 h.p. Wolseley and a 130 h.p. White and Poppe engine—but none had actually commenced their official trials, although several had been run for short periods by the makers. It was anticipated, however, that several would be ready for the six hours' trial by Monday last. This trial may be regarded, in some measure, as an elimination test; but as so many of the entrants have had extensive experience in this class of work and several engines have already undergone much more prolonged tests, it would appear to be possible that many of these engines should, except for some bad stroke of fortune, experience little difficulty in coming through it successfully.

Although all test beds are exactly similar, and the rooms, excepting that at the extreme end, in which they are placed are of the same size, it was considered by the Judges' Committee that it would probably be more satisfactory to all concerned if the decision as to which bed any particular engine should be mounted upon for the tests were made by drawing lots; and a similar procedure has been adopted in determining the order in which the engines are to be tested. It is possible, however, that for greater convenience, such makers as have a number of engines entered for the competition, will be permitted, by arrangement, to complete the tests of all their engines on the fixed beds consecutively, as of necessity they will have all their tools, &c., in the compartment allotted to them.

Full particulars of the conditions governing the competition, which still stand, except for one modification, namely, that the magneto need not necessarily be of British manufacture, have already appeared in FLIGHT, but these have been amplified in a circular embodying instructions to competitors, and it is interesting to observe that all engines will be permitted to make two attempts to complete the six hours' continuous trial, but a further attempt may be allowed, under exceptional circumstances, where a satisfactory reason can be advanced by the entrant for according such permission. Should any competitor claim some special advantage for his engine that is not included in the official list of desirable attributes (see FLIGHT for June 14th, 1913), on the satisfactory conclusion of the six hours' preliminary trial he may request that such special qualities be tested, and the Judges' Committee will then decide as to whether, and in what manner, such special test is to be made. On the completion of the six hours' preliminary trial and the special test, if carried out, the judges are at liberty to subject the engine to any test that is calculated to show its usefulness for service in any type of aircraft. These will probably embrace tests on the tilting beds, and much more prolonged runs at full and/or reduced powers on the fixed beds; as although the normal hours of working are limited to from 8 a.m. to 6 p.m., these periods may be extended at the discretion of the judges; or, the test may be continued on the succeeding day or days without any adjustments being permitted—the latter procedure corresponding somewhat with the ordinary conditions existing in practice, and perhaps being rather more severe.

The parts of the engine which are liable to wear may be examined on the conclusion of the individual trials, the fuel, oil, &c., will be measured in the course of the tests (as described in FLIGHT for the 25th ult.), while such other observations will be made by the judges, or at their direction, as are considered necessary in order to determine to what extent the engine possesses the desirable attributes previously referred to. It is worthy of notice, as indicating the degree of accuracy obtainable with the petrol flow-meter, that in the course of tests conducted on actual engines by the Inspection Department under the direction of Capt. R. K. Bagnall-Wild, the records obtained from the flow-meter differed by less than one per cent. from the actual fuel consumption figures determined by observing the amount of fuel consumed from the main petrol tank throughout the whole trials.

When the competitor has informed the secretary that his engine is ready for test, it is placed under the observation, during the working periods, of an engine-room artificer and a staff-sergeant (of whom six have been detailed for this purpose) from the Naval and Military Wings respectively of the Royal Flying Corps, and no work on the engine or even access to it is subsequently permitted except under the observation of an official appointed by the Judges' Committee. The measurements of weight, fuel, oil, water, temperatures, air speed, engine speed, brake load, &c., will be made under the direction of the Judges' Committee; but assistance in obtaining the correct results may be required from the maker of the engine under test. Every endeavour has been made to completely exclude all who are not directly concerned in the tests from the engine testing rooms—each of which is locked up when the firm's representatives are absent—as day and night watchmen have been appointed to keep off unauthorised persons, and although so closely adjacent, there is no communication between the building in which the engines are located and the Royal Aircraft Factory. At the end of the competition, however, the special enclosure surrounding the test house will once more be thrown into the Factory and the plant will be used for testing engines delivered by contractors and submitted to the authorities, under comparable conditions.

It is anticipated that the tests will last for a period of about three months, the reason for which will be readily understood when the number of engines submitted, and the extensive and prolonged character of the tests that will undoubtedly be required to differentiate between the various engines after the principal trials have been carried out.

No official information as to engine performance will be published in any way whatever until after the completion of the preliminary six hours' tests, but a statement of performance will be issued to each competitor at the end of the competition, and the firms concerned will be acquainted with the data relating to their own engines as the trials proceed. No marks will be published at any time, but certificates of performance may, at the discretion of the Judges' Committee, be given on the completion of the competition.

In their instructions to competitors, the Judges again emphasise that "no undertaking is made or implied that all or any particular number of engines will be ordered from the competitor whose engines give the best performance, or is awarded the £5,000 prize if for any reason the Judges should consider that ordering any other of the engines duly entered in the competition is of more value to the public service than the prize winner." The instructions also state that "before placing any orders for engines as the outcome of the competition, the Judges' Committee may make such investigation into the works' equipment, method of procuring supplies, financial standing, &c., of the producers of the engines, as they may think fit to ensure the completion, in the United Kingdom from British sources, in a reasonable time, of the engines proposed to be ordered."

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Mishap to the "Adjudant Reau."

WHILE the envelope of the French military airship "Adjudant Reau" was being inflated at Verdun on the 2nd inst., the fastenings of the net which was holding it down gave way. The gas-bag then rose to the roof and was seriously torn by the girders of the roof of the hangar. Fortunately no one was hurt, but the damage done was considerable. It will be recalled that this airship holds the airship records for distance and duration, having travelled 1,000 kiloms. in 21 hrs. 23 mins.

Long Cruise by Italian Dirigible.

THE Italian military dirigible "P5" on Wednesday of last week covered a circuit from Verona to Udine, Venice, Campalto and back to Verona in eight hours, the distance covered being about 500 kiloms.

7½ Hours' Cruise by "Z7."

LEAVING Johannisthal at 12.8 a.m. on May 1st, the new German military dirigible "Z7" cruised to Posen, where it will be stationed for some time, arriving there at 7.30 a.m.

The Accident to the Schutte-Lanz,

As recorded in our last issue, the new Schutte-Lanz airship "SL2" started from Mannheim on her official 20 hours' duration trial on Tuesday evening of last week, and after cruising over Cassel, Bremen, Hamburg, Kiel, Berlin, Potsdam, Jena, and Merseberg, finally arrived on Wednesday evening at Leipzig. During the cruise there had been a heavy leakage of gas, and on arrival at Leipzig, although the full 20 hours had not elapsed, the pilot deemed it prudent to land. In response to a message dropped from the vessel about two hundred soldiers were hurriedly collected and the airship was slowly brought down, until within about 150 metres of the ground, when it dropped suddenly. Considerable damage was done to the cars, while the propellers were smashed and the wooden framework of the envelope broken in parts. Although the airship failed by about half-an-hour to complete the 20 hours' trial, it is stated that she has been accepted by the German military authorities, and will be repaired as quickly as possible.

German Balloonists Sentenced in Russia.

AFTER being detained for nearly two months the three German balloonists, Berliner, Haase and Nikolai, who landed at Perm when attempting to beat the world's distance record, have been sentenced to six months' imprisonment or pay a fine of £210 each, for landing in Russia without permission. The charge of espionage was dismissed. The 58 days they have been detained is to be deducted from the term. Great indignation has been aroused in Germany by the severity of the sentence.

THE MEASUREMENT OF AIR SPEED.*

By A. P. THURSTON, D.Sc., F.R.Met.S., Associate Fellow Ae.S.

IT is a matter of extreme importance to be able to measure accurately the speed of the air in any situation and under any condition, because all our knowledge of the dynamical properties of the air is dependent upon a correct measurement of its velocity, and because the safety of a pilot depends upon knowing accurately the speed at which he is flying. He is then able to guard himself against the risk of stalling his machine or of attaining too great a speed. An air speed indicator is really as indispensable to a pilot as a foot rule is to a carpenter, or a "hooter" to a motorist.

The velocity of the air may be determined by three main methods.

(1) In the first method the velocity is measured directly by the time taken by a particle, body or substance floating in or dragged along by the air to travel from one point to another. Under this category all rotating helical vane instruments are generally included. This may be called "the velocity method" or "*v* method," as the reading obtained is independent of the density of the air.

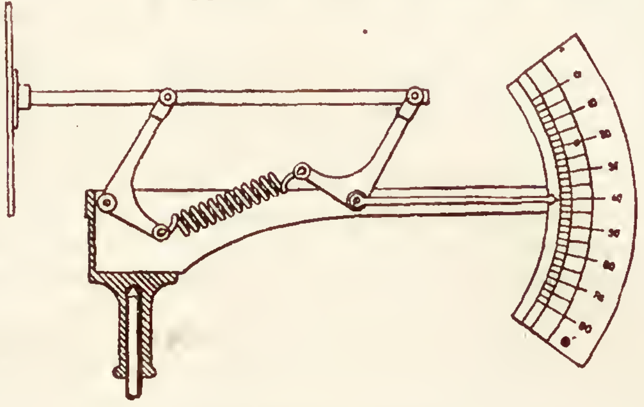
(2) In the second method the velocity is obtained by measuring the mass of air passing a certain point, as, for instance, by measuring its cooling or evaporative effect. This may be called "the density velocity method" or "the ρv method," since the mass of air passing in a given time is proportional to the product of the velocity and the density.

(3) In the third method the velocity is determined by placing an obstruction in the air and by measuring the force exerted or the pressure generated at the obstruction.

Suppose we consider a column of air having a cross section equal to that subtended by the obstruction and a velocity v per sec. The mass of air impinging on the obstacle per sec. will be proportional to ρv and its momentum to ρv^2. We know that force is equal to the rate of change of momentum, and since this column of air parts with its momentum to the obstacle, it follows that the force exerted or the pressure generated will be proportional to ρv^2. This may be called "the density velocity squared method," or simply "the ρv^2 method."†

Now an aeroplane in flight derives its support from impressing a downward momentum on the air which comes within its influence. The mass of air which it engages depends directly on its velocity v and the density ρ of the air and is therefore proportional to ρv, and the velocity with which the air is driven downwards, the inclination of the machine being kept constant, is proportional to the velocity of the machine. The lift is therefore proportional to the product $v \times \rho v$, *i.e.*, ρv^2, Thus, the dynamical buoyancy of the air is proportional to ρv^2. Instruments depending on the dynamical pressure of the air may therefore be referred to as "ρv^2 instruments" or "dynamical buoyancy meters."

It is obvious that as the height increases and the density of the air decreases, the velocity must be increased to obtain the same buoyancy from the air. Instruments of this class will therefore act excellently as buoyancy meters, but will be deceptive as to speed unless the density of the air is obtained and the true velocity deduced from the reading of the instrument at that density. It should be borne in mind by pilots and designers that if a machine is travelling at a great altitude the inertia stresses caused by sharp turns or quick evolutions may be greater than expected, since the velocity is greater than would appear from the instrument reading.



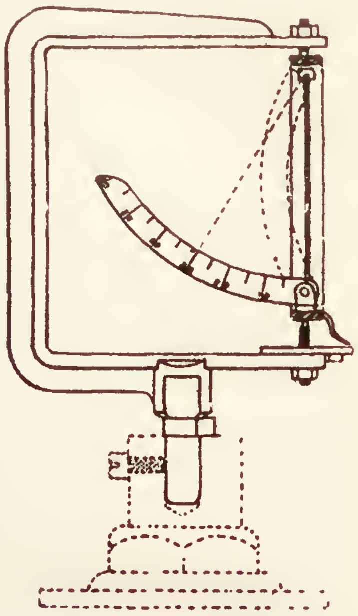


Fig. 1.—Maxim's air speed indicator. Fig 2.—Scattergood's anemometer.

v Instruments.—(1) Instruments coming under the first category, such as helical vane instruments, have the advantage that they are useful as "logs" in navigation, since their readings are independent of the density of the air. If used for this purpose they should be provided with a counter to record the actual distance travelled. Thus arranged they would form an interesting and useful adjunct to the ordinary ρv^2 instrument. Instruments of the v type are not suitable for low velocities, but may be regarded as fairly accurate over the range of velocity of a flying machine. The variation of friction, due to air pressure on the vanes, which varies as the square of the velocity and the density, is however a small source of error, in view of the fact that the reading of the instrument should vary as the velocity only. In fluctuating winds an additional error is introduced by the inertia of the rotating parts making the mean reading a little high.

(2) Instruments of the Robinson cup type, in which cup vanes are mounted on the ends of radial arms projecting from a shaft which rotates about a vertical axis, appear to be difficult to class. The velocity of rotation would appear to be in part proportional to the difference in the dynamical pressure on opposite cups and in part proportional to the velocity of the wind. Experience has proved that the best approximation to the true velocity is obtained by multiplying the speed of the centre of the cups by a factor 2.2. This type of instrument appears to be regarded by the makers as of the V type.

ρv^2 Instruments.—(3) Instruments of the ρv^2 class always consist of two distinct parts, one at which the pressure is generated and the

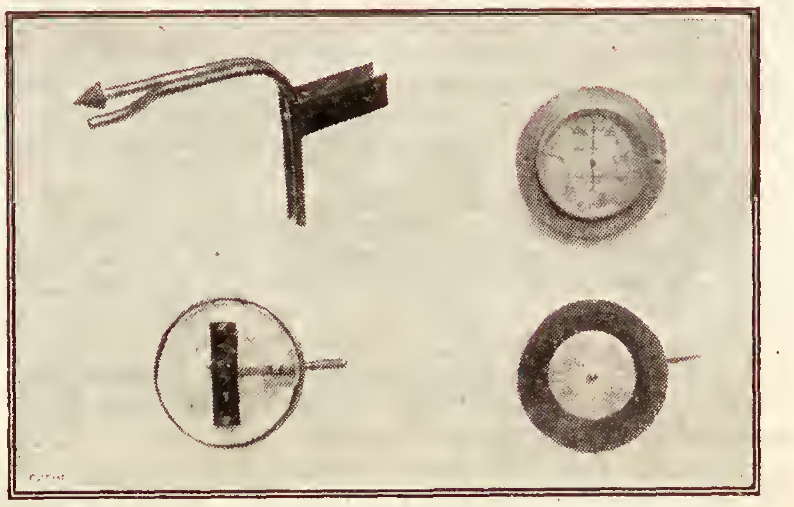


Fig. 3.—Head and Details of Clift's air-speed indicator.

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* Paper read before the Aeronautical Society of Great Britain, at the Royal United Service Institution, on May 6th.

† The theory of the Pitot tube is as follows:—

The total energy E in unit mass of a fluid = the potential energy + the pressure energy + the kinetic energy.

$$= h + \frac{p}{w} + \frac{v^2}{2g}$$

Where (in suitable consistent units) h = potential height of fluid. p = pressure. w = weight of a column of the fluid of unit cross section and height. v = velocity.

Now in the case under consideration the potential energy is not available and therefore $h = 0$.

$$\therefore E = \frac{p}{w} + \frac{v^2}{2g}$$

If the velocity and the kinetic energy are assumed zero, as is the case at the mouth of the Pitot tube,

$$\text{then } E = p \div w \qquad (1)$$

And if all the pressure energy is converted into kinetic energy

$$\text{then } E = v^2 \div 2g \qquad (2)$$

But the total energy is constant.

Eliminating E from (1) and (2)

$$\text{then } p \div w = v^2 \div 2g$$

$$\therefore v^2 = 2g\,p \div w$$

Let h' = the "head" of fluid corresponding with the pressure p

$$\text{then } h' = p \div w$$

$$\therefore v^2 = 2g\,h' \qquad (3)$$

If h'' = head of water in tilting gauge corresponding to the head h' of the fluid.

ρ = density of fluid.

$\rho = h'' \div h' \therefore h' = h'' \div \rho$. Substituting this value in (3).

$v^2 = 2g\,h'' \div \rho$ or $v = \sqrt{2g\,h'' \div \rho}$.

The density of air is generally taken as 0·0012.

If h'' is measured in feet and g is taken equal to 32·18, then the velocity given by the above equation will be in ft. per sec.

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other at which it is recorded. This class may be divided into two sub-classes.

(*a*) Devices in which the resistance of a plate or body in a current of air is measured mechanically.

(*b*) Devices in which the pressure generated on a body placed in the current is recorded on a manometer or equivalent device.

Type 3*a*.—Instruments shown in Figs. 1 and 2 are examples of type 3 (*a*). Fig. 1 shows Maxim's air speed indicator. In this device a circular disc is mounted so that its deflection is resisted by a spring and the amount of deflection is recorded on a dial. The dial may be graduated to record the velocity, since it varies with the resistance offered by the circular disc. Fig. 2, showing Scattergood's anemometer, illustrates another type in which the resistance is balanced by gravity. A plate is pivoted at its upper end and its inclination varies as the velocity of the wind. The quadrant may therefore be graduated to record the velocity.

In both these instruments, since the inertia varies as the square of the velocity, it follows that the mean reading will give the root mean square velocity which is as required. The friction at the joints, however, introduces a variable coefficient which will vitiate the accuracy of the device. In other examples of this type of device a sphere is suspended by a cord and the speed of the air determined by the deflection of the sphere.

In another method, which is often very useful in the laboratory, the resistance offered by a body in the current of air is weighed on a delicate balance. If this resistance has been carefully recorded over a range of speeds a very accurate reading of velocity can be obtained by means of this record.

Type 3*b*.—Instruments of type 3 (*b*) are much more generally used in accurate scientific work, owing to their great accuracy and to the fact that the parts which are placed in the air current may be very small. They consist of two parts.

3*b* (1) A tube for obtaining the dynamical pressure having its open end facing the wind and another tube for measuring the statical pressure of the air.

3*b* (2) A manometer for measuring the difference in pressure between the dynamical and statical tubes.

3*b* (1).—The dynamical or Pitot tube always consists of a tube with the open end facing the wind, but the statical tube may be of various designs. In the simplest form, with the statical tube embracing the dynamical tube, as described by Messrs. Jones and Booth,[*] the velocity is given by the equation

$$v = K\sqrt{2g\ h}$$

Where v is in feet per sec., g is the acceleration due to gravity = 32·18 approx., h is the difference of pressure in the two tubes in feet of air at the statical temperature and pressure of the air in the tunnel, and K is a constant which may be assumed equal to unity.[†]

In other forms the statical tube may be provided with a hood to decrease the pressure and to give a greater reading on the manometer, as in the R.A.F. tube and the Clift pattern, shown in Figs. 3 and 4, or it may have its axis at right angles to the current with a series of holes symmetrically placed around as in the Dines tube.

In these forms the velocity is given by the equation

$$v = K\sqrt{2gh}$$

Where K is a constant which is determined by comparison with a standard.

3*b* (2).—The pressure difference between the Pitot and the Static Pressure tube may be measured in various ways, as by—

(*a*) A liquid level gauge, such as the tilting gauge described by Dr. Stanton,[‡] or by the author,[§] or it may be of the R.A.F. pattern designed by Mr. F. A. Short and described by Mr. Horace Darwin,[‖] or it may be of a U tube of the Roberts type.[¶]

(*b*) A cylindrical or bell float in an enclosed vessel. In this type the dynamic tube is usually placed in connection with the interior of the float and the static tube with the interior of the vessel containing the float. In the Dines arrangement the float is designed in such a way that the amount by which it is lifted is proportional to the velocity of the wind. The rise of the float is recorded by an indicating device.

(*c*) A U tube mounted on a balance so that a difference of pressure in the two limbs causes a flow of liquid which upsets the equilibrium of the balance.

(*d*) A delicate Bourdon gauge.

(*e*) A piston and spring gauge. It is difficult in this gauge to eliminate friction. The friction causes the reading to lag behind the true reading. The readings therefore have a hysteresis loop.

(*f*) An elastic diaphragm or chamber gauge.

Types (*a*), (*b*) and (*c*) are gravity controlled devices and are particularly suitable for use in the laboratory and for delicate work, and types (*d*), (*e*), (*f*) are independent of gravity and are more suitable for use in actual flight, where a reasonably accurate "sight" reading is required which is unaffected by changes of acceleration or by shaking. These instruments give a true mean reading if the tubes are sufficiently large to prevent friction and eddy current losses, since the inertia of the moving parts varies as the square of the velocity.

Gravity versus Spring Controlled Instruments.—An aeroplane in flight is continually subject to changes in acceleration in every direction. Now force equals mass × acceleration. If, therefore, the masses of the movable parts of the recording instrument are considerable or are unbalanced, the readings will be inaccurate. In the case of the gravity controlled instruments it is clear that the readings will only be accurate when the machine is not subjected to an acceleration. For instance, if the machine is falling freely under gravity a small translational speed will give an infinitely large reading, and conversely if the machine is being accelerated upwards rapidly the velocity recorded will be much less than the actual velocity. In turning sharply the same result will be obtained. These effects are so well known that it is difficult to realise that it required a lengthy discussion in the technical Press to establish them, but it emphasises the need for keeping the primary principles to the front. A spring controlled instrument is free from many of the limitations of gravity controlled devices, although it is not so suitable for laboratory work.

The mechanism in the human middle ear (consisting of three semicircular canals at right angles containing fluid), which gives us our "sense of balance" (Kinesthetic Sense), is obviously a gravity controlled one. It would therefore be desirable that the readings of the speed indicator should act as a check to the senses, rather than be subject to the same "illusions" due to accelerations. Obviously a spring controlled instrument fulfils this condition much better than a gravity controlled instrument.

(*To be concluded.*)

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[*] *Aeronautical Journal*, July 1913.

[†] *Philosophical Magazine*, Vol. 21, Fry and Tyndall "On the Value of the Pitot Constant."

[‡] Proceedings, Institution of Civil Engineers, vol. clvi.

[§] *Aeronautical Journal*, April, 1911.

[‖] [¶] *Aeronautical Journal*, July, 1913.

* * *

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

Wilbur Wright Memorial Lecture.—The second "Wilbur Wright Memorial Lecture" will be delivered by Dr. R. T. Glazebrook, C.B., F.R.S., F.Ae.S., on "The Development of the Aeroplane," at the Royal United Service Institution, Whitehall, on Wednesday, May 20th, 1914, at 8.30 p.m.

The Right Hon. Lord Sydenham, G.C.M.G., F.R.S., will preside.

On the evening preceding the meeting (viz., on May 19th) the Council will entertain the lecturer and other distinguished guests at a banquet at the Royal Automobile Club, Pall Mall, S.W., at 7.45 p.m. for 8 p.m.

Members are invited to purchase tickets for themselves or their friends at £1 1*s*. each, inclusive of wines, cigars, &c. Members desirous of contributing to the guarantee fund, which has been opened to defray the costs of official guests, may send subscriptions in addition to purchasing tickets.

Cheques should be made payable to Griffith Brewer, and sent to the Aeronautical Society, 11, Adam Street, Adelphi.

B. G. COOPER, Secretary.

* * *

Maurice Farman Visits Chalons.

ON Monday Maurice Farman, on one of the new type machines bearing his name, flew from Buc to Chalons, going by way of Meaux, Montmirail and Rheims.

T. Elder Hearn Loops the Loop.

AFTER a short period of special training at the Blériot school at Buc, T. Elder Hearn, the well-known music hall artist, looped the loop on Monday. He intends to attempt to fly from Paris to London in a few days on the Blériot machine which he has purchased.

Fast Flying on Anzani-Dep.

ON his Deperdussin waterplane, which is fitted with a 10-cyl. 85 h.p. Anzani motor, Issartier on Monday flew with a passenger from Bordeaux along the Garonne and the Dordogne to St. Andre de Cubzac, covering the distance of 45 kiloms. in 25 mins. In the afternoon he returned to Bordeaux.

Parachute Descents from Aeroplanes.

AT Nevers on Saturday, Mme. Cayac de Castella, by the aid of a parachute invented by her husband, descended from a Goupy biplane piloted by Pelletier.

FOREIGN AIRCRAFT NEWS.

A German Distance Record.

LIEUT. WENCHER, accompanied by two other officers, on a 100 h.p. military biplane last week, flew from Metz to Freiberg, a distance of 200 kiloms. which is claimed as a world's record for pilot and two passengers. The weight of the three officers was 259 kilogs., and in addition the machine carried 50 kilogs. of baggage and 180 litres of fuel.

Long Flight on a Vendome.

ON the 29th ult., Goffin on a Vendome monoplane, fitted with an E.J.C. motor, made a very satisfactory flight, lasting an hour and a half, above and around Chateaufort.

Testing New Farman Designs.

AT Buc on the 29th ult., Henry Farman was busy testing the new type landing chassis, while his brother Maurice carried out some trials with a 1914 Maurice Farman fitted with a new arrangement of all-enclosed *nacelle* which is giving very good results.

Farman Père Enjoys a Trip.

ON the 30th ult., Maurice Farman made a long trip, accompanied by his father, to Etampes, Dreux, and Tillieres, eventually returning to Buc, the run being made with no more incident than if it had been effected by the aid of a motor car.

A High-powered Voisin.

TESTS were carried out on the 1st inst. by Rugere with a Voisin biplane of large dimensions which has been built to the order of the pilot Mahieu. The machine is fitted with a 200 h.p. Clerget-Blin fixed motor.

Tests with a Rhone Motor.

A TWO-HOURS' test with a Rhone motor, having a cylinder capacity of 10·9 litres, was recently carried out in the laboratory of the Automobile Club of France. The effective h.p. given off was 88·6, the fuel consumption 244 grammes per h.p. hour, and the oil consumption 57 grammes per h.p. hour.

Legagneux Beats Audemars.

THE feature of the meeting held at Buc last Sunday afternoon was a series of matches between Legagneux and Audemars, the former on a Clerget-Nieuport and the latter on a Gnome-Morane. There were three items, a speed test, a pursuit race, and a landing test, and in each Legagneux was the victor. In the speed test his time for the 20 kiloms. was 10 mins. 11 secs., while Audemars took 12 mins., and in the pursuit race Legagneux covered the 15 kiloms. in 8 mins. 1⅗ sec., beating Audemars by 1 min. ⅘ sec. During the afternoon Audemars looped the loop, as also did the Comte de Larienty Tholozan on a Blériot, while Garros gave a display of fancy flying. The meeting terminated with a parachute descent from a Blériot piloted by Cuendet.

A Meeting at Juvisy.

THE chief event at the meeting arranged at Juvisy for Sunday afternoon was a 10 kilom. handicap. The eliminating race for biplanes resulted in Champel on his Anzani-engined biplane securing first place, with Vallier on an Anzani-Caudron second, while in the monoplane heat Jupin on a Bathiat was the only finisher. In the final Champel had an easy win. Jupin afterwards gave a display of looping, &c., while Champel carried a number of passengers.

Vidart Loops the Loop.

AT Etampes on Sunday last Rene Vidart looped the loop for the first time on a Deperdussin monoplane fitted with a Rhone motor. During a second flight he made fifteen successive loops.

The Schicht Prize.

AS announced in our last issue, Wittmann, on the Lohner-Arrow monoplane, with Austro-Daimler motor, was awarded the first prize in the Schicht competition, while the second prize was secured by the pilot who flew under the *nom de vol* of "Bareth" on a Lohner biplane, the only other machine to finish the complete itinerary.

Another German Looper.

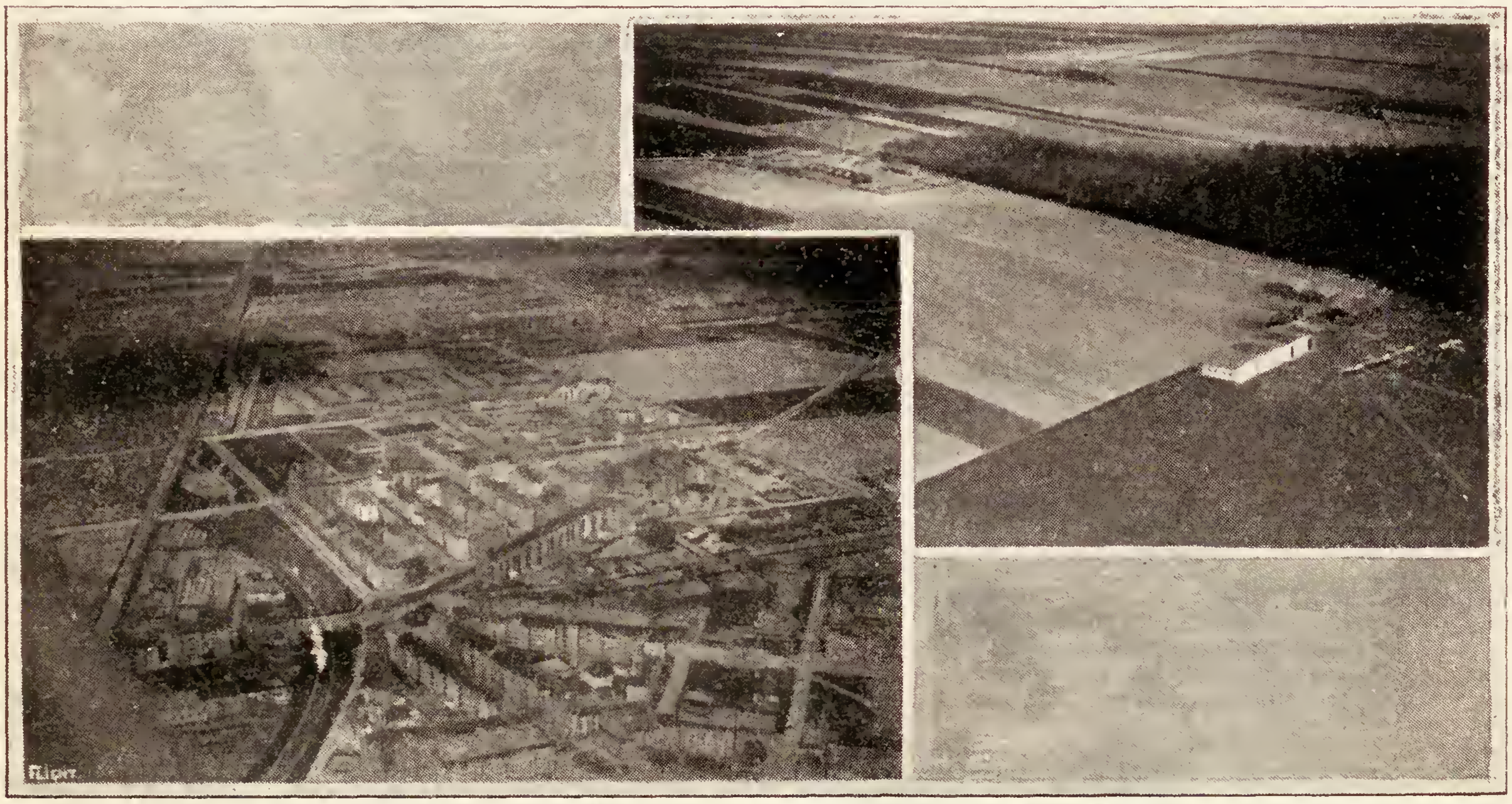
LAST week the well-known German constructor, Fokker, succeeded in looping the loop at Scherwin on a monoplane of the Morane type.

Fatality in Germany.

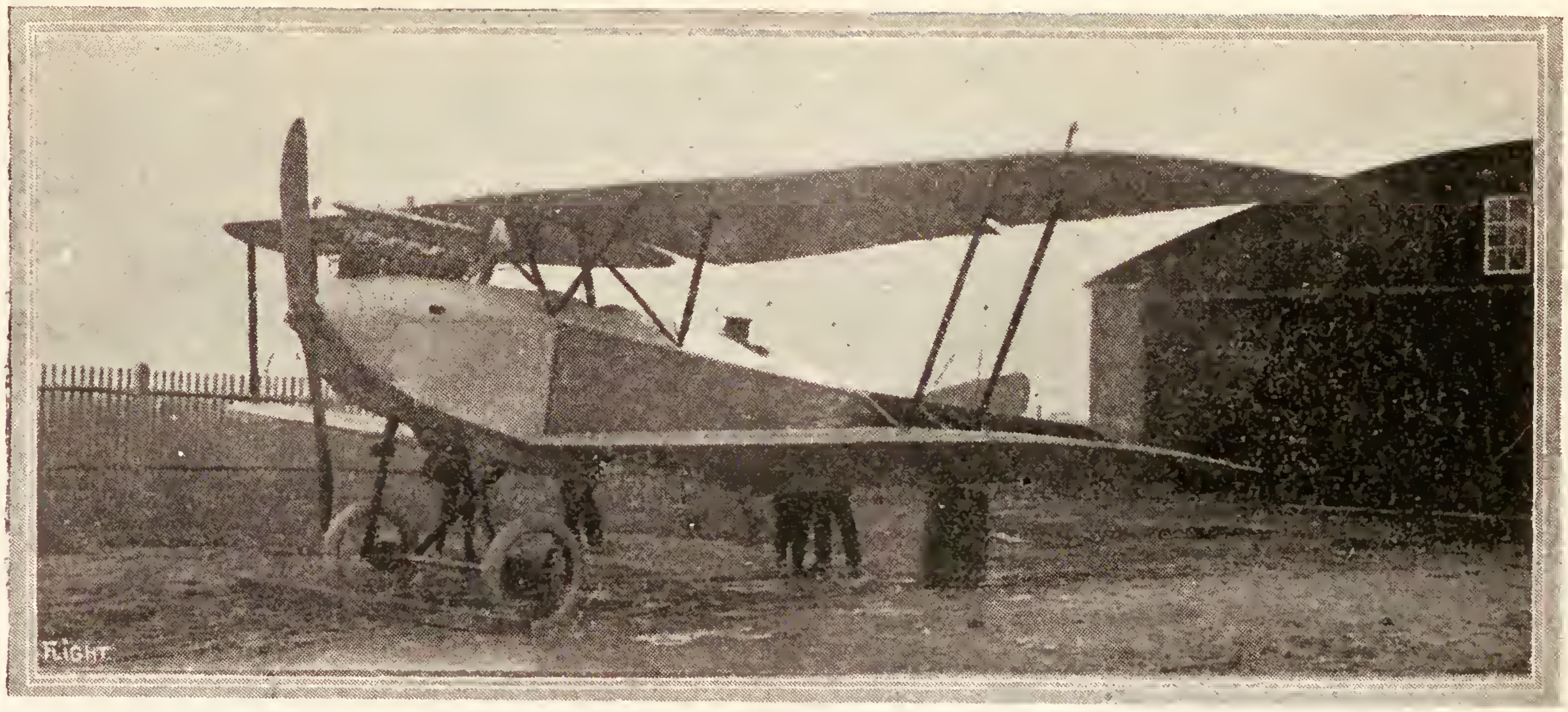
AFTER a fine flight from Doeberitz on the 1st inst., Lieut. Niemeier was landing at Halberstadt when his biplane was caught by a gust of wind and overturned. The passenger, Lieut. Mayer was killed through being crushed by the motor, while the pilot had both his arms broken and was otherwise seriously injured.

An Aeroplane Factory for Holland.

ACCORDING to the *Gazette of Holland* arrangements are being made for the establishment of a works in Holland for the construction of aeroplanes. A flying ground has been secured adjoining the aerodrome at Soestenberg, where Farman biplanes and Brouckere monoplanes will be built under licence. The Company will be under the management of M. Henri Wijnmalen.



Left: Leipzig from above, taken from a D.F.W. scouting biplane. Right: The D.F.W. works, which are situated on the historic battlefield of Leipzig, where, in 1813, Napoleon was defeated by the United forces of England, Germany, Austria and Russia. One wonders what would have been the issue of that famous battle had the contesting armies possessed a number of aeroplanes similar to those flying over the field regularly at the present day. At the D.F.W. works are employed, we understand, no fewer than 722 workmen, in addition to a staff of 56 engineers and office staff, whilst the works are capable of turning out machines at the rate of four or five a week.



A "D.F.W." scouting biplane, which is credited with a maximum speed of 106 to 110 miles per hour, and a minimum speed of 51 miles per hour. She will climb to an altitude of 3,500 ft. in about 6 mins.

Military Aviation in Holland.

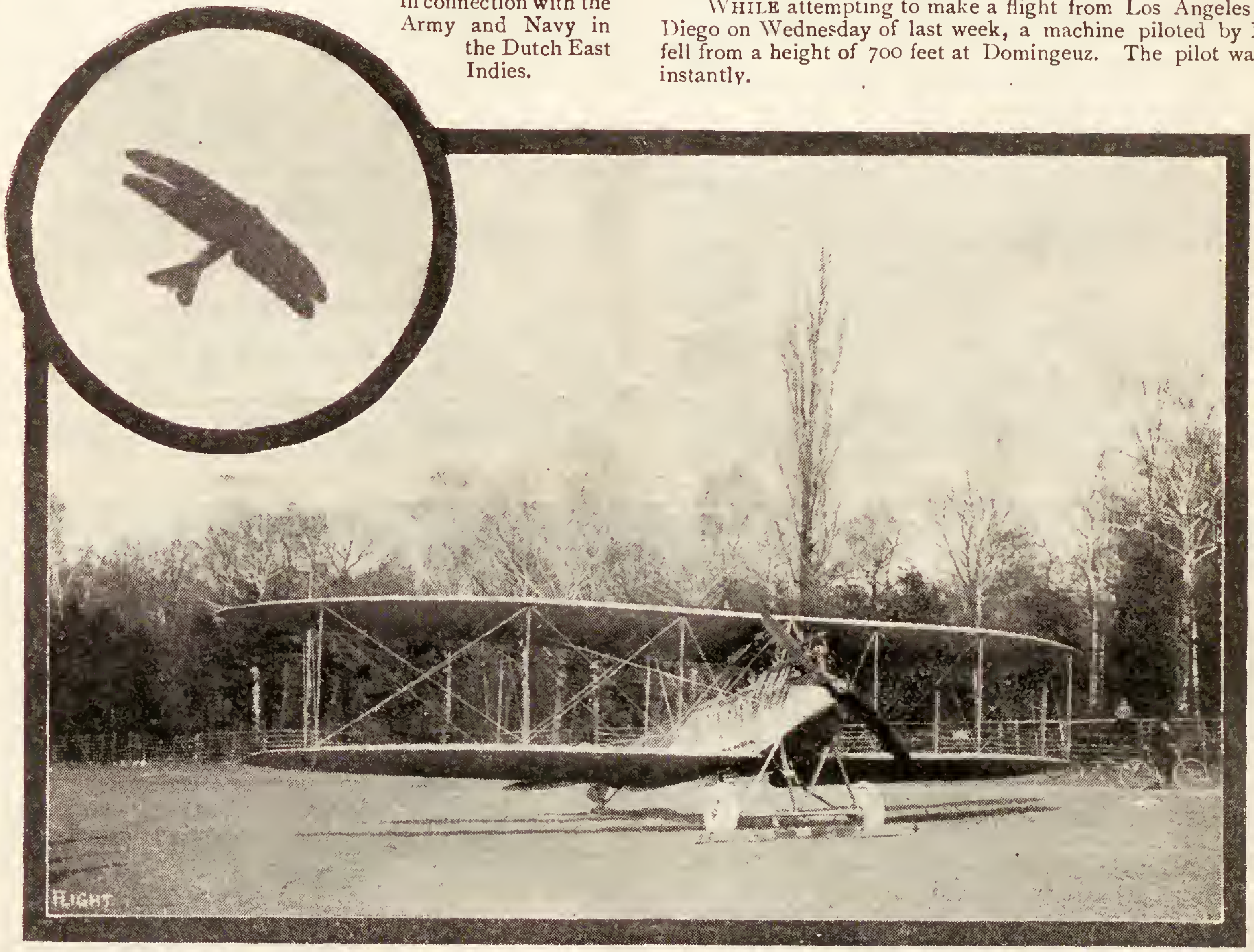
AT present the Dutch Army possesses four flying officers, but in the forthcoming estimates provision is to be made for the extension of this branch of the service by the acquisition of more machines. Aeroplanes are to be used as much as possible at any manœuvres which may be held, and it is also proposed to carry out some flying exercises in connection with the Army and Navy in the Dutch East Indies.

Cross-Country Test for Sikorsky Giant.

IT is stated from St. Petersburg that arrangements are being made for a race between the Sikorsky giant biplane and an express train from the Russian capital to Moscow. M. Sikorsky will pilot the aeroplane, while the train is to be driven by M. Shtshukin, Assistant to the Russian Minister of Communications.

Fatal Accident in California.

WHILE attempting to make a flight from Los Angeles to San Diego on Wednesday of last week, a machine piloted by Royston fell from a height of 700 feet at Domingeuz. The pilot was killed instantly.



A "D.F.W." all-steel biplane, in which the only wood employed is that of the propeller. This machine, which was designed by Mr. Cecil Kny, the Technical Director, will be built in this country as soon as the new works at Richmond are completed. With a full load, including fuel for 5½ hours and two passengers, the machine has climbed to a height of 3,500 ft. in 4 mins. The engine is a 100 h.p. Mercedes, and the speed is 78·4 miles per hour. Inset is a view of the machine in flight.

Models

Edited by V. E. JOHNSON, M.A.

Two Interesting Model Types.

AMONGST this season's coming competitions will in all probability be found those in which the competitors will be compelled to submit models of the covered-in *fuselage* Canard type, and also in which twin tractor models will be *eligible* and permitted (as an experiment), to compete on equal terms with their single tractored relatives. In the case of the Canard type model there will be certain restrictions with respect to the maximum length and breadth of the *fuselage* in order to ensure the use of a *fuselage* and not a mere tube.

In view of this the accompanying photos, drawings, and particulars, kindly supplied us by Mr. A. B. Clark (Hon. Sec. South-Eastern Model Aero Club), of Mr. F. Plummer's models should prove especially interesting.

The Covered-in *Fuselage* Canard-type Model.—This machine was constructed about fourteen months ago. At first it was flown with the *fuselage* open, and very good flights were obtained. No actual record of the flights was kept, unfortunately, but, as far as memory serves one, the average distance flown was about 230 yards, after rising from the ground. Afterwards it was converted into a hydro with "quick-detachable" floats, and again good flights were made. Later on Mr. Plummer decided to encase or cover in the *fuselage* to observe the effects produced by such a course. The floats were therefore removed, and the land chassis fitted on again, as the prospect of a *fuselage* filled with water was not at all enticing.

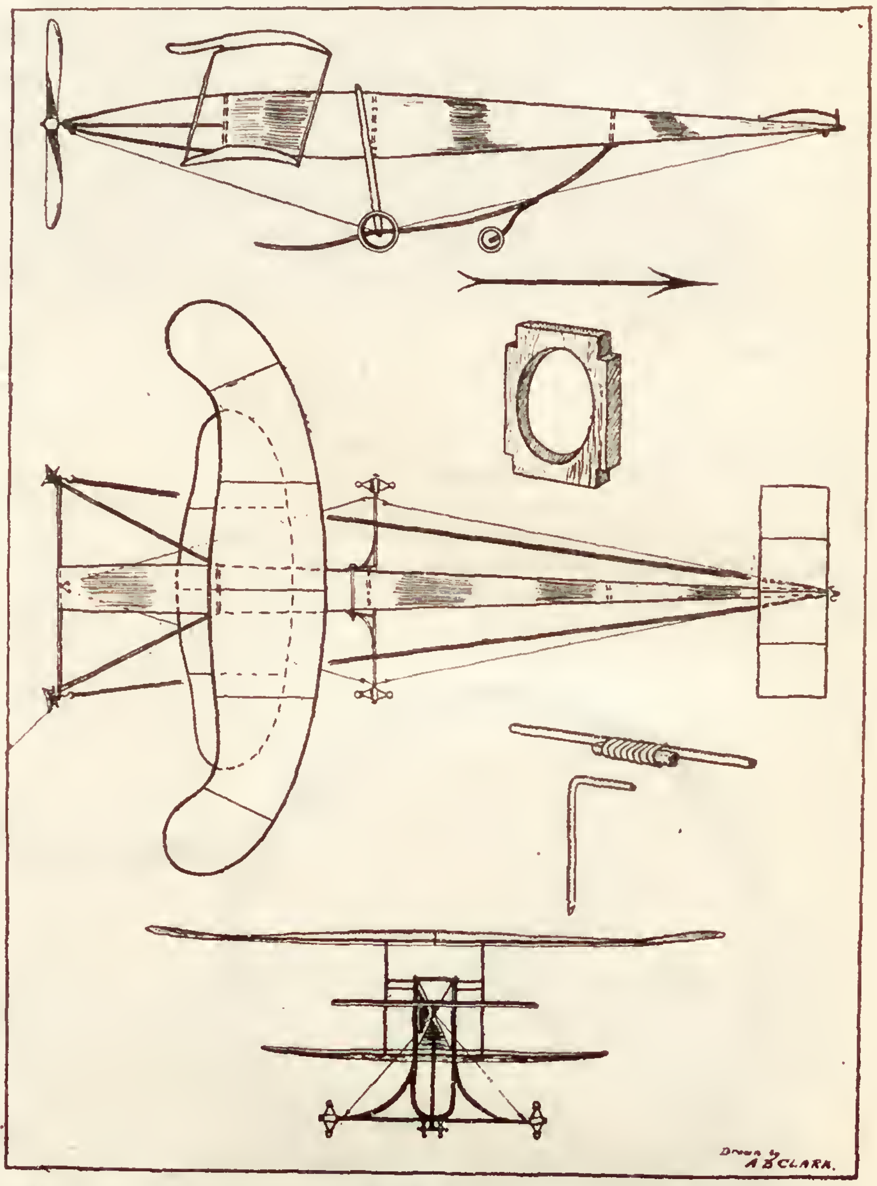
The flights obtained—with the body or *fuselage* covered in—were much better than any made previously, the improvement being at least equivalent to a distance of 40 yards. The stability of the model was far better, both laterally and longitudinally. And, taking it all round, the enclosing of the body may be reckoned a distinct success, so much so that Mr. Plummer has no intention of again removing the model's clothes.

A general idea of the machine may be obtained from the accompanying scale drawings and photos.

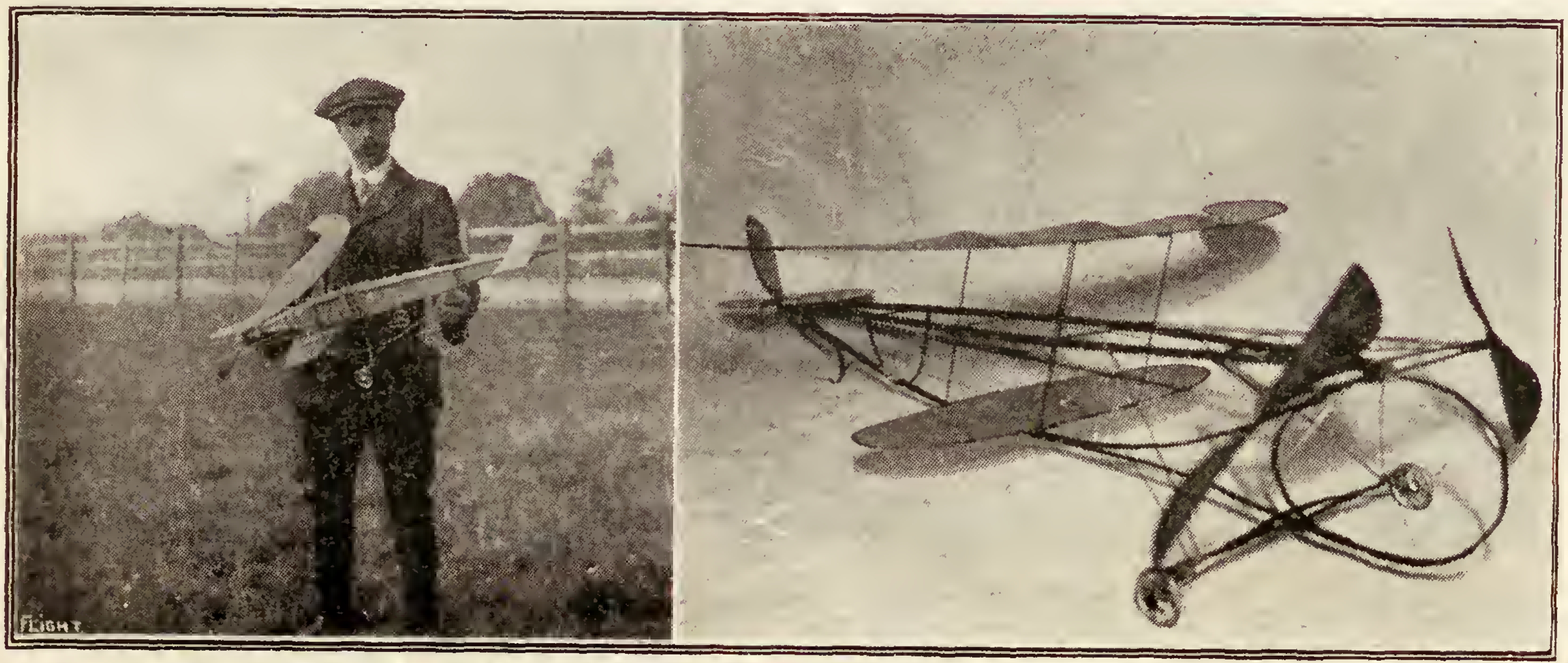
The *fuselage* is 33 ins. in length, and is built up (a feature to be recommended) of four longitudinals of ¼ by ⅛ in. silver spruce, brought to a point at the front, and forming a horizontal knife edge at the rear. These longitudinals are held apart by three "distance blocks" sawn from ⅛-in. thick whitewood or 3 ply-wood, see sketch for shape. The front block measures 1¾ by ⅞ ins. over all, and is 10 ins. from the nose of the model. The middle block is another 10 ins. further back, and the overall dimensions of this are 2⅝ by 1¾ ins. The third or last distance piece is 2¼ by 2 ins., and is situated 6½ ins. from the propeller-bearing outrigger. In each case the dimensions are greatest as viewed from the side. *The four-wheeled chassis* and central skid is easily constructed from split bamboo, and is fairly obvious from the illustrations.

The main planes and elevator are made of 18 s.w.g. piano wire in the usual way. The upper plane has a maximum span of 25 ins., and is 5½ ins. wide at the middle. The lower plane has a maximum span and chord of 15 ins. and 5½ ins. respectively.

These planes are not rigidly connected to each other, but are joined by piano wire inter-plane struts which fit into small pieces



Mr. F. Plummer's (S.E.M.Ae.C.) canard biplane, with covered-in *fuselage*.



Mr. F. Plummer, of the South-Eastern Model Ae.C., with his enclosed body canard biplane. On the right Mr. Plummer's twin tractor biplane. The skid construction should be noted.

of brass "by-pass" tubing which are soldered to the leading and trailing edge of each plane. A detailed sketch is shown. The tips of the upper main plane are swept back 2 ins. and have a slight negative angle of incidence. The *elevator* is rectangular, and measures 9 ins. by 3. By means of a piece of cycle-spoke and two small nuts to fit, the angle is quickly altered.

The twin propellers are 9 ins. in diameter, and have a pitch of 18 ins. They are each driven by 6 strands of $\frac{1}{4}$-in. strip rubber. The probable duration is 35 to 40 secs.

Competitions for Season 1914.

We have received the following communication from Mr. O. Hamilton, Junr. (Hon. Sec., Stony Stratford and District Kite and Model Club). "I should be glad to add my quota to the discussion on the above subject. I feel it is one which will stand a great deal of debate before a proper and satisfactory programme of events could be arranged. It is pleasing to note the development of the more scientific side, but there is a possibility that our more advanced London friends may forget their country cousins somewhat, more especially those who are unable to spend the time they would like upon the subject and are therefore not so forward as the clubs nearer the mother club, the K. and M.A.A. [Such clubs must, of course, organise special competitions to suit their own immediate needs.] The intelligent public fail to understand the principles of the present-day model, since they cannot see its prototype in full-size aspect, as in the case of a model racing yacht, which, if produced in full-sized form from the model, would possibly show the absurdity; in the case of the aero model the essential differences are far more apparent. [They are not only apparent but very real.] Mr. W. E. Evans states that the Canard type model has received its death-blow [in its present form] for scientific work. This is perhaps a somewhat tall order, as I personally think this is still adaptable to the requirements of our more staid model workers. Hence I think it ought to be included in a more fruitful and wider field of research. [By all means on certain lines.] Examining the various proposals brought forward in detail, I think we owe our Paddington friends a large debt for their suggestion for a competition for types *à la* Dunne, because there is at once attaching a new problem for automatic stability and constructional ideas. Now, if I may, I should like to review your suggestions in the issue of April 18th.

(1) This should certainly be the case, except in the case of juniors or beginners with r.o.g. models.

(2) This is excellent, one of our members is experimenting with a motor that would be adaptable to such a type, and up to the present the results are decidedly encouraging. [Adopted as: the length of the *rubber-motor* shall not exceed the span, a quite satisfactory result.]

(3) That three longitudinals [at least] should be used for tractors is very necessary; nothing looks so ugly as the single stick tractor r.o.g.

(4) This suggestion is most progressive, but I think that the 8-oz. twin hydro should be encouraged for early experiment, as this gives much valuable data for such questions as flotational stability and the position of the floats relative to the centre of gravity of the machine, when in flight [none of the suggestions put forward were for *early* experiment, but for standard competitions. Save when experimenting with a new type, hydros under 1 lb. weight are useless].

(5) A most sound and progressive suggestion, and one that all clubs should develop to some degree.

(6) Another good suggestion, *i.e.*, a controllable motor.

(7) This class is, I think, most necessary, as it will assist in possibly helping to find data for a successful full-size machine of this type.

(8) This is very good, but the judging for design, &c., in a large competition would take a lot of time and reduce the number of trials.

(9) This is also a sound suggestion, and would prevent the design of a mere pot-hunting model.

(10) This is certainly necessary, and arrangement could be made.

(11) This is a very good suggestion, but rather premature, I fear, unless some light alloy can be found for the motor parts.

In addition to the above sound suggestions, I venture to bring forward a few of my own:—

1. That in all competitions where possible not less than two flights be made, preferably three, the result to be the average of these. [Three flights, the average to be taken, will be the rule.] This has already been suggested in your columns, but I see no mention of it in any of the latter suggestions, and I feel I must draw attention to it because we have used it with such success in all our competitions but one, and find it gives a truer indication of a machine's possibilities and efficiency.

2. That some clause or rule in the programme of the events demands a respectable chassis to be fitted to all r.o.g. models and hydros. This is very necessary, as most chassis are conspicuous only by their absence. Speaking personally, I have not done much with r.o.g. models owing to lack of time to study the chassis question; two straight wires and a pair of wheels does not seem to me to be sufficient.

3. That a competition be introduced for steering and stability of various model types.

4. That a surface rating be used having a higher unit ratio than the one used at Olympia [4 oz. per sq. foot for monoplanes and 3 oz. for biplanes]. That a qualifying test should be a combination of both distance and duration, so regulated that the qualifying machines are of an all-round nature; this would be accomplished by suggestion No. 1.

5. That the stability of the model be noted whilst gliding to earth, motor run out. This would be a more effective guide to the relative stability of different plane sections."

[Practically speaking, all the principal points raised by our correspondent will be found to have been effectively dealt with by the Advisory Council of the K. and M.A.A. when their programme for this season's competitions is published.]

Proposed Junior Model Aero Club for Hove.

Mr. J. J. Allen (11, Brooke Street, Hove) will be glad to hear from anyone interested in the above.

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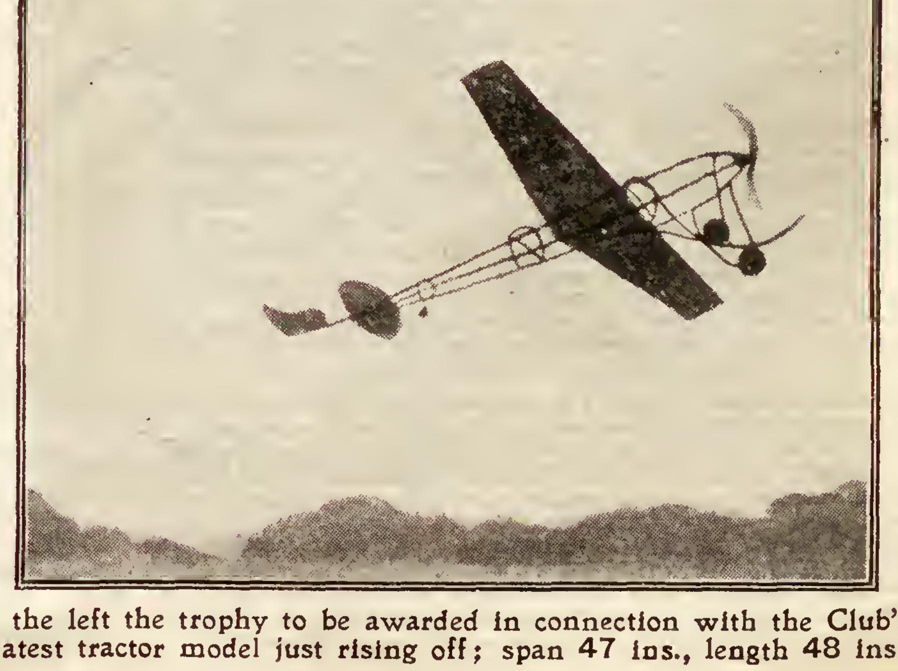
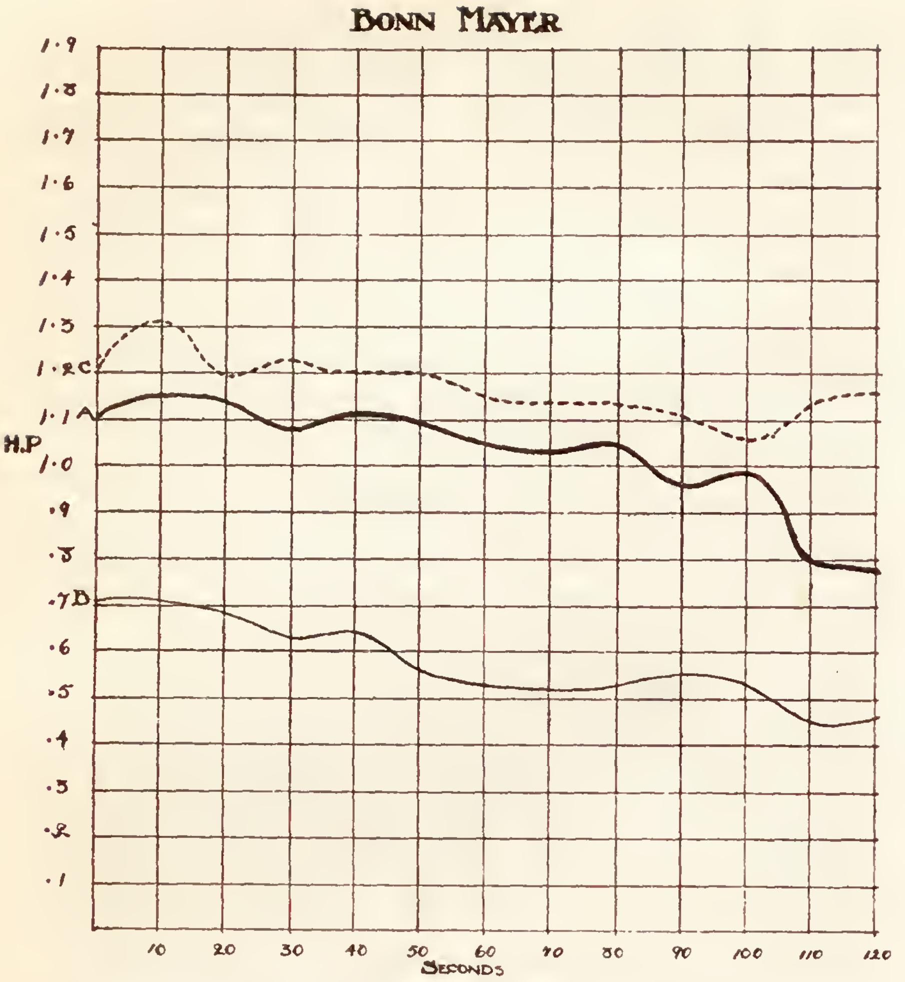
KITE AND MODEL AEROPLANE ASSOCIATION

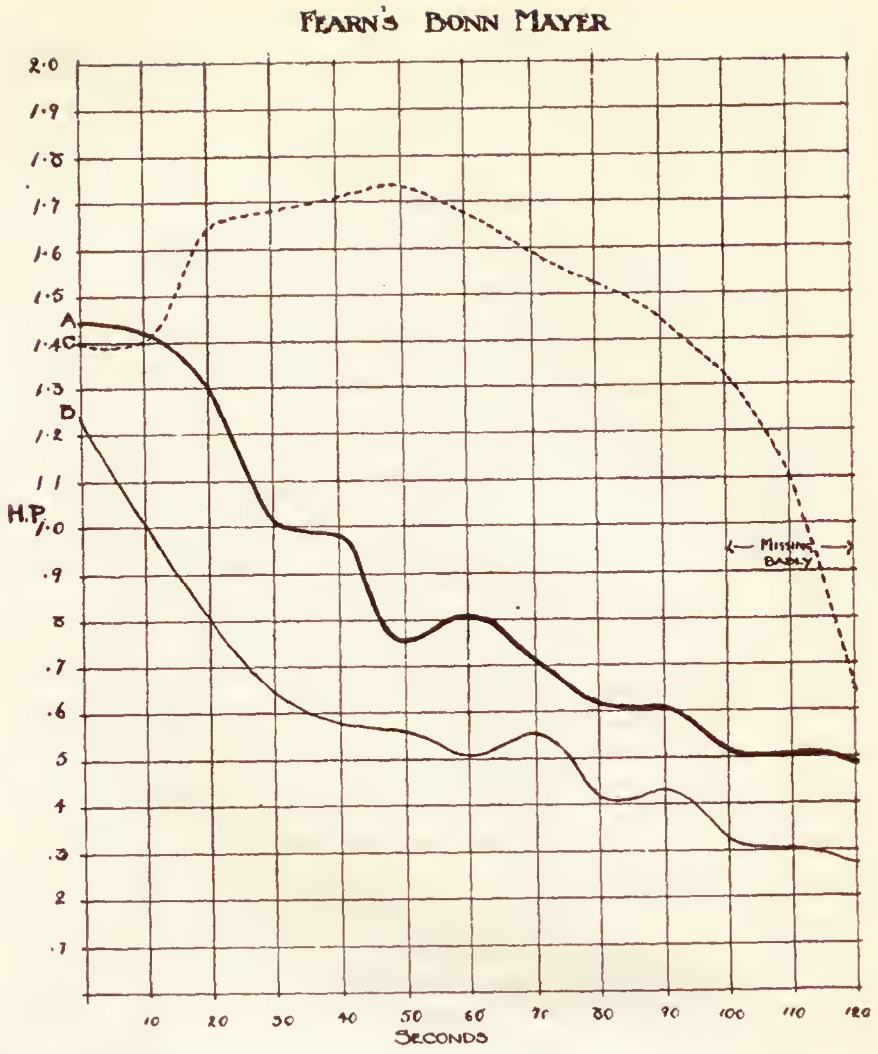
Official Notices.

International Aero Exhibition. Official Results of Engine Brake Tests.—The last of the competitions held in connection with the above Exhibition, for prizes offered by the Royal Aero Club, took place at the East London College, Mile End Road, on April 28th. The judges in this class were Professor J. T. Morris, M.I.E.E., Head of the Electrical Engineering Department, and



LIVERPOOL AERO RESEARCH CLUB.—On the left the trophy to be awarded in connection with the Club's Exhibition. On the right Mr. G. H. Kilshaw's latest tractor model just rising off; span 47 ins., length 48 ins.





Dr. A. P. Thurston, D.Sc., A.F.Aë.S., Chairman of the Research Committee K. and M.A.A., and Head of the Aeronautical Laboratory of the College. These gentlemen conducted the tests, the annexed charts showing the results of the trials, which were made with a Horne's tachometer with a 1,000 to 4,000 range. The weights of the engines, with fuel, &c., for a 2-minute run were as follows: Mr. Mayer's Bonn Mayer—Weight of engine and carburettor, 4 lbs. 6⅛ ozs.; battery (accumulator), 10 ozs.; tank and petrol for run, 1¾ ozs.; coil, 10¼ ozs.; total, 5 lbs. 12⅛ ozs. Mr. Fearn's Bonn Mayer—Weight of engine, 6 lbs. 15 ozs.; carburettor, pipes, &c., 15 ozs.; battery, 15 ozs.; coil, 10¼ ozs.; total, 9 lbs. 7¼ ozs. Mr. Mayer's engine gave the best results, and he, therefore, wins the £5 prize. The following are the results of weight per horse-power: Mr. Mayer's, 5·02 lbs. per H.P.; Mr. Fearn's, 7·29 lbs. per H.P. Mr. Pratt entered a steam-driven motor, viz., a 6-cyl. coil flash boiler, pump fed, 16 in. diam. special air brake, but this was withdrawn after two attempts on account of pump leaking.

Aeronautical Exhibition in Germany.—A Model Section is being organized in connection with the Aero Exhibition and the Prince Henry Flight at Frankfort from May 17th to 21st, and the organizers hope that, in spite of the short notice, some English aeromodellists will send out models for our German friends to see. Exhibitors will have to pay the carriage out, and the organizers will pay carriage on return journey. All models must be sent addressed: Model Exhibit, Ing Oskar Ursinus, "Flugsport," Frankfurt-am-Main, and must be dispatched by the 14th.

Programme for Season.—The various committees have now drawn up the rules, and it is hoped that members and friends will endeavour to obtain advertisements for same, so as to reduce the cost of printing the edition. The charges are: Whole page £2, half page 25*s.*, quarter page 15*s.*, 1 in. by 5 in. 10*s.*

Gift of Trophy.—The British Petroleum Co. have presented the Association with a Trophy for the International Meeting; it will be known as the "Shell Trophy." The Council desire to thank the donors for their gift, and hope that others interested in the development of aviation will come forward and subscribe to the International Fund.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, Leyspring Road).

May 10th, flying Wanstead Flats, 6.30 a.m. At 10.30 a.m., twin-screw duration competition. May 17th, tractor duration competition.

Paddington and Districts (77, Swinderby Road, Wembley).

May 9th, flying at Sudbury. Competition for silver and bronze medals.

Sheffield Ae.C. (41, Coniston Road, Abbeydale, Sheffield).

May 12th, 8 p.m., general meeting at Broomhead's, Leopold Street. May 16th, "tractor biplanes" contest for M. D. Manton's silver medal. May 30th, "hydro-aeroplanes" contest for the President's challenge cup. Time and place for above contests will be announced at general meeting.

UNAFFILIATED CLUBS.

Finsbury Park and District (32, Ashley Rd., Crouch Hill, N.)

May 9th, r.f.g. tractor duration contest Finsbury Park kite ground, 4 p.m.; practice flying at 3 p.m. May 16th, practice flying Finsbury Park, 3–6 p.m.

Ilford Model Ae.C. (83, Endsleigh Gardens, Ilford).

May 10th, first competition meeting at 9.15 sharp at aerodrome, Hog Hill, Hainault Forest, Chigwell Row, near "Green's." Competitors who are not present at the judge's flag at 9.15 punctually will be disqualified. Most importance will be given to "tractor events."

S. Eastern Model Ae.C. (1, Railway Approach, Brockley).

Usual flying meetings this week-end at the club's various grounds. Members are particularly requested to make a start on models intended for the next "trophy" competition, instead of leaving them until the last moment.

"Tel" Indicator on Schneider Cup Winner.

The Sopwith seaplane on which Pixton won the Schneider Cup was fitted with a "Tel" revolution indicator, and, in writing to the Haslar Telegraph Works, the Sopwith Co. state that during the race it acted up to its splendid reputation.

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PUBLICATION RECEIVED.

Simplicity and Success in Photography. Burroughs Wellcome and Co., Snow Hill Buildings, London, E.C.

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Aeronautical Patents Published.

Applied for in 1913.

Published April 23rd, 1914.

7,478. J. Wulffing. Airships.
24,033. Soc. Anon. des Aeroplanes Robert Savary. Wheels.

Published April 30th, 1914.

8,594. C. H. M. A. Alderson. Hydro-aeroplanes.
9,851. W. W. Nobbs and A. J. Thomas. Framework of aircraft.
13,367. J. Hill. Vessels for navigation in air or on water.

Published May 7th, 1914.

6,483. A. Toussant and G. Lepère. Aeroplanes.
9,181. E. P. F. A. Coursin. Sighting apparatus for aeroplanes.
9,355. Neufeldt and Kuhnke and Ges. für Nautische Instrumente. Hydro-aeroplanes.
9,472. W. H. Nosworthy and S. J. Prescott. Aerial machines.

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A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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CONTENTS.

Editorial Comment: PAGE
- A Remarkable German Army Test ... 505
- Nailed to the Counter ... 506
- A Sand-Yachting Query... ... 506

Men of Moment in the World of Flight: Mr. J. L. Hall ... 507
Flying at Hendon ... 508
The Watson Rocking-Wing Aeroplane ... 510
Mr. Sydney Pickles and his Accident ... 513
Royal Aero Club Official Notices ... 514
From the British Flying Grounds ... 516
Honouring Mr. T. O. M. Sopwith and Mr. Howard Pixton ... 517
Daily Mail £5,000 Prize. Full Regulations ... 518
Eddies. By "Æolus" ... 519
The Measurement of Air Speed. By A. P. Thurston, D.Sc.... 521
The Flying Machine from an Engineering Standpoint. By F. W. Lanchester 523
Foreign Aircraft News ... 527
Correspondence... ... 528
Models. Edited by V. E. Johnson, M.A. ... 529

EDITORIAL COMMENT.

A Remarkable German Army Test.

One of the most remarkable tests of efficiency which has ever been carried out since aircraft became an essential part of the equipment of modern armies, has recently been concluded in Germany. In obedience to sudden orders issued by the General Inspector for Aeronautics, twenty-four aeroplanes, each piloted by an officer and carrying an observer, started simultaneously from different centres in flights of three each. The centres were situated approximately 300 miles from Doberitz, which was the common objective. The starting points were Cologne, Posen, Königsberg, Halberstadt, Metz, Strasburg, Darmstadt, and Graudenz (East Prussia), and the orders were that each squadron should follow a prescribed route. The weather during the flight was wet and stormy, but the whole of the squadrons reached Doberitz intact and without accident, the Cologne detachment, which has to travel about 312 miles, accomplishing its prescribed flight in the wonderful time of three hours—an average of 104 miles an hour. After remaining at Doberitz for two days, the squadrons were ordered to fly to Hanover, 240 kiloms. away, which was done—again without accident—in about three hours' average time.

According to the reports which have reached this country, the orders to set out on this really wonderful flight were totally unexpected, and were intended to test the war efficiency of the air corps. There was no time for preparation—the men and machines were taken absolutely by surprise—which makes a wonderful performance all the more wonderful. Its success is about the finest tribute possible to the state of preparedness for war of the German air corps. To us it is of the greatest interest, though we must say that the fact of its accomplishment "gives us to think furiously." We have not the slightest doubt that our own Royal Flying Corps, both Military and Naval Wings, could do exactly the same if ordered. We have the greatest confidence in the preparedness of the army and navy airmen to go forth and do those things for which they exist.

At the same time there is a grave lesson to be taken to heart in connection with this German mobilisation by air. That is that we must by no manner of means underrate the efficiency or the state of readiness for war of a possible enemy. We are becoming accustomed to hear that all is not well with the French service, that Germany is obsessed by the dirigible, and that British machines and British airmen have overtaken and passed the rest of the flying world. There may be much of truth in all these statements which purport to record the facts, but the incident we are discussing should certainly be taken very much to heart by those responsible for our aerial policy, and equally by the nation at large. The last thing in the world that we must do is to fall into a state of smug complacency with regard to our own service. Not that, so long as the direction of affairs is in its present hands, there is much fear of that happening, but then these things have happened in the past, and to be forewarned is to be forearmed. It is impossible to forget in this connection the events which led up to the passing of the Naval Defence Act in the late eighties of last century, when Lord George Hamilton was First Lord of the Admiralty. A long period of peace, combined with the complacent feeling that we were invincible at sea, had led to the neglect of the Navy, until we had fallen into a position of almost hopeless inferiority in relation to the "Two Power" standard. Suddenly the nation awoke to a sense of the peril—and it cost many millions of money and a time of intense anxiety to regain our position at sea. That is the sort of thing we have to guard against now, and if we are wise we shall go quietly on our way, keeping a watchful eye upon things lest the same should befall.

* * *

Nailed to the Counter. In face of the many statements that have been made from time to time that Government officials, and particularly those of the Royal Aircraft Factory, have persistently stood in the way of the development of private enterprise, the speech of Mr. Sopwith, at the luncheon given in his honour on Tuesday last, was exceedingly interesting. In effect, he gave much of the credit for his victory in the race for the Schneider Cup to the help received from the authorities. In fact, he went so far as to say that his success was in no small measure due to the fact that his firm had had to build machines to the specifications of the Army aviation authorities, of whom he specifically named General Henderson.

We ourselves have at times felt it incumbent upon us to criticise in no measured terms the policy of the Government in aerial matters, and in particular the want of active interest and direct encouragement of enterprise which at one time characterised that policy. But we have never given credence to the many outrageous reports which have been brought against those responsible for the direction of policy. Our readers will recollect that some little while ago we offered to open our columns to any definite charges, accompanied by chapter and verse, of the kind of thing so freely alleged against the officials of the Air Department generally. It may be also within their recollection that no single concrete reply was made to our invitation—the whole thing ended as it had begun, in an atmosphere of allegation and innuendo, unsupported by a single proved fact. Nor, so far as we have been able to discern, has anyone else been more fortunate (?) in securing evidence of the practices laid to the charge of the authorities. We hold no brief for anyone, but there is an old English proverb which has it that fair play is a jewel, and it is that fair play that we are anxious to see given to everyone all round. Although we were pretty well satisfied that there was nothing much in the charges—the failure of those who brought those charges to respond to our invitation was concrete proof enough of that—we are more than glad that Mr. Sopwith has made such a statement as that to which we listened on Tuesday. It shows that so far from the Air Department endeavouring to stand in the way of the private manufacturer, where that manufacturer is seriously in the business, and has ideas that are worth anything, the officials of that department are only too willing to assist in their development. Which is all as it should be.

* * *

A Sand-Yachting Query. In our correspondence we publish a letter from a valued correspondent, asking for information as to suitable stretches of sand round the coast for the purpose of sand-yachting. It may be that this is a sport which has a somewhat remote relation to flying, but nevertheless we are much disposed to its encouragement, for the reason that it is at least by way of a cousinly relative, inasmuch as we can well understand that the individual having once tasted the joys of flying without leaving the ground, so to say, will be ambitious to go farther and take to the air. Out of this may easily come something that will materially help towards the development of aviation, and to that end we invite our readers to reply through our columns to the enquiry addressed to them.

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ROYAL FLYING CORPS.

THE following were announced by the Admiralty on the 6th inst. :—

Lieuts. J. T. Cull and B. D. Ash, to the "Pembroke" additional, as Flying Officers, for the Isle of Grain Naval Air Station, for advanced course of instruction, to date April 29th. E. T. R. Chambers, H. A. Williamson, R. J. Bone, and E. R. C. Nanson, to the "Pembroke," additional, as Flying Officers, for Calshot, Isle of Grain, Yarmouth, and Felixstowe Naval Air Station respectively, all to date May 5th.

Capt. C. F. Kilner, R.M.L.I., to the "Pembroke," additional, as Flying Officer, for Dundee Naval Air Station, to date May 5th.

Lieut. C. E. Robinson, R.M.L.I., to the "Pembroke," additional, as Flying Officer, for the Isle of Grain Naval Air Station, for advanced course of instruction, to date April 29th.

Royal Naval Reserve.—Lieut. H. E. M. Watkins, to the "Pembroke," additional, as Flying Officer, for the Isle of Grain Naval Air Station, for advanced course of instruction. To date April 29th.

Sub-Lieut. I. H. W. S. Dalrymple-Clark, to the "Pembroke," additional, as Flying Officer, for Eastchurch Naval Flying School. To date May 5th.

Probationary Sub-Lieuts. C. Draper, H. A. Busk, and E. T. Newton-Clare, confirmed in the rank of Sub-Lieut. R.N.R., and appointed to the "Pembroke," additional, as Flying Officers, for the Isle of Grain Naval Air Station, for advanced course of instruction. All to date April 29th.

The following were announced by the Admiralty on the 8th inst. :—

Staff Surgeon N. J. Roche, to the "Pembroke," additional, for Calshot Naval Air Station, temporary, to date May 7th.

R.F.C.—Lord Edward Grosvenor, to the "Pembroke," additional, for Calshot Naval Air Station, as Flying Officer, to date May 6th.

The following appointments were announced in the *London Gazette* of the 12th inst. :—

R.F.C.—Central Flying School.—Capt. Andrew G. Board, South Wales Borderers, a Flight Commander, Military Wing, to be an Instructor, vice Capt. J. M. Salmond, King's Own (Royal Lancaster Regiment). Dated May 1st, 1914.

R.F.C.—Military Wing.—Capt. John M. Salmond, King's Own (Royal Lancaster Regiment), a Squadron Commander, is granted the temporary rank of Major. Dated May 1st, 1914.

Capt. Charles A. H. Longcroft, Welsh Regiment, a Flight Commander, is advanced to Squadron Commander, and is granted the temporary rank of Major whilst so employed. Dated May 1st, 1914.

The undermentioned Flying Officers are advanced to Flight Commanders. Dated May 1st, 1914:—*Lieut. George B. Stopford, Royal Artillery; *Lieut. George I. Carmichael, Royal Artillery; *Lieut. Edward G. Harvey, Duke of Edinburgh's (Wiltshire Regiment); *Lieut. Arthur H. L. Soames, 3rd (King's Own) Hussars; *Lieut. Felton V. Holt, Oxfordshire and Buckinghamshire Light Infantry; Capt. Wilfrid Picton-Warlow, Welsh Regiment; Capt. George E. Todd, Welsh Regiment; and Capt. Ulick J. D. Bourke, Oxfordshire and Buckinghamshire Light Infantry.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending May 9th, 1914 :—

No. 2 Squadron. Montrose.—The Officer and N.C.O. pilots of this squadron were out daily throughout the week, practising reconnaissance. The preparations for the move southwards are nearly complete.

No. 3 Squadron. Netheravon.—Observation of artillery fire was carried out on several days.

No. 4 Squadron. Netheravon.—Besides practising reconnaissance work half of "B" flight took part in a Southern Command exercise during the week. The new power in the workshops is proving satisfactory.

No. 5 Squadron. Farnborough.—The pilots of this squadron carried out observation flights over the district round Aldershot.

No. 6 Squadron. Farnborough.—The machines of "A" and "B" flights were out from day to day.

Aircraft Park. Farnborough.—The workshops have been kept fully employed with repair work on aircraft and M.T. and with the receipt and issue of technical stores of all kinds.

Headquarter Flight. Farnborough.—The flight was engaged in kiting, photography and experimental work throughout the week.

Nos. 1 and 7 Squadrons. Farnborough.—These two new squadrons are in process of formation. Personnel, machines and M.T. will be gradually drafted to them.

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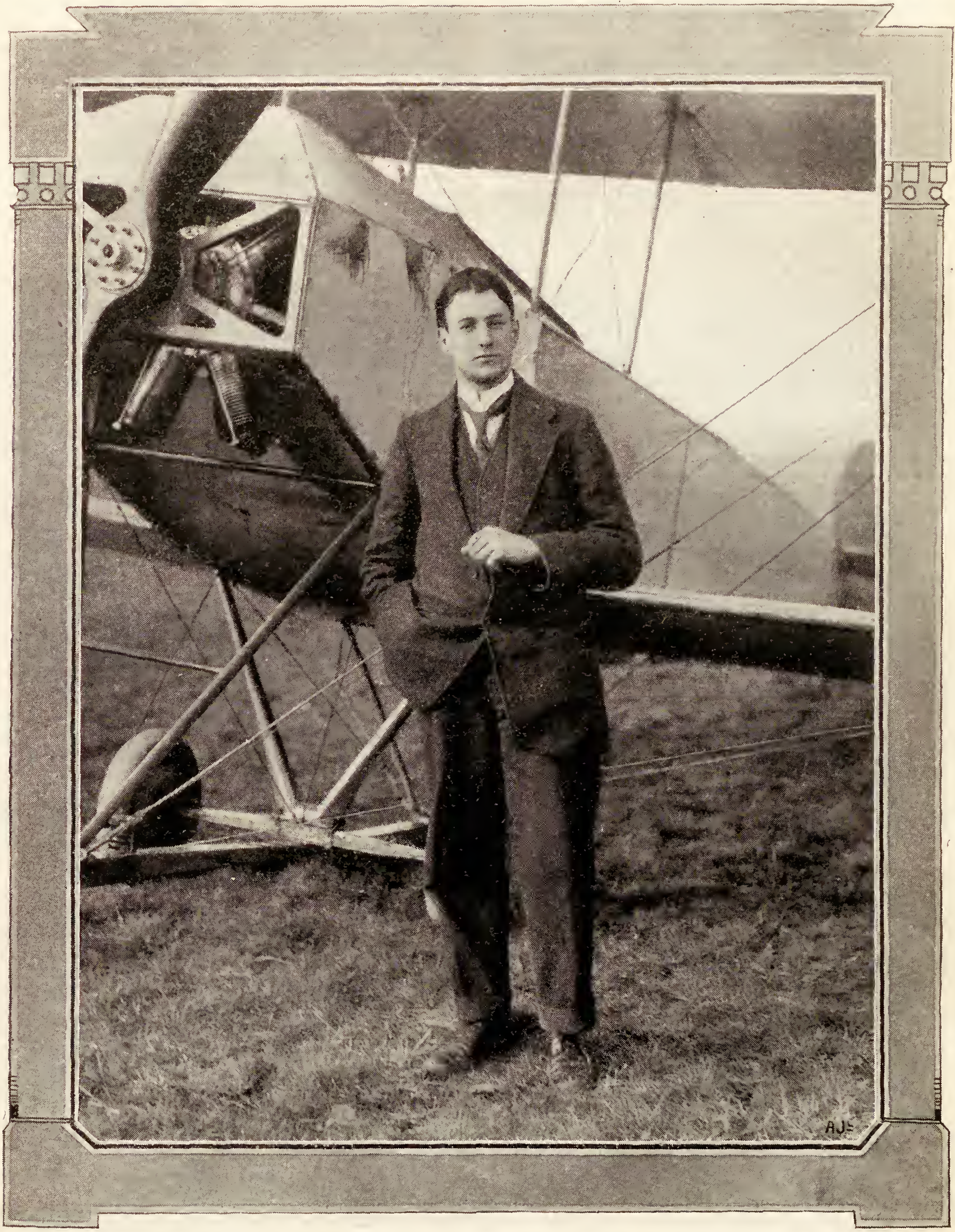
* Is granted the temporary rank of Captain whilst so employed.

MEN OF MOMENT IN THE WORLD OF FLIGHT

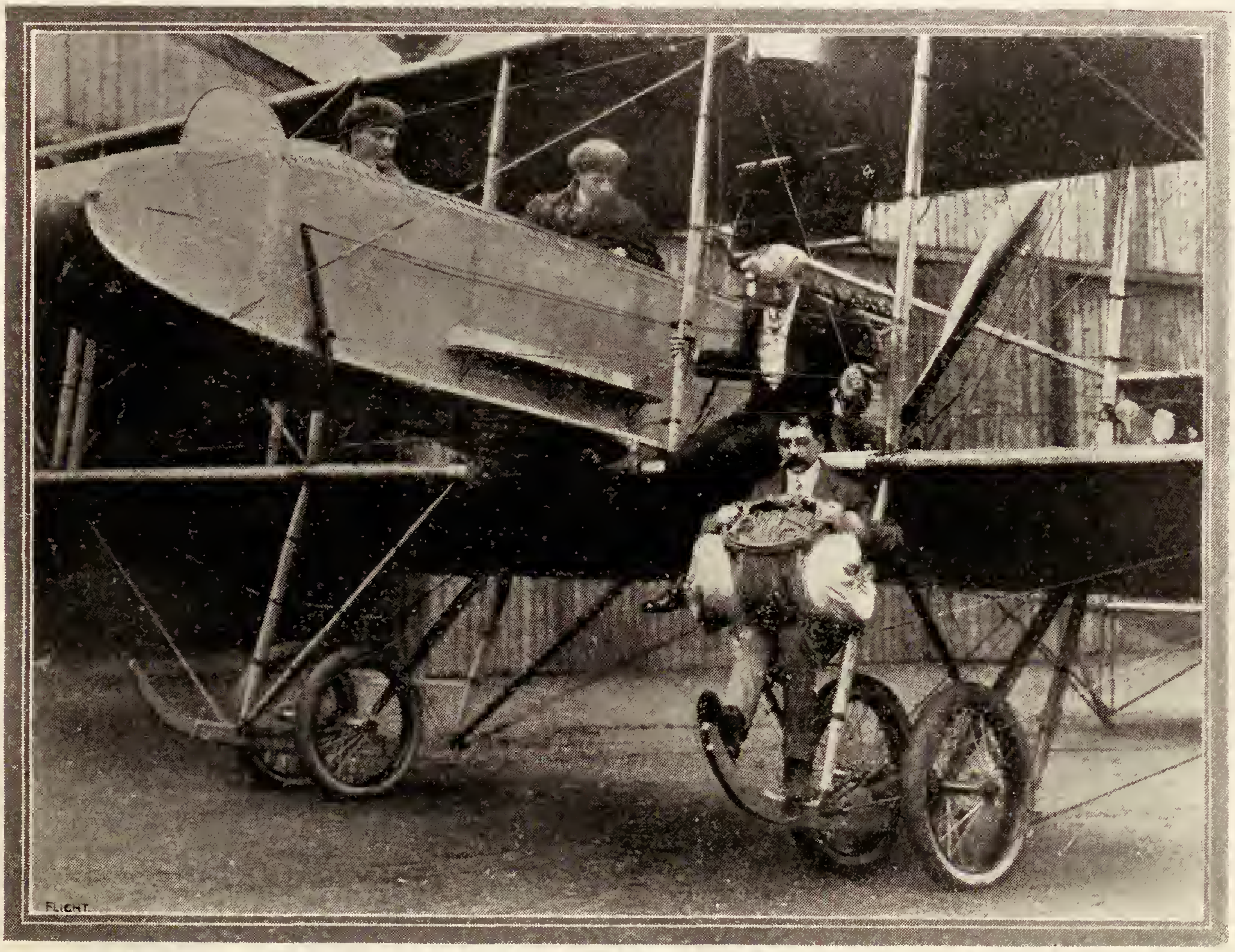


MR. J. LAURENCE HALL, who has a school at Hendon, where he does a good deal of flying on Caudron biplanes and Blériot monoplanes. He learned on a Blériot in 1912, and he has also flown the 80 h.p. Clement-Bayard monoplane.

FLYING AT HENDON.

ALTHOUGH the weather on Thursday afternoon of last week was so bad, two out of the small but enthusiastic attendance of visitors applied for passenger flights, and they were not disappointed, for L. A. Strange gave them each a flight on the 80 h.p. Blériot. One of these passengers, it should be mentioned, was a lady, who thoroughly enjoyed her experience in spite of the unfavourable conditions. No other flights were made that afternoon.

Saturday turned out very dull, with a 30–35 m.p.h. wind blowing, so that the 16-mile cross-country handicap had to be abandoned. At about 3.30 p.m. L. A. Strange ascended with a passenger on the 80 h.p. Blériot, and put up a 15-min. flight in a slight drizzling rain. Shortly after W. Birchenough went up on the 50 h.p. G.-W. bi-rudder 'bus, R. J. Lillywhite making a flight on the same machine a little later on. Strange then made two more passenger flights on the Blériot, whilst Mr. Crawshay started off on a cross country flight with Miss Trehawke Davies on the latter's 70 h.p. Blériot, returning to the aerodrome some 45 mins. later. Pierre Verrier made the next ascent on one of the old-type Maurice Farmans. After climbing until he reached an altitude of about 3,000 ft., where he was at times lost to view behind the clouds, he descended with a beautiful glide with the engine stopped and the propeller stationary. A little after 5 o'clock Marcel Desoutter brought out Lord Edward Grosvenor's 50 h.p. Blériot and made a very good flight of about 8 mins. duration. He started off quite in his old style, climbing very sharply, and made an excellent landing, showing that he has not forgotten the old days. It is indeed gratifying to see this plucky young pilot in the air again, but still we sincerely hope that if he intends to continue flying he will do so with the utmost caution. Lillywhite made one more flight on the bi-rudder' bus, and Strange made two passenger flights on the Blériot before Louis Noel brought out the new Grahame-White 100 h.p. Military biplane which was exhibited at the last Olympia Show. Noel first made two straight flights, and then put up a circuit of the aerodrome. The machine was very fast—well in the neighbourhood of 70 m.p.h.—but seemed to be rather unsteady longitudinally, although very steady laterally. There also appeared to be a tendency for the machine to turn to the right. It would seem, therefore, that our remarks on this machine in the Show report, viz., that the tail should be further back, are borne out in practice. On landing, Noel reported that he had a difficulty in turning with the rudder, the latter being rather small, and that although he had the control-lever almost right back he found it very hard to keep the machine climbing. This suggests that the machine is slightly nose-heavy, and would be even more so if a passenger were carried. It is, of course, very difficult to form an opinion on a new machine during such a short flight, especially as the engine was not running its best; and we must admit that, considering that the machine was on its first practical tests, and that a new machine always requires adjustments, we were otherwise favourably impressed. We must, too, congratulate Louis Noel on his pluck in trying out a new machine under unfavourable weather conditions. After this all the machines were returned to the hangars; but later in the evening an interesting experiment was made. This was a parachute descent from the five-seater biplane. Mr. W. Newell, an experienced aeronaut-parachutist, who was to make the descent, and F. W. Goodden—who has also made numerous parachute descents—after considering various places from where the leap could be made with safety, finally decided that a temporary seat should be made above the left-hand skid of the chassis, so that the parachutist could sit there with his feet on the latter ready to jump off. A rope seat was, therefore, made between the front and diagonal skid struts and all was ready. Newell took his "seat" with his parachute, folded and tied with a breaking-cord, on his lap, and with Carr in the pilot's seat and Goodden and Lillywhite as passengers the aerobus started off at 7.45 p.m. After climbing for 18 minutes, an altitude of 2,000 feet was reached, and then Newell made his leap into space. The parachute opened almost immediately and floated gracefully to earth, Newell swinging about tremendously at first. One of



The parachute descent of Mr. W. Newell at Hendon on Saturday last, when he descended from a height of 2,000 ft. by means of this parachute from a Grahame-White biplane piloted by Mr. Reginald Carr, the descent from the time of his leaving the aeroplane occupying 2 mins. 22 secs. Mr. Newell is seen on the skid exactly as he ascended for the feat, immediately above him being Mr. F. W. Goodden, who assisted him to jump from the aeroplane, whilst in the pilot's seat is Mr. Carr, with Mr. J. Lillywhite in the centre.

the spectators was George Reynolds, the official timekeeper, who of course could not refrain from consulting his chronometer for timing the descent, which was given as 2 mins. 22 secs. Newell made a successful landing close to No. 1 pylon, and a small crowd was close at hand to give him the welcome he deserved, which consisted of many hand-shakes and "three cheers." A minute or so after he touched the ground the aerobus landed. Considerable amusement was caused by Gooden announcing that he climbed out of the *nacelle* and got close to Newell, and, when the time came, assisted him off with his foot! Newell, however, was so cold, that he did not notice this, in fact he said he was unable to feel if he was standing on the skid or not. The parachute used was a standard type 26 ft. in diameter, 30 ft. long and 40 lbs. in weight. It may be remarked that this is the first time that a parachute descent has been made from an aeroplane in this country, and we understand that a special seat is to be fitted to the aerobus for similar demonstrations.

Dull weather again "favoured" the aerodrome on Sunday afternoon, but there was nevertheless a capital attendance of visitors. Several flights were made by the following pilots:—L. A. Strange, passengers on the 80 h.p. Blériot; R. H. Carr, R. T. Gates, and R. J. Lillywhite on G.-W. 'buses. Carr also flew the Blériot.

Naval and Military Aeroplane Engine Competition.

On visiting the engine-testing house at Farnborough on Saturday last, it was found that the 130 h.p. Wolseley, the 95 h.p. Dudbridge Ironworks Salmson and the 135 h.p. Sunbeam had been removed from the test beds; and it was anticipated that they would be succeeded by the 120 h.p. Beardmore Austro-Daimler, the 130 h.p. Wessex and, probably, the 90 h.p. semi-aircooled Wolseley engine.

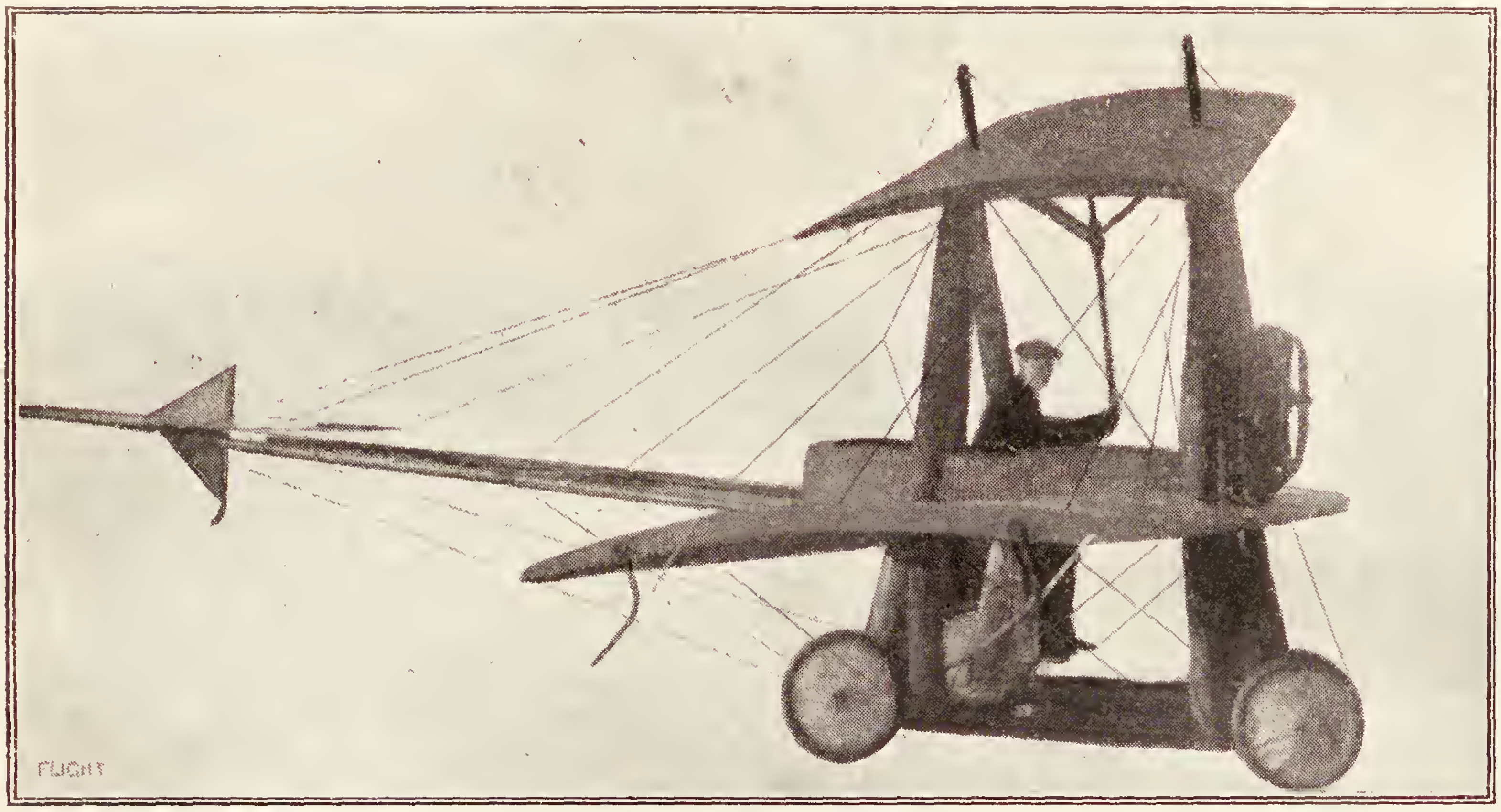
By reason of the fact that the members of the Management Committee are not permitted to give any information respecting the performances of the various engines, it is not possible to obtain any official account of what has already taken place in connection with the competition; while the makers, with whom we have been in communication, whose engines have occupied, or are now occupying, the test benches, are not disposed, at the moment, to discuss what has occurred. It would appear, however, that various mishaps of a very serious nature have happened during the tests of several engines, due, we believe, to trouble with the cardan shaft between the engine and the transmission shaft. But in view of dearth of information of a definite character and our unwillingness to prejudge the matter in the absence of adequate data, we will defer comment.

Loading up the five-seater Grahame-White biplane at Hendon Aerodrome, as seen from the pavilion.

THE WATSON ROCKING-WING AEROPLANE.

IN connection with the competition organised by "L'Union pour La Sécurité en Aéroplanes," Mr. P. A. Watson, of Dundee, who has been experimenting with rocking-wing aeroplanes for a number of years, is at present demonstrating his latest type machine (No. 3) at Buc. We have asked Mr. Watson for a description of his machine, and he has sent us a copy of the explanation which, in accordance with the rules of the competition, he has given l'Union. The following extract from Mr. Watson's explanation of the principles of his machine will, we think, make it clear in what respect his aeroplane and the manner in which it is controlled differ from ordinary types.

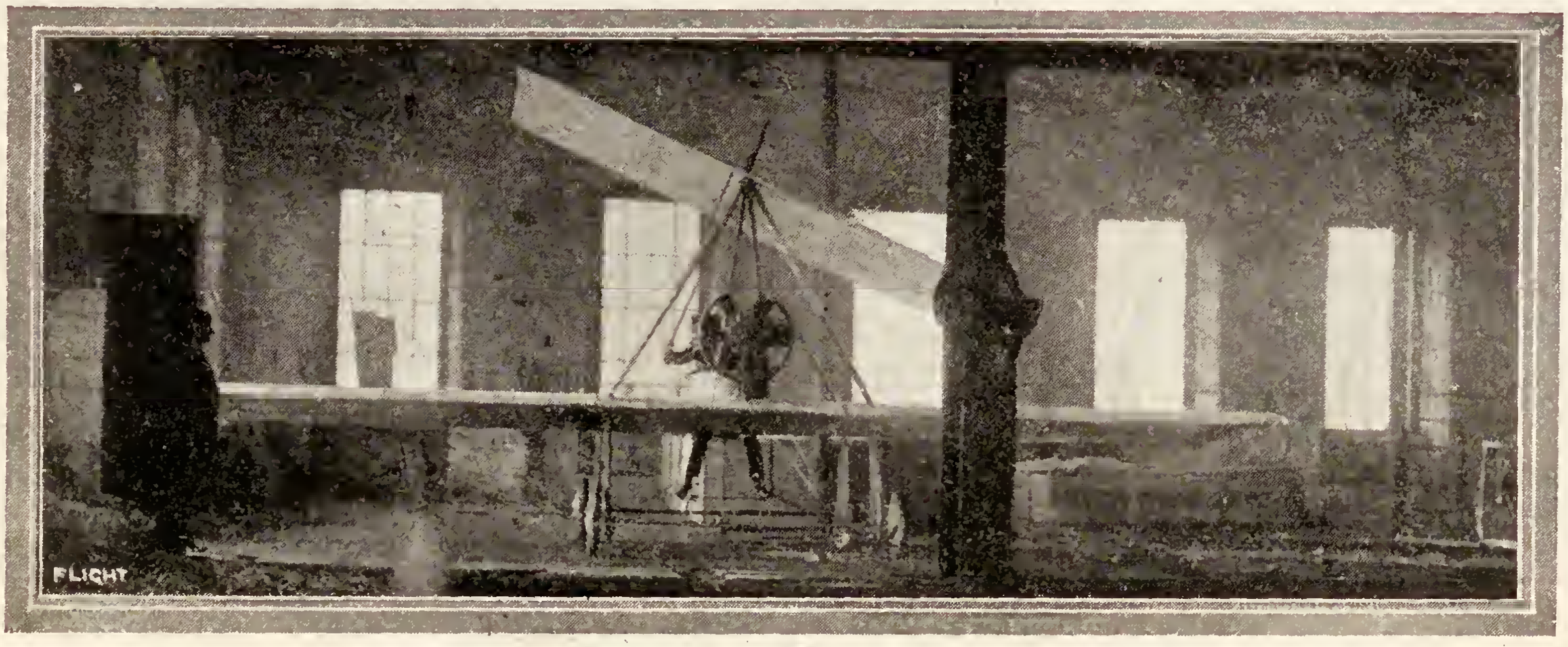
The machine (No. 3), as will be seen from the accompanying photographs, is of the tractor type, and is driven by a 40 h.p. Anzani engine, mounted in front of the wicker-work *nacelle*. The chassis, which is of the four-wheeled type, is very robust and provides a comparatively wide track. An outrigger formed by two tail booms carries at the rear a monoplane elevator and a small fixed vertical fin. It will be observed that no movable vertical rudder is fitted. Mounted on a very strong *cabane* formed by two pairs of inverted V struts, is the balancing plane, by means of which lateral equilibrium is maintained, and the action of which is explained by Mr. Watson in the following extract:—



Side view of Watson No. 3.

"The method of preserving lateral equilibrium invented by the Wright brothers has been slavishly followed, but this has probably been due to the fact that these gentlemen were the first to fly in a practical way. This does not prove, however, that they have not misled everybody as to the best means of preserving lateral equilibrium. It must be remembered that they began their experiments at Kittyhawk with the fixed intention of preserving lateral equilibrium by warping the wings, and when this means alone was found insufficient they never considered the possibility of using other means than warping, but looked for an addition to their warping wing machine and devised the vertically pivoted tail.

"The Wright Brothers have stated, and it is well known, that if the angle of incidence of the lower wing is increased, its resistance is also increased, so that the fore and aft axis of the machine turns about its vertical axis, away from the line of flight, and the lower



Front view of Watson No. 3.

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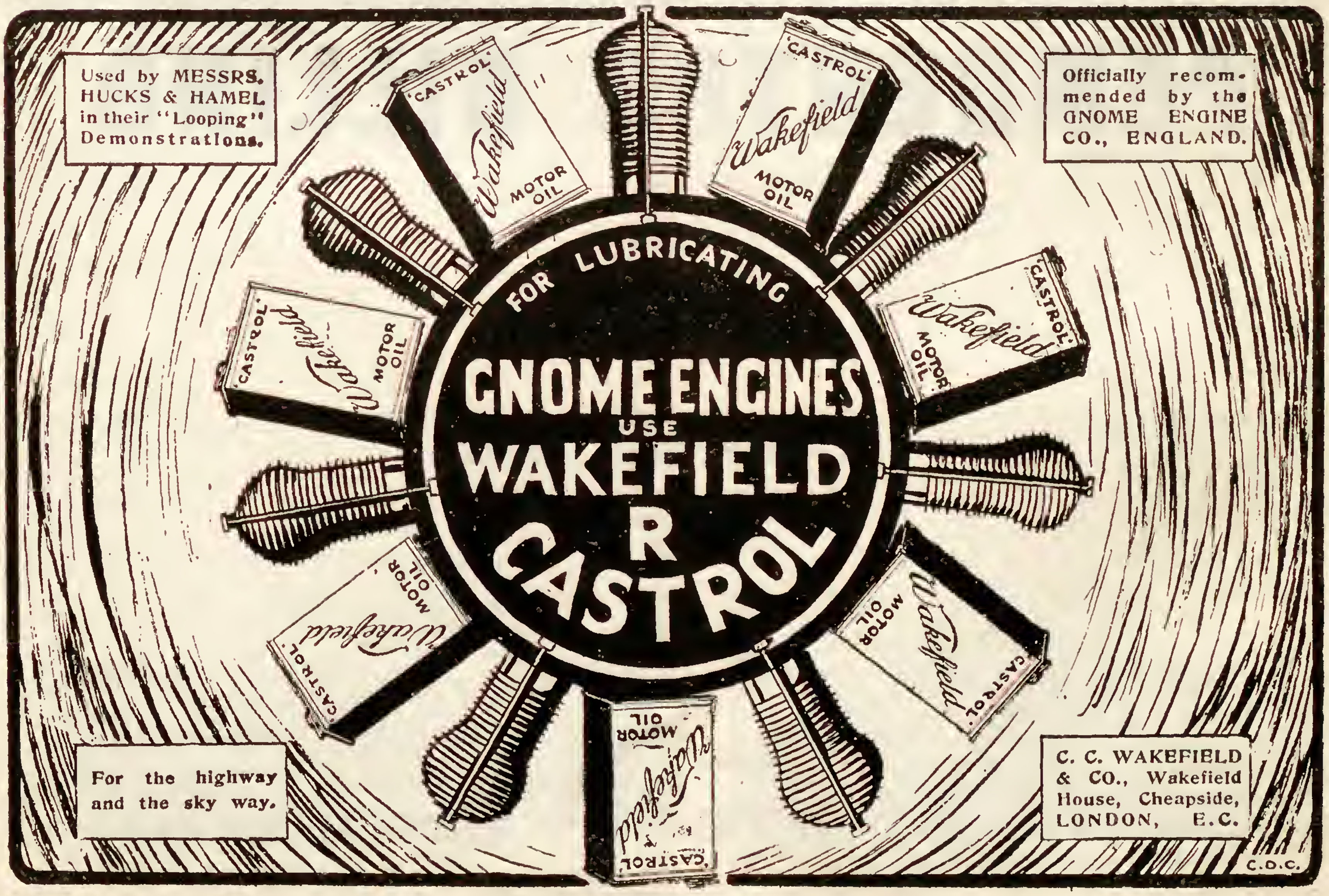

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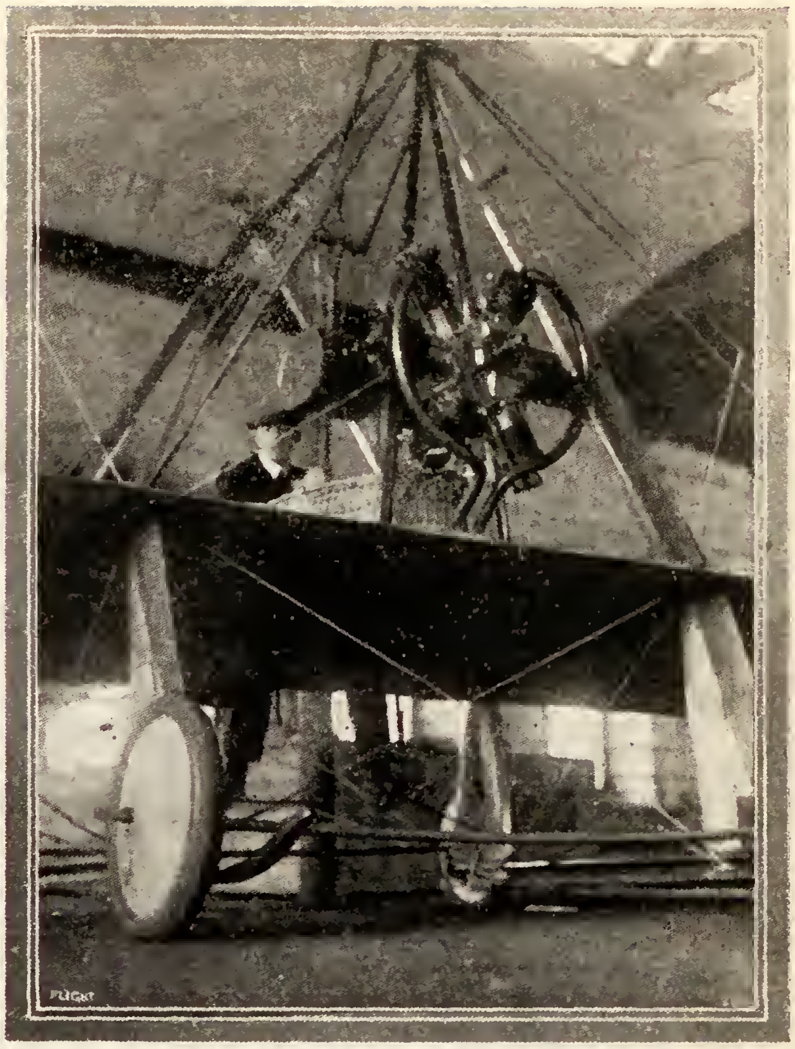
wing loses its velocity, unless this is prevented by the movement of a vertically pivoted tail. In the absence of a vertically pivoted tail the loss of velocity of the wing whose angle of incidence is increased, causes it to lose its support, and it descends while the other rises. Thus the vertically pivoted tail is proved to be necessary if lateral equilibrium is to be preserved by the warping of the wings. The absence in a bird of the vertically pivoted tail proves that warping of the wings is not the method employed by a bird to preserve lateral equilibrium.

"The method by which a bird preserves its lateral equilibrium, and steers to right or left, is a beautiful method of flight. If a soaring bird is making a straight flight with its wings transversely in the horizontal and it wishes to steer to one side, it rocks its wings about a fore and aft axis by pulling one wing down and allowing the other to rise. It is able to do this because the centre of gravity of a bird is below its centre of support, and a pendulum thus exists. The force which this pendulum exerts if shifted from the natural position in which it hangs, provides a fulcrum in mid-air from which the wings can be rocked. Since the mass of the pendulum is considerable its inertia also helps in providing a fulcrum. When the wings are rocked out of the horizontal their lift has a component force pulling to one side of the line of flight. Now, when a body which is moving in a straight line is acted on by a constant force at right angles thereto, the body describes a circle. Therefore when the bird has rocked its wings it describes a circle.

"It must be remembered that this beautifully balanced flight takes place without any attention on the part of the bird except that it controls the elevation (according to whether it wishes to ascend or descend or fly horizontally during the turn) and rocks its wings to the extent which it considers necessary to make a circle of the desired diameter. In fact the bird possesses a method of flight which takes care of itself and is controlled by two movements. The difficulty which caused Wilbur and Orville Wright to abandon this beautiful method of flight adopted by the bird was that considerable power is required to rock the whole surface of the wings in the manner of the bird.

"A soaring bird has sufficient power to rock the whole wing surface quickly, since it employs for this purpose its strong flying muscles, but the pilot of an aeroplane has not sufficient power for this purpose. Thus the Wright brothers abandoned the perfect method of flight of the bird in favour of warping wings and a vertically pivoted tail, because with this latter method the pilot can preserve lateral equilibrium without having to exert so much power. Less power is required to warp or to control the *ailerons* than to rock the whole wing surface in the manner of a bird. The choice between one or the other of these methods of preserving lateral equilibrium is a choice between the perfect flight of the bird, which, however, has the disadvantage of requiring considerable power on the part of the pilot, and the method of preserving lateral equilibrium by controlling the angle of incidence of the wing tips, or the angle of incidence of the supplementary surfaces, a method which has the advantage of requiring small power on the part of the pilot, but which causes an excess of resistance on the surface which has the greater angle of incidence, and thus necessitates the vertically pivoted tail with its consequent disadvantages.

"It remains to examine whether it is not possible to invent a method of preserving lateral equilibrium, which requires small power on the part of the pilot, and which does not increase the resistance of one side of the machine and thus does not necessitate the use of a vertically pivoted movable tail.



Three-quarter front view of chassis and *nacelle* of the Watson No. 3, showing slots in main planes through which the pilot raises his legs when lying down inside the *nacelle*.

"In the machine described, a supplementary aeroplane surface possessing a lifting effect is situated above the main aeroplane, and is attached to an upward extension of the frame of the machine. This supplementary surface can be rocked about a fore and aft axis with the exertion of small power on the part of the pilot, and when thus rocked it gives rise to a component side force similar to the side pull of the wings of a bird when they are rocked. This side pull is exerted on the upward extension of the frame of the machine, and thus controls the 'list' of the frame of the machine in the same way as a bird controls its 'list.' The main aeroplane is rigid with the frame, so that the rocking of the upper plane controls the rock of the main plane. The torque about the fore and aft axis of the machine depends on the distance between the centre of gravity of the machine, and the upper part of the upward extension of the frame where the supplementary aeroplane surface is situated. This surface may be of small area, and may still exert a sufficient torque about the fore and aft axis of the machine, if the upward extension of the frame is sufficiently long. It must be remembered that the pressure on the upper rocking wing is always balanced about the axle on which it rocks, so that the rocking does not require great power on the part of the pilot. On the other hand when wings are warped, the wing with the

Watson No. 2 in flight at Errol, Perthshire, 1912.

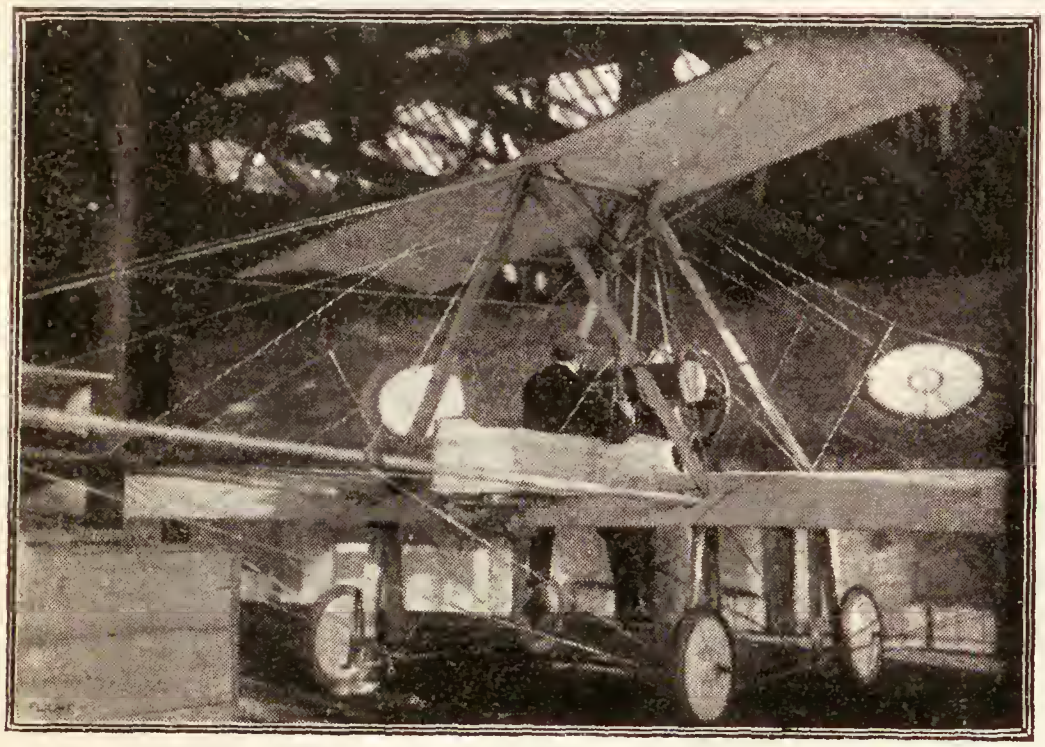
Watson No. 2, 1912, showing balancing plane in operation.

greater angle of incidence has the greater pressure, and considerable power is required on the part of the pilot because of this unbalanced pressure. By placing the supplementary aeroplane surface above the main aeroplane, and in making it to rock about a fore and aft axis, power is obtained with which to rock the main aeroplane surface. This is obtained without introducing any other force than the one required, that is to say the equilibrium of the aeroplane is left unaltered in every respect except that the 'list' is controlled. For instance, the relation between the resistance to the movement of advance, between the upper and lower parts of the machine, is not affected when the upper wing is rocked. When the main plane is rocked out of the 'horizontal' by the action of the supplementary plane, the machine makes a circular flight in the same way as a bird makes a circular flight. Thus the pilot can control the 'list,' and can steer to right or left as he desires. The resistance on one side of the machine is not increased when the main plane is rocked by the upper plane, since the main plane and the upper plane have everywhere the same angle of incidence. Thus there is never a tendency of the fore and aft axis of the machine to turn about the vertical axis, away from the line of flight. Therefore no movable vertically pivoted tail is required. Since there is no warping of the wings, and since no vertically pivoted tail is required, movements to create an exact balance between the warp and the vertically pivoted tail are not required. Steering to right and left is caused solely by the rocking of the wings out of 'the horizontal.' Therefore the 'banking' is always just as much as the turn requires. If for any reason the machine acquires a 'list,' the pilot has only to rock the upper wing to correct this list, and if he desires to circle to right or left, again he has only to make one movement, namely, to rock the upper wing; the main plane is then rocked by the upper wing, and the circle is made without requiring any other attention on the part of the pilot, except that he controls the angle of incidence of both the upper and main plane, by means of the elevation rudder so as to make an ascent, a descent or a horizontal flight, taking care not to make a rock of the main plane too great for the power of the engine. If the turn becomes too quick, as may happen because of the tendency of the outer wing to rise and thus to increase the rock of the main plane, the pilot has only to rock the upper plane so that the upper part of the frame is pulled away from the centre of the circle. The main plane thus approaches more nearly to the horizontal and the circle increases in diameter.

"My machine is almost 'fool-proof,' for, as has been shown, only one single movement must be made to preserve lateral equilibrium and to steer. This consists of a transverse movement of the lever. The elevator is controlled by a fore and aft movement of the same lever. The pilot, by rocking the upper plane, gradually rocks the main plane until the circular flight is being made as quickly as he desires, and the turn then takes place without requiring any other attention on the part of the pilot. In fact, this apparatus possesses the advantages of the bird's flight and requires little power on the part of the pilot. The equilibrium is natural compared to the forced equilibrium of the warping wing machine.

"There is another difference between the machine described in the enclosed specification and the machine with warping wings, which is probably *the greatest advantage of all* possessed by the former. This is, that the warping of the wings and the movement of a vertically pivoted tail, because of their indirect action, that is to say because they depend on the speed of advance, preserve their power to restore the equilibrium, only if the aeroplane has sufficient speed to make the warping of the wings and the movement of the vertical tail effective. If the ordinary aeroplane has lost its speed of advance by being made to ascend too quickly, or if it begins to sideslip, no amount of warping of the wings and movement of the vertically pivoted tail will prevent a tendency to capsize laterally, and even in calm weather there is a tendency to capsize laterally if a single propeller is used and the engine is kept running, because of the torque of the engine acting on the machine.

"On the other hand, the machine described in the enclosed specification may be made to preserve its lateral equilibrium, even if it has lost its speed of advance, because of the positive action of the upper plane in preserving lateral equilibrium. Thus if the machine has a 'list' to one side and has lost its speed of advance, so that it begins to descend, the upper wing, when rocked, is caught by the current of air caused by the descent, and the machine is 'righted.' In this case, the upper wing acts almost like a safety parachute, and not only 'rights' the machine but stops the descent."



Three-quarter rear view of Watson No. 3, now at Buc.

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Airship Sheds at Farnborough.

In answer to a question put in the House of Commons last week, Mr. Churchill stated that the airship sheds at Farnborough were only intended to house small airships for training purposes. It was under consideration to remove these sheds to another site, and if this were done it might be found convenient to slightly alter and improve them at the same time.

Hollow Wood in Aeroplane Construction.

In our issue dated May 2nd, we published a translation of an article that had appeared in *L'Aerophile*, in which the method of hollowing struts and spars on the Farman and other machines was described. This concluded with a comparison between the strength of a hollow and a solid strut, stating how much superior the former is to the latter in its resistance to fracture under bending stresses. It should be noted, however, that whereas in the original article the dimensions are given in millimetres, the modulus of the section has been calculated from centimetre measurements, and that although the conclusions arrived at are, in general, correct, the strut is subject, in practice, to an end loading, and the transverse bending load is of negligible amount.

Blériot Brookland School Starts.

Active work at the new school which has been organised by the Blériot Co., at Brooklands, will commence on Monday next.

Gordon-Bennett Eliminating Trials.

From the official notices of the Royal Aero Club on p. 514, it will be seen that the eliminating trials to select the team of three to represent Great Britain in the Gordon-Bennett Race, will be held on Salisbury Plain during the last week in August. Each entrant will be allowed to fly three machines, and the programme will include slow and high speed tests over a distance of 200 kiloms. made up of 20 circuits of a 10-kilom. course.

Aviation in New Zealand.

Reverting to the article which appeared in our issue of May 2nd under the above title, it should have been made clear that the photographs were sent by Mr. A. W. Schaef, who also sent along the details of his own flying and those relating to the smash of Scotland at Newtown Park, Wellington. Incidentally it may be pointed out that only five weeks elapsed between the occurrence of the mishap and the appearance of the particulars in Flight.

It is interesting to learn that Mr. Schaef is now on his way to England, where he intends to secure his pilot's certificate and obtain as much information as possible, first hand, regarding matters aeronautical. Mr. Schaef is sure of a warm welcome in England, especially from those who are acquainted with the work which he has accomplished on the Anzani-engined monoplane which he constructed himself.

MR. SYDNEY PICKLES AND HIS ACCIDENT.

As our readers will have gathered from FLIGHT, Mr. Sydney Pickles has now practically recovered from the terrible accident which overtook him in September last year, when on a Champel machine he lost control when flying at Hendon with Mrs. Stocks, the very popular aviatress, as passenger. He has found it impossible to keep from aviation, and although he has no intention of coming back into the very active side of flying, he intends, as already announced, to continue flying as an amateur, as and when the inclination takes him, as witness his recent work down at Eastchurch.

This week, when talking over his past work, he gave us a most interesting account of exactly what took place in connection with the deplorable accident, an account of which he had written down in detail on November 23rd last (his medical attendants absolutely refusing to allow him to make any written notes before that date), a few weeks after the accident had occurred, when everything was still vividly in his mind. The details, down to the most minute particular, seemed to have impressed themselves firmly upon his brain, and in view of the many distressing statements which were made at the time of the accident in regard to what Mr. Sydney Pickles did and did not do, and what his intentions were, his present very clear account is of striking interest, and entirely exonerates him from any suggestion of having attempted a risky stunt at an unreasonably low altitude, a suggestion which at the time was, we believe, made in connection with the finish up of his flight. Mr. Pickles' account, as given in his own words, is as follows :—

"About six p.m. on September 20th, 1913, at the London Aerodrome, Hendon, I was asked by Mrs. Stocks to give her a passenger flight with me on the 110 h.p. Anzani-engined Champel biplane. This machine is of the 'pusher' type with an outrigger tail, and the seating accommodation is arranged in front similarly to the well-known Henry Farman machines. Dusk was drawing in, but there was yet ample light left for a short flight. Mrs. Stocks and I climbed on board the machine, and started away from No. 1 pylon, and making in the direction of pylon No. 4. We lifted very quickly, and on reaching the other side of the aerodrome we were up quite a good height. I then flew round pylons Nos. 4, 5, and 6, keeping to the usual course followed in the speed races, and at a height of about 250 ft. Somewhere near No. 6 pylon I turned round and spoke to Mrs. Stocks, saying how glorious the lights of Hendon looked in the distance. As it was beginning to get dark I decided to curtail the flight and land, so I continued along down the middle of the racing course until I was nearly opposite No. 1 pylon. Here I intended to throttle down the motor, and glide down, and also to turn the machine towards a point near No. 4 pylon. This meant a fairly sharp left-hand turn during the glide. Then I intended to cross the aerodrome to somewhere near No. 4 pylon, turn back again, and land.

"Well, I throttled the motor down, and then ruddered over to the left to make the turn. After completing the turn I pressed on the right side of the rudder bar to bring the rudder straight again, and to my unpleasant surprise the bar refused to move. By this time the machine had made a complete circle, and naturally taken a terrific bank owing to the small diameter of the circle. I now instantly resorted to my lateral control in order to reduce the bank, which felt as if it were vertical. This appeared to have a little effect, but the machine still kept spinning and side-slipping. Then, curiously enough, I seemed to realise fully the fate of Paul Beck, in America, and how one person remarked to me that had he switched his motor on he might have saved himself. I thought I was in a similar position to his, so I would try what he apparently did not. I then reached for the throttle lever and opened the throttle wide, at the same time bringing the elevator lever back towards me, as the machine had by now got its nose down. The object of this manœuvre was of course to try and get the nose up. After doing nearly a complete circle with the throttle open I could see no improvement in my position, and, realising that it was increasing my speed towards the ground, I closed the throttle. By this time my machine was in a hopeless position, and I reached forward and turned the switch off, thinking, 'Well, we won't have a fire anyway.' I now fully realised that a smash was inevitable, and then the green megaphone-stand flashed past me, and I realised, much to my astonishment, that I was falling behind this stand, and how near the ground I was, and I pulled the elevator lever right back against my chest as a last effort to flatten out the machine, and also in order to hold my passenger in her seat, and prevent her being thrown out on her head. (I was surprised at falling behind the stand, as when I first lost control I was 300 ft. up, or more, over the flying ground, about halfway between No. 1 pylon and the enclosure. How I got there I cannot explain, except that possibly the rotation of the machine caused a drift, which was perhaps increased when I opened the throttle in my attempt to save the accident.) Then we struck ! I distinctly heard the crash, and was momentarily dazed with the shock. When all seemed quiet I opened my eyes, and felt rather surprised at realising that I was still alive. During the whole of the struggle I had had, my anxiety was with my lady passenger, Mrs. Stocks, and I felt sure that we should both 'go out.' The whistling of the wires gave me an idea of the speed at which we were about to strike. As Mrs. Stocks was herself an experienced flyer, the ordeal she must have gone through, sitting there helpless, while the machine was dashing to the ground, must have been terrifying, yet she did not make a sound.

"Then I could hear people's footsteps coming round the machine, and the petrol trickling away from the petrol tank, and I also heard the shouts of 'Put out matches, pipes, cigarettes, &c.' quite distinctly, although I had my eyes closed. I only have a very dim recollection of being lifted out of the machine, but directly they laid me out on the stretcher I felt pain, real pain, in my back. The ambulance men quickly arrived on the scene, and I distinctly heard them pronounce 'Compound fracture right leg.' This I did not feel at all, but in addition to the pain in my back I felt a burning sensation in my body, which turned out afterwards to be caused by a wound $3\frac{1}{2}$ ins. deep. I thought I would make an effort to see, and found it very difficult. I said, 'How is she ?' and somebody asked 'Who ?' This exasperated me, as I felt irritable. I said, 'My passenger.' They replied, 'She's all right, we gave her something, and she was able to be carried away.' As I lay on my back I felt curious as to the damage done to the machine, so I turned my head to the left and opened my eyes in order to have a look at the machine. I also recollect hearing quite distinctly a person's voice sympathising with me when I complained of pain. One of the sentences was, "Never mind, you'll be all right. I'm your friend, Pickles.' I then said, 'The control wouldn't work,' and a voice answered 'Yes, I know.' I was feeling frightfully exhausted from shock, and thought that should anything happen to me this would be an explanation, however meagre. As I still lay on my back beside the machine I was looking at the irregular row of heads, when everything slowly darkened and went black. I knew I had my eyes open, so I complained about not being able to see. They got me some liquid, which they wanted to put in my mouth, and I asked what it was, because I am a strict teetotaller. (Of course, in a case of emergency such as this I would not have refused it, but I just wanted to know first.) Then the ambulance men lifted me and proceeded to carry me away on the stretcher. Each pace they took gave me terrific pains in my back, which caused me to complain and ask them to take it easily. After a short while we arrived outside the Grahame-White offices, and here they rested a minute. I looked at the many people around me for a familiar face, and soon discovered one. I have since found out that it was Mr. Harry Delacombe. As I was looking up at him he had his head turned away a little, so I proceeded to speak to him, saying, 'Will you do something for me ?' and he naturally replied, 'Yes.' I then added, 'I want you to telegraph my mother. The address is Lancaster Court Hotel, Lancaster Gate. Tell her I'm fairly all right—you know.' I was next taken inside the aerodrome hospital to await the return of the motor which had taken Mrs. Stocks to the hospital. I was then taken to the hospital near by, where they proceeded to cut the clothes off my legs, and get me ready for the surgeon, who was coming down from London to perform an immediate operation. I clearly remember my mother coming into the ward to see me before the surgeon arrived. They put me under an anæsthetic for the operation, and I awoke the next day fully realising that I was to be a patient for a long time. As a matter of fact, as I write these lines I am still lying on my back since the accident seven weeks and three days ago, and I am certain the accident was entirely due to my heel becoming fixed between the rudder bar and the flooring of the *fuselage*, with the result that the machine kept turning, and which turning was in all probability aggravated by my opening the throttle.

"By doing the latter very considerable forward impetus was imparted to the machine, and it is possible, as I have already said, that had I left the throttle alone, the smash would have happened in the aerodrome instead of in the enclosure."

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday, May 12th, 1914, when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Griffith Brewer, Major J. D. B. Fulton, C.B., R.F.A., Major F. Lindsay Lloyd, Mr. F. K. McClean, Mr. J. T. C. Moore-Brabazon, Mr. Alec Ogilvie, Mr. C. F. Pollock, Mr. T. O. M. Sopwith, and the Secretary.

New Members.—The following new Members were elected:—Lieut. A. D. Cunningham, R.N., Chave Charles Nainby Luxmoore.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

774 W. R. Ding (Wright Biplane, Beatty School, Hendon). April 27th, 1914.
775 Air Mechanic A. J. Locker (Bristol Biplane, Bristol School, Salisbury Plain). April 28th, 1914.
776 Eric Parker (Grahame-White Biplane, Grahame-White School, Hendon). April 29th, 1914.
777 Lieut. William Annesley Underhill (Worcestershire Regiment), (Vickers Biplane, Vickers School, Brooklands). May 10th, 1914.
778 Robert John MacGeagh Hurst (Vickers Biplane, Vickers School, Brooklands). May 10th, 1914.
779 2nd Lieut. Cuthbert Evan Charles Rabagliati (King's Own Yorkshire L.I.) (Bristol Biplane, Bristol School, Brooklands). May 11th, 1914.

The following Certificate was passed in America:—

Thomas Melville Ross (Curtiss Biplane, San Diego). April 13th, 1914.

The following Certificates were passed in France:—

Charles Ricou (Maurice Farman Biplane, Etampes). April 10th, 1914.
Capt. James Edward Pearce (Maurice Farman Biplane, Etampes). April 21st, 1914.

Accidents Investigation Committee.—On the motion of Col. H. C. L. Holden, the reports on the fatal accidents to Mr. George Lancelot Gipps and Sergeant Eric Norman Deane, R.F.C., were unanimously adopted and ordered to be published in extenso.

(Full Reports will be found following these notices).

Gordon-Bennett Eliminating Trials.—The regulations for these Trials, as drawn up by the Competitions Committee, were approved. It was decided to hold the Trials on Salisbury Plain during the last week in August.

***Daily Mail* Circuit of Great Britain Race, £5,000.**—It was decided to hold this Race during the first fortnight in August, viz., from the 1st to the 15th, and subject to arrangements being made, the starting place will be in the district of Southampton Water.

Aerial Navigation Regulations and Prohibited Areas.—Mr. Griffith Brewer briefly reported on the Conference of the Fédération Aéronautique Internationale, held in Paris on May 5th, 1914. A vote of thanks was passed to Mr. G. Brewer and Mr. J. T. C. Moore-Brabazon for attending as delegates on behalf of the Club.

(A report of the proceedings appears under these Notices).

Suspension of J. G. Gilpatric, American Aviator.—Letter was read from the Fédération Aéronautique Internationale, notifying the suspension of J. G. Gilpatric from April 22nd to August 22nd, 1914, by the Aero Club of America for flying over the City of New York on April 14th, 1914.

Competitions Committee.

A meeting of the Competitions Committee was held on Thursday, May 7th, 1914, when there were present: Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Mr. Alec Ogilvie, and the Secretary.

Gordon-Bennett Eliminating Trials.—At the invitation of the Committee, the Entrants for the Gordon-Bennett Aviation Race attended as follows:—

Cedric Lee (The Cedric Lee Co.).
Capt. H. Lutwyche (A. V. Roe and Co., Ltd.).
H. White Smith (British and Colonial Aeroplane Co., Ltd.).
Capt. H. F. Wood (Vickers Ltd.).

It was decided to hold the Eliminating Trials on Salisbury Plain during the last week in August.

Each entrant will be allowed to fly three machines in the Trials, and no machine will be selected unless it has flown in the Trials.

The Trials will consist of (*a*) Slow Speed Test, and (*b*) Speed Test. In the case of the Speed Test it was decided to have this over a course of about 10 kilometres, and to fly the full distance of the Gordon-Bennett Race, viz., 200 kilometres.

***Daily Mail* Circuit of Britain Race, £5,000.**—It was decided to hold this Race during the first fortnight in August, viz., from the 1st to the 15th, and the Secretary was instructed to make arrangements for the starting place and various controls round the coast.

British Empire Michelin Trophy, £800.—The Committee discussed the competition for this year and it was eventually decided to make it a Duration Contest, subject to the approval of the Michelin Tyre Co., Ltd.

Public Safety and Accidents Investigation Committee.

A meeting of the Public Safety and Accidents Investigation Committee was held on Tuesday, May 12th, 1914, when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. A. E. Berriman, Eng.-Lieut. E. F. Briggs, R.N., Major J. D. B. Fulton, C.B., R.F.A., Mr. J. H. Ledeboer, Mr. F. K. McClean, Mr. Alec Ogilvie, Mr. Mervyn O'Gorman, C.B., Major-Gen. R. M. Ruck, C.B., R.E., and the Secretary.

Fatal Accident to Mr. Philippe Marty.—The Committee proceeded to inquire into the fatal accident to Philippe Marty at Hendon on Sunday, April 26th, 1914. Mr. R. T. Gates, Mr. Louis Noel and Dr. A. B. Leakey attended and gave evidence. The report was drawn up and ordered to be submitted to the Executive Committee.

Fatal Accident to Lieut. H. F. Treeby.—The consideration of this accident was resumed and the report was drawn up and ordered to be submitted to the Executive Committee.

Fatal Accident to Capt. C. R. W. Allen, R.F.C., and Lieut. J. E. G. Burroughs, R.F.C.—The Committee resumed its consideration of the various reports of the tests carried out by the National Physical Laboratory.

Death of His Grace the Duke of Argyll.

The Royal Aero Club has received a letter from H.R.H. Princess Louise, thanking the Members for their kind expression of sympathy in her great sorrow.

Daily Mail Circuit of Britain Race, £5,000.

Date of Contest ... ... August 1st to 15th.
Starting Place ... ... Southampton.

Entries.—The Entrance Fee is £100 per aircraft, and entries will be received up to 12 o'clock noon, May 30th, 1914. The Entrance Fee of £100 is payable either in one sum or as follows:—

£50 by noon on May 30th, 1914.
£50 by noon on June 20th, 1914.

Late entries will be received up to 12 noon, June 30th, 1914, in which case the Entry Fee will be £150.

The Entry Form, which must be accompanied by the Entrance Fee, must be sent in to the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

No part of the Entrance Fee is to be received by the *Daily Mail.* All amounts received will be applied towards payment of the expenses of the Royal Aero Club in conducting the competition. Any balance not so expended will be refunded to the entrants.

Full particulars appear in this issue on page 518.

LONDON AERODROME, HENDON.

The Directors of the Grahame-White Aviation Company, Limited, have kindly granted free admission to the London Aerodrome, Hendon, for the remainder of the year 1914, to all Members of the Royal Aero Club on presentation of their Club Membership Card. Motor cars must be paid for.

Aerial Navigation Regulations and Prohibited Areas.
Paris Conference.

An Extraordinary Conference of the Fédération Aéronautique Internationale was held in Paris on Tuesday, May 5th, 1914, at which Prince Roland Bonaparte presided. The following countries were represented:—Argentine, Austria, Belgium, France, Germany, Great Britain, Hungary, Italy, Netherlands, Portugal, Russia, Spain, Sweden, Switzerland, and the United States. The Royal Aero Club (Great Britain) was represented by Mr. G. Brewer, Mr. J. T. C. Moore-Brabazon, and Mr. H. E. Perrin. The Governments of France, Holland, and Portugal also sent official delegates.

After discussion, the following statement was drawn up:—

(Translation from French.)

The F.A.I., assembled at an Extraordinary Meeting at the Aero Club de France, May 5th, 1914, to consider what steps should be taken to procure from Governments the suppression, or, as an alternative, the reduction to an absolute minimum of the areas prohibited to Aerial Navigation,

Being of opinion that it is an easy matter, with the collaboration and on the responsibility of the Sporting Authorities, to prohibit all photographic apparatus on aeroplanes, dirigibles or balloons,

And taking into consideration the very annoying hindrance which the establishment of prohibited areas causes to the development of aerial navigation, which is equivalent as regards aeroplanes and dirigibles to imprisonment in a limited space and as regards spherical balloons, to a veritable sentence of death, it not being possible, in this case, to control direction,

It was Resolved :—

1. That the Governments investigate amongst themselves the possibility of suppressing or reducing the extent of the prohibited areas by limiting to absolute necessity the radius of the prohibited areas round fortified places, which would immediately create a number of free passages, at any altitude.

2. As regards spherical balloons, that every civil pilot of spherical balloons, approved by his National Sporting Authority, be authorised to fly over the prohibited areas at any altitude, and to alight within them in case of necessity.

That there be issued for this purpose an international permit, valid for one year, granted at the request and on the responsibility of the National Sporting Authorities:

As regards aeroplanes and dirigibles :—

That the arrangements resulting from the Franco-German agreement (paragraph 11 Section IV) be extended to all countries of the F.A.I., simplifying, as far as possible, administrative formalities.

Resolved :—

That the Government of the French Republic be asked to call together again the International Diplomatic Conference on Aerial Navigation, in order to regulate in a uniform manner all questions relating to Aerial Navigation.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

ACCIDENTS INVESTIGATION COMMITTEE OF THE ROYAL AERO CLUB.

REPORT No. 20.

Report on the Fatal Accident to Mr. George Lancelot Gipps, when Flying as a Passenger With Mr. Frederick Warren Merriam at Larkhill, Salisbury Plain, on Monday, January 26th, 1914, at about 4.45 p.m.

Brief Description of the Accident.—Mr. Frederick Warren Merriam was flying a Bristol monoplane fitted with a 50 h.p. Gnome engine at Larkhill, Salisbury Plain, on Monday, January 26th, 1914, at about 4.45 p.m., with Mr. George Lancelot Gipps as a passenger for an instructional flight. The flight had lasted about five minutes, during which time a circuit had been made at a height of about 80 ft. In making a noticeably flat left-hand turn, the aircraft suddenly banked steeply and, making a quarter-turn, nose dived to the ground from a height of about 50 ft. The pilot, Mr. Merriam, was injured, but the passenger, Mr. Gipps, was killed.

Mr. George Lancelot Gipps was granted his Aviator's Certificate No. 513, on June 13th, 1913, by the Royal Aero Club.

Report.—The Committee sat on Monday, March 30th, 1914, and received the report of the Club's representative, who visited the scene of the accident within a short time of its occurrence. Evidence was also given by eye-witnesses of the accident and by Mr. F. W. Merriam, who was piloting the aircraft at the time of the accident. From the consideration of the evidence, the Committee regards the following facts as clearly established :—

1. The aircraft was built in May, 1912, and completely reconstructed in September, 1913.

2. The pilot and passenger were sitting side by side, and the flight was being made for instructional purposes.

3. The wind at the time of the accident was about 8 to 12 m.p.h.

4. The aircraft was fitted with a dual control, giving equal power of control to both pilot and passenger, and without means of disconnecting the passenger's control.

5. Neither the pilot nor the passenger was strapped in, and they were not wearing helmets.

6. The aircraft was not fitted with an engine revolution indicator, air speed meter or banking indicator.

7. The pilot was under the impression that the passenger was resisting his control.

8. The controls were found to be intact after the accident.

Opinion.—The Committee is of opinion that the accident was due primarily to ruddering violently when the aircraft was unbanked, causing it to sideslip outwards, lose way and nose dive. The overruddering was due to the action of the passenger in first resisting the control of the pilot and then suddenly yielding.

Recommendation.—The Committee recommends that in all dual controlled machines used for instructional purposes, means should be provided whereby the instructor can instantly disconnect the passenger's control.

ACCIDENTS INVESTIGATION COMMITTEE OF THE ROYAL AERO CLUB.

REPORT No. 21.

Report on the Fatal Accident to Sergt. Eric Norman Deane, R.F.C., when Flying at the Brooklands Aerodrome, Weybridge, on Wednesday, April 8th, 1914, at about 7.30 a.m.

Brief Description of the Accident.—Sergt. Eric Norman Deane was flying a Bristol Biplane (Pusher type), fitted with a 50 h.p. Gnome engine, at the Brooklands Aerodrome, Weybridge, on Wednesday, April 8th, 1914, at about 7.30 a.m., and was undergoing the test for his Aviator's Certificate. He had completed the two sets of figures of 8 and alightings in a satisfactory manner and was carrying out the altitude test at the time of the accident. At a height of about 1,000 ft., the pilot commenced a spiral descent at a very steep angle. After descending about 600 ft., and when about 400 ft. from the ground, the pilot fell out of the aircraft and was killed.

Sergt. Eric Norman Deane was a pupil at the School of the British and Colonial Aeroplane Co., Ltd., at Brooklands.

Report.—The Committee sat on Tuesday, April 28th, 1914, and received the report of the Club's representative who witnessed the accident. Eye-witnesses of the accident also attended before the Committee and gave evidence.

From the consideration of the evidence, the Committee regards the following facts as clearly established :—

1. The aircraft was built by the British and Colonial Aeroplane Co., Ltd., in November, 1913, and was of a type in which the pilot sits on the front edge of the lower plane with the engine and propeller behind, and is quite unenclosed.

2. The wind at the time of the accident was about 5 miles per hour.

3. The control wires were found to be intact after the accident.

4. Sergt. Deane had been a pupil at the Bristol School for about six weeks, and during the latter part of the time had made many good flights.

5. The School instructor has stated that in his opinion Sergt. Deane was fully competent to pass the tests for his Aviator's Certificate.

6. The pilot was not strapped into his seat, nor was the aircraft fitted with a safety belt.

7. A spiral descent is not laid down as part of the tests for Aviators' Certificates.

Opinion.—The Committee is of opinion that the accident was due primarily to the pilot forcing the aircraft down at too steep an angle, resulting in his falling forward on his control and accentuating the steepness of the descent.

Recommendation.—In view of the numerous instances which have come before the Committee in which the use of a safety belt might conceivably have either prevented the accident or mitigated the results, the Committee strongly recommends that all aircraft be fitted for and with some form of quick-release safety belt in order that the pilot may avail himself of this safeguard should he wish to do so. In making this recommendation the Committee is fully alive to the objections that have been raised to the use of the safety belt.

Double Fatality at Farnborough.

It is with the deepest regret that we have to record the catastrophe which occurred at Farnborough on Tuesday last and which cost the lives of Capt. E. V. Anderson and Air-Mechanic Carter. It appears that two Sopwith machines, both belonging to No. 5 Squadron of the Royal Flying Corps, one piloted by Capt. Anderson and the other by Lieut. Wilson, who was accompanied by Air-Mechanic Carter, had been flying at various altitudes for over half an hour when the upper one started to dive at the same time as the other commenced to rise. They collided at a height of about 400 ft. and crashed to the ground on the Aldershot Golf Links and close to Government House. Capt. Anderson and Air-Mechanic Carter were killed instantly, but Lieut. Wilson had a miraculous escape, and he managed to extricate himself from the wreck before anyone was able to reach the spot. On examination at the hospital it was found that he had sustained a fractured jaw and was severely bruised, but the latest reports state that he is out of danger.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

There was very little flying last week owing to the state of the weather.

Monday, Tuesday and Wednesday, no flying owing to this.

The following machines were up: No. 16 Avro, 40 Caudron, 31 Henry Farman, 49 B.E., 36 Deperdussin, Comdr. Samson, 10 Short, to Isle of Grain.

Thursday, very windy. Two machines only were up, No. 50 B.E. and 16 Avro.

Friday, very windy. Lieut. Briggs on No. 39 Blériot, returned from Brooklands; 40 Caudron was also up.

Saturday, very windy. Lieut. Briggs on No. 39 Blériot to Sheerness, flying over the Danish Royal Yacht and returning. No. 45 Caudron was also up.

Sunday, very windy and showery. No flying.

Civilian Flying.—Nil.

Brooklands Aerodrome.

Owing to the rain and strong winds (blowing up to 50 miles an hour) no school work was possible during last week. No machines were out on Monday, Tuesday, or Thursday or Friday.

On Wednesday morning, Mr. Barnwell (with a passenger) was flying round a passing balloon on the 100 h.p. Vickers gun 'bus. In the afternoon Mr. Mahl was out on the 80 Sopwith, and Mr. Pixton flew to Farnborough on a Sopwith "scout." Lieut. Collett, R.N., was flying the D.F.W. biplane. (This machine will be fitted with petrol capacity for about 40 gallons to permit of lengthy non-stop flights in the near future.) The 80 Sopwith was again out carrying passengers.

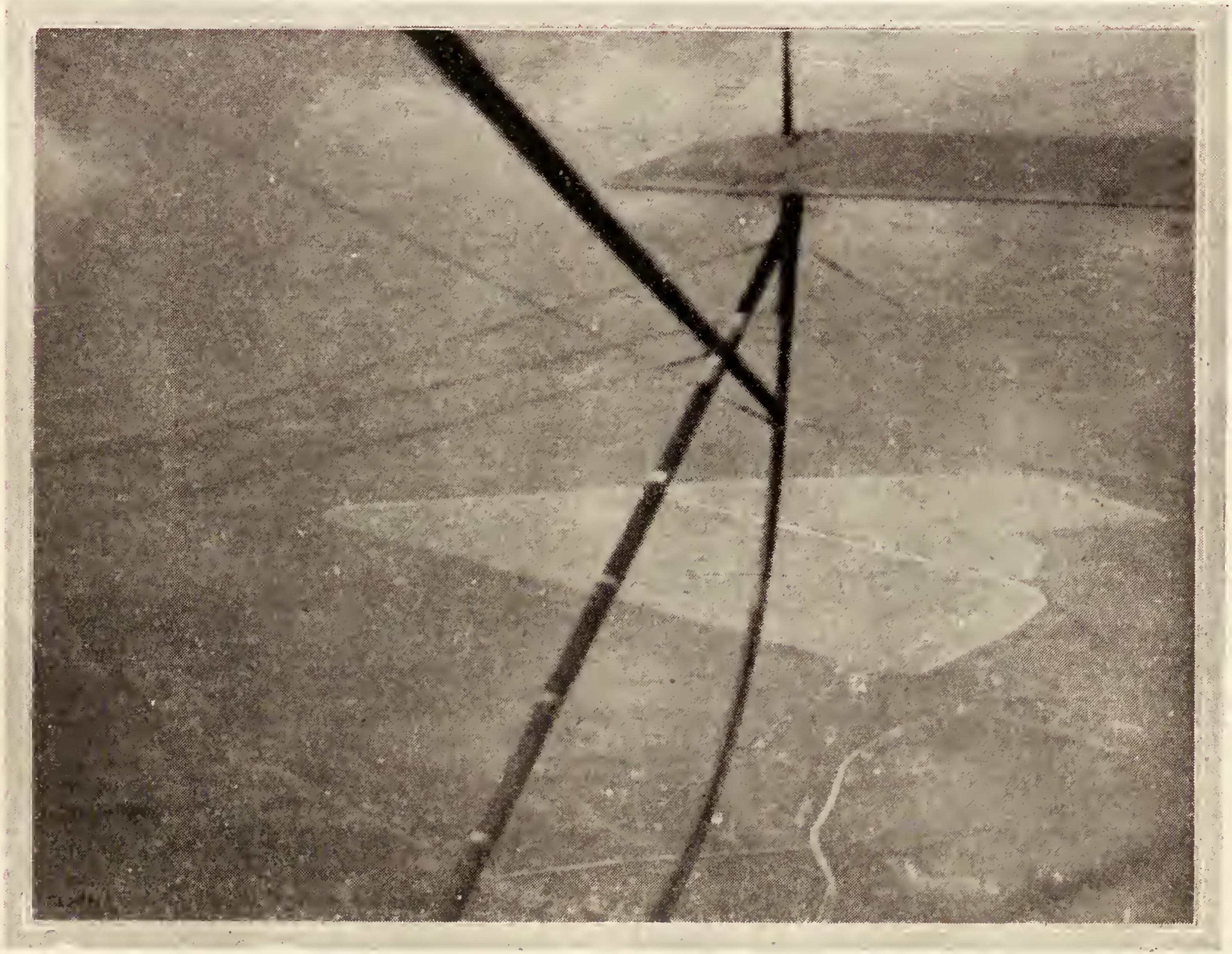
On Friday No. 3 Sopwith "scout" arrived.

On Saturday, Mr. Barnwell carried two passengers on the 100 Vickers gun 'bus, and Mr. Pixton was flying the No. 3 Sopwith "scout."

Bristol School.—Owing to the exceptionally strong winds, no tuition was possible at this school throughout last week, but pupils took advantage of the opportunity to assist in the dismantling and erection of machines, motors, &c.

Vickers School.—School work last week, as everywhere else, was impossible owing to the continued spell of windy weather until Sunday, when Lieut. Underhill and Mr. Liddell made solos

Mr. W. Rowland Ding, who recently took his ticket on a Wright machine at the Beatty School, Hendon, and who afterwards made a successful cross-country flight on the Handley Page biplane at an altitude of 2,000 ft.



Staines Reservoir, from 4,300 ft. up, another snap taken from Mr. J. Alcock's 100 h.p. Sunbeam-engined Maurice Farman.

on biplane. Lieut. Underhill and Mr. Hurst both went for *brevets*, getting through in good style.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Wednesday, last week, Mr. Clarke straights with Instructor Howarth Messrs. Howett, Winter, Gilston-Shepherd and Y. Y. Lui (new pupils), rolling with Instructor Lillywhite.

Shoreham Aerodrome.

Pashley School.—The wind stopped all school work last week except on Tuesday. Mr. Mortimer excellent circuits, Mr. Hale 8's in perfect style; instructor, C. L. Pashley. Eric C. Pashley went up for the first time this year and controlled the machine with his usual excellent style. His turns have lost none of their style.

HONOURING MR. T. O. M. SOPWITH AND MR. HOWARD PIXTON.

AT an informal luncheon given by the Royal Aero Club on Tuesday, this week, to Mr. T. O. M. Sopwith and Mr. Howard Pixton, to celebrate the British victory in the Schneider International Seaplane Race at Monaco, on April 20th, the Marquess of Tullibardine, the Chairman of the Royal Aero Club, presided.

The Marquess of Tullibardine was supported by Brig.-Gen. David Henderson, C.B., D.S.O., Mr. S. F. Edge, President of the Society of Motor Manufacturers and Traders, and Mr. Julian W. Orde, Secretary of the Royal Automobile Club. The following were also present:—Charles Agnew, A. J. A. Wallace Barr, C. Gordon Bell, R. W. B. Billinghurst, Griffith Brewer, Ernest C. Bucknall, John Cates, Harry DelaCombe, Roy DelaCombe, Frank Fisher, R. T. Gates, C. K. Gregson, Charles G. Grey, Lieut. Spenser D. Grey, R.N., C. G. Grunhold, Col. H. C. L. Holden, C.B., F.R.S., B. C. Hucks, Prof. A. K. Huntington, A. A. Dashwood Long, J. H. Ledeboer, Cedric Lee, Major F. Lindsay Lloyd, Pierre Marechal, O. P. Monckton, W. B. R. Moorhouse, Henry Morris, N. C. Neill, N. Pemberton Billing, N. S. Percival, H. E. Perrin, H. J. Preston, H. R. Preston, Stanley Spooner, J. H. Spottiswoode, B. Stevenson, G. Holt Thomas, C. C. Turner, James Valentine, H. E. Voigt, H. Walter, T. D. Wynn Weston, J. Withers, J. E. Withers.

In giving the toast of "Mr. Sopwith and Mr. Pixton," the Chairman spoke as follows:—

"We are here to congratulate an English constructor and an English pilot on Britain's first international aviation victory on a *British aeroplane*. I refer of course to the splendid performance of Mr. Sopwith and Mr. Pixton in winning the Schneider International Maritime Race at Monaco last month.

"We must not forget that Mr. Grahame-White won England's first international race, the Gordon-Bennett Trophy, in America in 1910 on a French machine.

"True, in the Sopwith machine the motor was French, but we need not grudge this share of the victory to our good friends across the Channel, and it is only fair to recollect how much the Gnome motor has assisted all constructors and pilots in advancing the science and practice of aviation for the past four years. We can only hope that the Government Air Engine Competition now in progress may produce one or more British motors the equal, if not the superior, of anything designed and manufactured abroad.

"Before we heard of Mr. Sopwith as a constructor, he was world-famous as a pilot, first achieving fame by his victory in the Baron de Forest Prize of £4,000 on an all-British Howard Wright Biplane. Soon after he established a reputation in America as one of the world's greatest race-fliers, and gave us a taste of his ability in this direction by his many successes in handicap races at Brooklands, followed by his victory in the first *Daily Mail* Aerial Derby round London.

"For the past eighteen months, however, he has deserted the pilot's seat to devote his whole time to the manufacture of aeroplanes, and combining his practical experience with his engineering knowledge, ranks as one of the foremost aeroplane builders in the world.

"Mr. Sopwith for over two years has told his friends his conviction that biplanes could and would be built to beat any monoplane for speed with the same engine power. Also, that a far greater range of speed and consequently greater climbing efficiency could be attained by biplanes than monoplanes. All these important ideas and expectations he proved in practice at Monaco. when his small biplane, fitted with a 100 h.p. motor, attained a 15–20 per cent. greater speed than any of the French racing monoplanes, even with their 160 h.p. motors. His machine, even with its sea floats, showed a range of speed of about 60 kiloms. to 160 kiloms. The best French monoplanes with larger motors could not do better than from about 90 kiloms. to 135 kiloms.

"As to Mr. Pixton, the pilot, I am told that some of the French people spoke of him as a young and unknown aviator. We all know here in England that Mr. Pixton took up flying in the early days of aviation, and since that time he has justly earned the reputation of being one of England's most capable pilots.

"Mr. Pixton, I understand, had not previously competed in a race of any importance, and had had scarcely any experience in taking pylons. But his ability in this direction proved itself to be equal to that of all the world-famous pilots.

"The greatest of all International Aviation Races has yet to be held this year—namely, the Gordon-Bennett Aviation Trophy. In this race the Club hopes to have three representatives, and, as showing the interest in this event, five of the leading British manufacturers have entered, necessitating the holding of eliminating trials.

"Having carried away from France the most important trophy offered for international hydro-aeroplanes, it is not too much to hope for success in the Gordon-Bennett Race."

Mr. Sopwith, after thanking the Chairman and the guests for the very flattering reception of the toast, gave a highly humorous account of the various little happenings which led up to the ultimate completion of the perfected Sopwith machine which carried off the prize. He also referred in sportsman-like terms to the bad luck of the Frenchmen who competed against him with their Nieuport monoplanes. He acknowledged in very generous terms the great help which the Gnome motor had been to himself in his work, and to the whole of the aviation industry, and he concluded by stating that the building of the Sopwith seaplane which secured the Cup was due largely to the support of the authorities in helping them forward by their orders, and it was that which had enabled them to succeed. The actual machine which secured the trophy was, he said, the direct outcome of a machine built practically to the specifications of General Henderson.

Mr. Sopwith paid a high tribute to the skill of Mr. Pixton, whose flying in the Race drew forth the admiration of the French people at Monaco. He hoped that the British manufacturers would meet with success in the forthcoming Gordon-Bennett Race.

Mr. Pixton also replied briefly in modest terms, attributing largely the win to the excellence of the design of the Sopwith seaplane rather than himself as pilot.

Col. Holden proposed the toast of "The Guests," especially mentioning the name of Brig.-Gen. Henderson, who had done so much for the country in connection with aviation, and had gone as far as it was possible for any man in such an official position, where he was necessarily hedged round with a vast amount of restrictions and red-tapeism.

General Henderson, in replying, congratulated Mr. Sopwith and those concerned with him on the victory, which he hoped and believed very soon would be thought nothing of by reason of our British machines securing so many victories in other directions. From the British engines under test at Farnborough, he thought that there was every prospect of very great further British triumphs in that direction also.

Mr. S. F. Edge, who was also coupled with the toast, was quite convinced that this was only one of a series of big successes in store for the constructors of this country. He was glad to be able to say on behalf of the S.M.M.T. that this year's Aero Show had paid its way. He was very gratified to know that we had succeeded in the interests of Britain in building a machine which had such flexibility as the Sopwith—greater flexibility in speed than any other aeroplane in the world. It was, he thought, the very most important thing to accomplish, the same as in evolving motor cars, a result which he had persistently placed before himself as paramount in his past work in the motor car industry.

A vote of thanks to the Chairman, with a reply from the Marquess of Tullibardine, brought a very pleasant little function to a close.

Montrose Squadron Flying South.

IN order to take part in the combined manœuvres which are to be held on Salisbury Plain next month, 10 machines of No. 2 Squadron of the Royal Flying Corps started from Montrose on Monday morning on their journey south. All machines were B.Es., and the pilots were Capt. Dawes, Capt. Todd, Lieut. Martin, Lieut. Corballis, Lieut. Empson, Capt. Waldron, Lieut. Rodwell, Lieut. Dawes, Lieut. Kelly, and Major Burke. The machines are being followed by transport vehicles (34 in number). With the exception of Major Burke, who had engine trouble, all reached Edinburgh. On Tuesday the whole of the machines reached Berwick, while on Wednesday they all progressed to Blyth.

DAILY MAIL £5,000 PRIZE, 1914.

CIRCUIT OF GREAT BRITAIN.

(Under the Competition Rules of the Royal Aero Club.)

THE FULL REGULATIONS.

THE proprietors of the *Daily Mail* have offered the sum of £5,000 to be awarded to the entrant of the aeroplane which shall first have completed a prescribed circuit round Great Britain in flight within a period not exceeding 72 hours, under the following regulations:—

Regulations.

1. *Date of Contest.*—The competition will open on Saturday, August 1st, 1914, at 6 a.m., and will finish Saturday, August 15th, 1914, at 6 p.m.

2. *Sunday Flying Prohibited.*—There shall be no flying in the Competition between midnight on Saturday and midnight on Sunday, and the period shall not count in the 72 hours.

3. *Qualification of Competitors.*—Both the entrant and pilot or pilots must be British subjects and duly entered on the Competitors' Register of the Royal Aero Club. Pilots must hold an aviator's certificate issued by the Royal Aero Club or other club affiliated to the International Aeronautical Federation.

A passenger must be carried throughout the flights, and the combined weight of the pilot and passenger must be not less than 264 lbs., any deficiency in weight being made up by means of ballast. Pilots and/or passengers may be changed during the contest.

4. *Qualification of Aircraft.*—The complete aircraft and all its parts, including the motor, must have been entirely constructed within the confines of the British Empire, but this provision shall not be held to apply to raw material.

5. *Entries.*—The Entrance Fee is £100 per aircraft, and entries will be received up to 12 o'clock noon, May 30th, 1914. The Entrance Fee of £100 is payable either in one sum or as follows:—

£50 by noon on May 30th, 1914.
£50 by noon on June 20th, 1914.

Late entries will be received up to 12 noon, June 30th, 1914, in which case the Entry Fee will be £150.

The Entry Form, which must be accompanied by the Entrance Fee, must be sent in to the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

No part of the Entrance Fee is to be received by the *Daily Mail*. All amounts received will be applied towards payment of the expenses of the Royal Aero Club in conducting the competition. Any balance not so expended will be refunded to the entrants.

6. *Course.*—The course will be a circuit of Great Britain, with the exception of that part of Scotland north of the Caledonian Canal. Competitors may make the circuit starting in either direction.

7. *Controls.*—The official controls round the course will be announced later. Competitors must alight at each of these controls for purposes of identification.

The aircraft must remain one hour in each control. During the first 30 minutes it must be entirely at the disposal of the officials for examination; the last 30 minutes may be utilised for replenishments and repairs. This period of one hour will not count in the 72 hours.

8. *Starting and Finishing Place.*—The start and finish will be made on Southampton Water.

Competitors will be at liberty to start at 6 a.m. on Saturday, August 1st, 1914, or at any subsequent time and date, provided the complete circuit is accomplished by 6 p.m. on Saturday, August 15th, 1914, within the stipulated 72 hours.

All starts must be made under the supervision of the official of the Royal Aero Club and of the official timekeeper.

There is no restriction as to the number of starts made by a competitor, but in every case the start must be made from the official starting place.

9. *Stoppages.*—Stoppages between the controls are not prohibited, but all alightings must be effected on the sea, an inlet of the sea, an estuary, or a harbour. An alighting on land or inland water will terminate the attempt. (For the purpose of this contest the Caledonian Canal will be considered as the sea.)

10. *Towing.*—Towing is not prohibited, but the finishing line must be crossed in flight.

11. *Repairs.*—Individual replacements and repairs to the aircraft and motor may be made *en route*, but neither may be changed as a whole. The aircraft may be taken ashore for such repairs and replacements. Any time thus spent on repairs will count in the 72 hours.

No repairs or replenishments may be effected during the 30 minutes' allowance for official inspection in controls.

Five parts of the aircraft and five parts of the motor will be stamped or otherwise marked, and at least two marked parts of each of these five must be in place on arrival at each control.

12. *Identification of Aircaft.*—Competitors must have their aircraft completely erected at a place appointed by the Club at Southampton, and must hand them over to the officials for the purposes of being marked. No competitor will be allowed to start until 24 hours have elapsed from the time of so handing over his aircraft. After being originally marked by the officials no fresh parts will be marked.

13. *Time Cards.*—Each competitor before starting will be supplied with a card, which must be handed to and signed by the Club official at each control. A competitor is alone responsible for the safe custody of his card.

14. *Safety Appliances.*—Competitors and their passengers must be equipped with life-belts or other appliances for keeping themselves afloat.

15. *Shed Accommodation.*—Accommodation for the aircraft will be provided at or near the official starting place free to each competitor for one week prior to start of the competition till the closing date.

16. *Examination at Final Control.*—Each aircraft, after passing the finishing line, must, if required by the Club, remain for exhibition and examination for at least 24 hours from the time of arrival.

General.

1. A competitor, by entering, thereby agrees that he is bound by the regulations herein contained or to be hereafter issued in connection with this competition.

2. The interpretation of these regulations or of any to be hereafter issued shall rest entirely with the Royal Aero Club.

3. The competitor shall be solely responsible to the officials for the due observance of these regulations, and shall be the person with whom the officials will deal in respect thereof, or of any other question arising out of this competition.

4. A competitor, by entering, waives any right of action against the Royal Aero Club or the proprietors of the *Daily Mail* for any damages sustained by him in consequence of any act or omission on the part of the officials of the Royal Aero Club or the Proprietors of the *Daily Mail* or their representatives or servants or any fellow competitor.

5. The aircraft shall at all times be at the risk in all respects of the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself, or his passenger, or his aircraft, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the Royal Aero Club and the proprietors of the *Daily Mail* in respect thereof.

6. The Committee of the Royal Aero Club reserves to itself the right to add to, amend or omit any of these rules should it think fit.

Royal Aero Club,
166, Piccadilly, London, W.,
May, 1914.

* * *

Mr. B. C. Hucks at Leicester.

ON Wednesday last week Leicester had its first looping demonstration. Mr. Hucks first indulged in stunts on his two-seater. He has recently developed the famous *chute de côte*, which on a monoplane looks particularly effective. After a punctured tyre had been replaced, Mr. Hucks took up a local undertaker for a flight. The next trip on the same machine was for the height-guessing competition. Mr. Hucks flew straight for Leicester climbing all the way, circled the town and returned to the aerodrome at Old Ayleston, still climbing steadily. On reaching the centre of the ground Mr. Hucks had arranged to fly a small circle, and it was at that point that the height was to be judged. Unfortunately, however, at the very moment that he was about to make the turn he ran into a dark cloud and disappeared entirely from view. It was then agreed to accept estimates of the highest point reached, and the winner of the £5 offered by a local music hall got within 2 feet of the actual figure. Mr. Hucks' new Blériot looper was then brought out for its first flight in public. It had been tried out at Hendon a few days previously, and Mr. Hucks had decided to have the seat moved further forward. He rose very quickly and completed six loops and two upside down flights.

On Thursday Mr. Hucks again flew at Leicester, carrying several passengers on the two-seater and on the looper made six loops.

On the following Saturday a huge crowd witnessed a wonderful display. Three passengers were carried, much fancy flying and *chutes de côte* were indulged in, and seven loops were made on the 50.

EDDIES.

The fame of Mr. J. E. B. Thornely, the young Eastbourne pilot, has spread to Germany with good effect, as I learn from his manager, Mr. Roberts, that arrangements have been made for a lengthy tour of the Fatherland, giving exhibitions of looping flights. He will be flying at Mannheim on May 17th, at Frankfort a/M. on May 18th and 19th, and at Münster on the 21st. From there he will proceed to Pforzheim, Hamburg and Bremen, and thence to Hanover and other places. I feel certain that our readers will join me in wishing him good luck on his trip.

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It was a very pleasant surprise to me on Sunday last at Brooklands to see that most indomitable pilot, Gordon Bell, step out of Mr. Sopwith's Rolls-Royce as smiling and cheerful as ever, and, with the exception of a little stiffness, he has now quite got over his mishap on the Cedric Lee machine. The accident, it will be remembered, was caused by a bolt coming adrift, and does not detract from the value of the machine, with which Mr. Bell expresses himself as very pleased.

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From a chatty letter to hand from Mr. George Payne, of Ballarat, Australia, it is evident that Harry Hawker's trip "down under" has created considerable enthusiasm among our Australian cousins. In the case of the local poet this enthusiasm has found vent in the following effort, which I think well entitled to a corner in this page:—

'ARRY 'AWKER.

(After Kipling, behind scratch.)

News Items.—Mr. Harry Hawker, the young Australian airman, made several successful flights at Caulfield in the presence of 30,000 people. During one of his flights he was accompanied by a young lady.

Senator Millen, Minister of Defence, was a passenger with Mr. Hawker in a recent flight over Melbourne.

'E's a boster ! 'Arry 'Awker,
'E's a doer, not a talker,
Wot we calls a real corker,
Tho' not rash ;
'E cares nothing for a blizzard,
Though it cut him to the gizzard ;
In the air he "is"— a "wizard"—
Less the smash.

An' 'e don't use any frillin'
Just to set the people thrillin'
When they pay their bloomin' shillin'
At the show ;
But 'e takes things wery easy
While 'e sees the engine's greasy,
An' 'e shouts, 'owever breezy,
"Let 'er go !"

An' away 'e goes a-soarin'
While the ladies all adorin'
With us common blokes a-roarin'
In our joy ;
An' our praise 'e needn't flout it,
So let everybody shout it,
For there is no doubt about it
'E's the boy !

'An' we 'ear that Mr. Millen
Found that flyin' was so killin'
That no doubt 'e'll now be willin'
Straight away
To give 'im an invitation
To be boss of aviation
For our young Australian nation,
With good pay.

With 'is plane to fly about in
'E'll be just the boy for scoutin'
If the foeman pokes 'is snout in
Doin' wrong.
'E will never prove a balker,
'Ere's good 'ealth to 'Arry 'Awker,
May 'e keep like Johnny Walker—
Goin' strong !

. . . .

But be wery careful, 'Arry,
While with us you mean to tarry,
Or I'll bet you're bound to marry
Wery soon ;
For you'll find yourself a-sighin',
An' the ring you will be buyin',
If you take the ladies flyin'
Near the moon !

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In his letter, Mr. Payne also mentions that Australia is sending us another of her sons, as Mr. Treloar, of Ballarat, is going to England shortly in order to be initiated into the gentle art of flying. I hope that Mr. Treloar will prove as apt at handling the control-lever as are those of his compatriots who have already made a name for themselves in the flying world over here.

T. Elder Hearn, who is better known under his stage name, Tom Hearn, "the lazy juggler," proved last week that, however lazy he may appear on the stage, he is certainly energetic enough when in the air. He obtained his pilot's certificate on a Blériot monoplane at Buc in March last, after a very brief period of tuition; in fact, I understand that he took his ticket after only four hours' actual practice, and last week, whilst waiting to take delivery of a Blériot two-seater monoplane, he persuaded M. Blériot to lend him one of the looping machines, on which he did altogether four loops.

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On Tuesday of last week the two-seater was ready, and "lazy Tom" decided to make a start for his flight to England, in spite of the very rough weather. Leaving Buc he set his course for Abbeville, but the wind proved stronger than anticipated, and so when he had to come down after fighting the elements for 2 hrs. 40 mins., during which time he encountered several rainstorms, he found himself, not at Abbeville, but at Amiens. Fortunately a military aviation camp was close at hand, and a hangar was placed at his disposal. At 3 o'clock on Wednesday he left Amiens and flew to Folkestone, *via* Boulogne. Landing at Folkestone about 6 o'clock, after taking nearly an hour to cross the Channel, he had half an hour's rest and then started again, with the intention of flying on to Hendon. The weather was still very rough, and, running out of oil, he had to descend at Gillingham, near Chatham. Here he succeeded in obtaining a sufficient supply of castor oil from a local chemist (strangely enough at a lower price than that asked for the precious fluid at the dealers'), but darkness prevented flying any farther that day. Another start was made on Thursday morning at 6.30, but as there was a ground mist which prevented him from getting his bearings, Mr. Hearn had to come down at Hounslow Heath. In landing he buckled a wheel, and so the machine was *hors de combat* until a spare wheel could be obtained. As luck would have it there was an empty hangar on Hounslow Heath in which he got permission to house his machine. At the first favourable opportunity Mr. Hearn hopes to continue his aerial journey to his destination, Bradford.

To have persevered with his flight under such unfavourable conditions and with so little experience was perhaps a little imprudent, as Mr. Hearn himself admits, but at any rate it shows that he is a "sticker," and if he will persevere in the same way in the future he will doubtless soon gain the necessary experience which goes to the making of a good pilot.

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I should think that Frank Goodden, the well-known pilot of the Caudron biplane, who has now joined the Grahame-White Aviation Co., can claim the distinction of being the first to kick a man out of an aeroplane from a height of 2,000 ft. I hasten to explain however, that Goodden didn't do it out of spite to a rival parachutist, but in order to help him clear the wires of the Grahame-White biplane from which the "kickee," Mr. W. Newell, made a parachute descent on the evening of Saturday last.

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Several of the new machines which were seen at Olympia are either tried or about to be tried very shortly. The new Grahame-White 100 h.p. biplane has already been taken up for a few trial flights, with Louis Noel at the helm, and has proved very fast. A few minor alterations have suggested themselves during these trial flights, and as soon as they have been carried out the machine will make its public appearance. The little Avro scouting biplane would have been finished and tried by now, had it not been for the fact that the firm has been so busy in other directions that they have not had time to give it a few finishing touches. I am informed, however, that it will be put through its tests at Brooklands very shortly. The Hamble River seaplane, which was shown incomplete at Olympia, is having its chassis redesigned, and a few other alterations made. It will in all probability be tried by Mr. Gordon England.

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As noted in FLIGHT recently, the aerodrome of M. Blériot at Buc, since the commencement of "looping," has become a most popular Sunday afternoon rendezvous for Parisians, and it has led to the organisation of races, after the style of the meetings at Hendon. Among the most popular items in the programmes are the races with taxying *pingouins* around the pylons. In view of the eccentric gyrations of pupils when they first begin their rolling practice, a race of this sort might provide quite a lot of amusement if introduced at our own aerodromes. Another "gymkhana" event which has been successfully tried in France is to send up miniature balloons from the windward side of the aerodrome and then despatch several pilots on their various types of machines in pursuit of them. This I am told provides quite a lot of sport, and some of the pilots succeed in destroying several of the balloons. Hendon please note!

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They are telling a rather amusing story down at Brooklands. A pupil was going out on one of the biplanes and was heading for the river. He just managed to get the machine off the ground about three inches before reaching the bank, and in doing a left-hand turn in order to bring the machine back over the solid ground he forgot to use his *ailerons*, with the result that the machine side-slipped outwards. Suddenly he seemed to remember that there was something he had to do, and looking about him he caught sight of the *aileron* cables. Letting go of his control lever with both hands he leaned out to the right and caught hold of the *aileron* cable and proceeded to haul it in as though it were one of the sheets of the stay-sail of a boat. The machine promptly banked and continued on a left-hand turn. Within a few seconds he flattened out, but, finding himself now over the sewage farm, the performance was repeated, after which he managed to land safely.

"ÆOLUS."

* * *

The Aerial Derby.

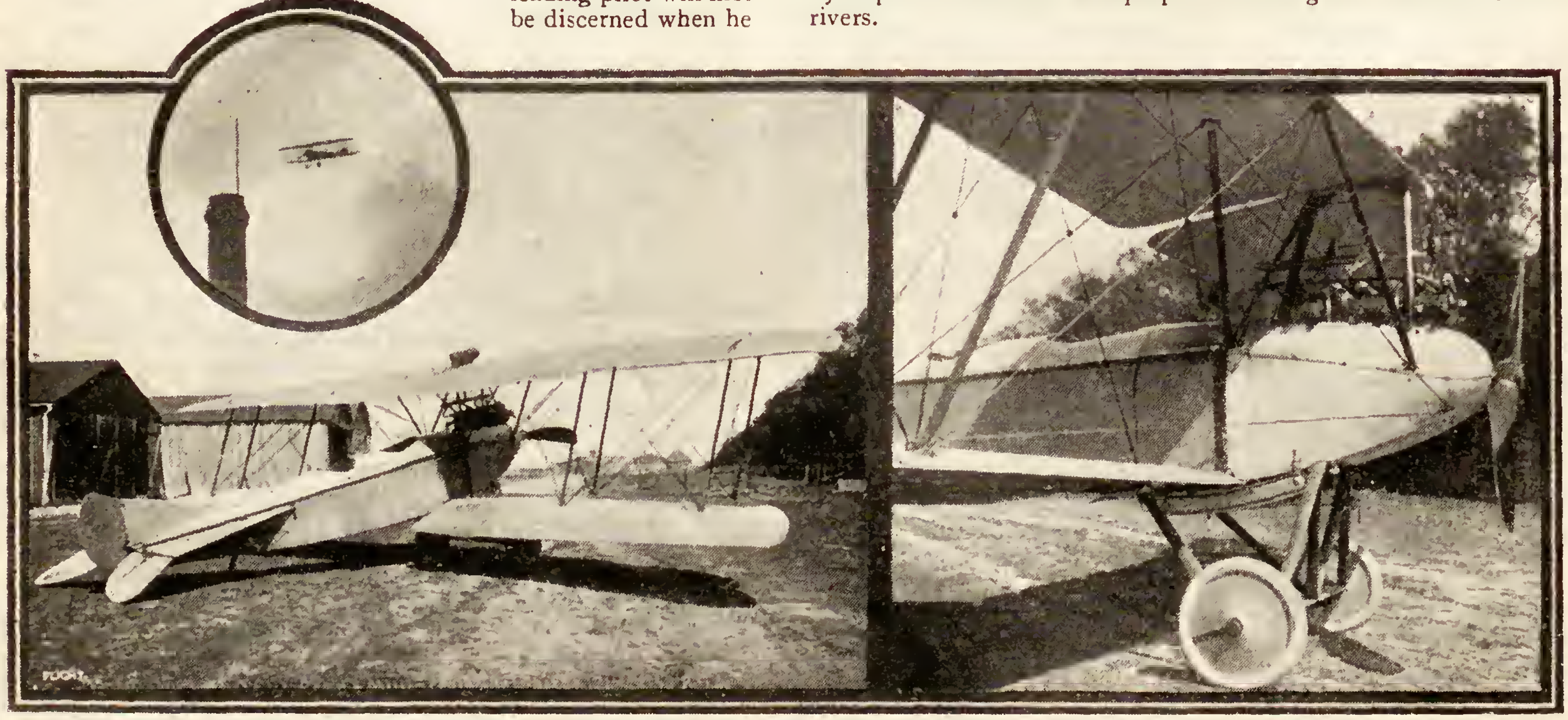
ALTHOUGH the entry list does not close until Monday next, fourteen machines have already been entered to take part in the Aerial Derby round London, which is to take place on Saturday, May 23rd. They include Gustav Hamel and F. Goodden on Moranes, R. H. Barnwell on a Vickers biplane, S. V. Sippe and H. Busteed on Bristols, P. Verrier on a H. Farman, R. H. Carr and Louis Noel on Grahame-Whites, C. H. Pixton and another pilot on Sopwiths, L. Strange on a Blériot, V. Waterfall on a Martinsyde, H. Blackburn on an Avro, and Jack Alcock on a M. Farman. It is expected that several other well-known British and foreign pilots will take part, and that there will be at least twenty machines flying in the contest. As we have before mentioned, the course will be the same 95-mile circuit, starting from and finishing at Hendon, as was used last year, the turning points being at Kempton Park, Epsom, West Thurrock, Epping and Hertford. The machines will be despatched from Hendon at one minute intervals, the first leaving about 4.15 p.m. Extra accommodation is being provided in the enclosures at Hendon Aerodrome, from which, if the day is clear, the leading pilot will first be discerned when he is about five miles away. The prizes for the race are the *Daily Mail* Gold Cup, the "Shell" £250 for the fastest time, the "Shell" trophy and prize of £100 for the winner of the sealed handicap, £75 to the second, and £25 to the third.

Daily Mail Circuit of Britain.

THE actual date of the Circuit of Britain for the *Daily Mail* prize of £5,000 has now been settled. The competition will open at 6 a.m. on Saturday, August 1st, and the start may be made at any subsequent time and date provided the circuit is completed by 6 a.m. on Saturday, August 15th, within the maximum time allowed of 72 hours. The start and finish will be on Southampton Water. The full rules will be found on p. 518.

An Anzani for Shanghai.

As a further sign of the world-wide activities of the General Aviation Contractors, Ltd., of 30, Regent Street, S.W., it may be mentioned that they are this week sending to Shanghai a 35 h.p. Y Anzani engine, together with a Rapid propeller with metal sheaths, propeller shafting, transmission gear, and special starting device, an installation which will be used on a propeller-driven hydroplane with which it is proposed to navigate some of the Chinese rivers.



Two views of the 150 h.p. D.F.W. fast reconnaissance type biplane. Inset, the same machine in flight.

THE MEASUREMENT OF AIR SPEED.

By A. P. THURSTON, D.Sc., F.R.Met.S., Associate Fellow Ae.S.

(*Concluded from page* 499.)

THE Clift and Ogilvie air-speed indicators are described in detail because they have proved their worth and deserve to be better known. They are elastic diaphragm instruments belonging to class (*f*). Instruments of this type utilise the hydraulic or Brahmah Press principle for increasing the magnitude of a force. They consist of two parts, a pressure head and a diaphragm recording device. The Pitot tube is connected with one side of the diaphragm and the static tube with the other. The force due to the difference of pressure between the Pitot and the static tubes is multiplied by the ratio of the diameters of the diaphragm and the Pitot tube. A powerful force may therefore be obtained for operating the indicating device.

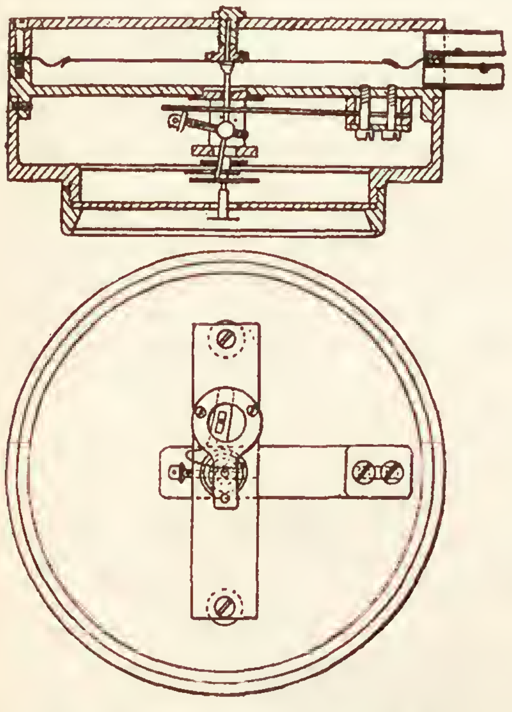


Fig. 4.—Sectional elevation and plan of Clift's air-speed indicator.

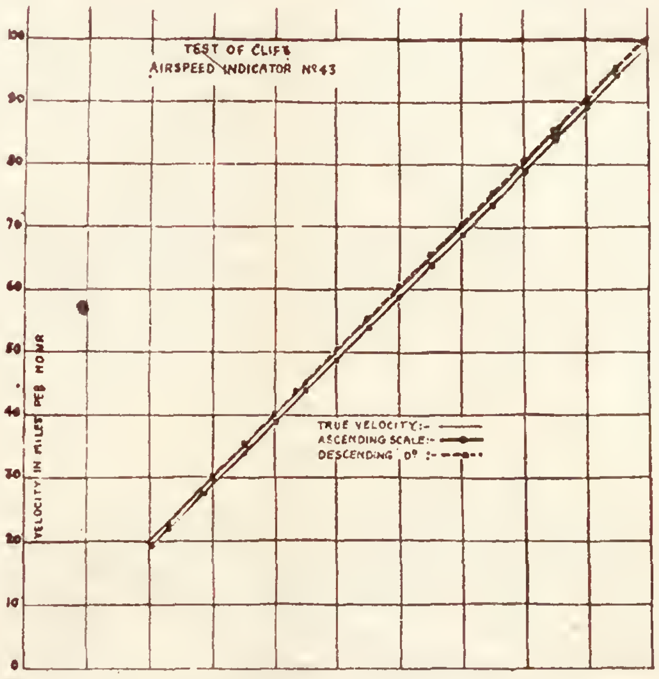
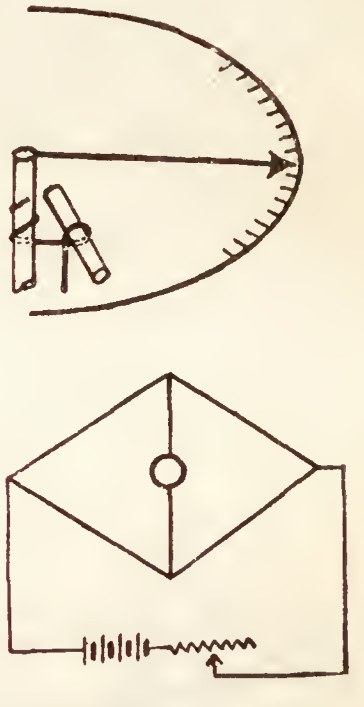


Fig. 5.—Chart showing test of the Clift air-speed indicator.



Figs. 7 and 8.—Above is a diagram of the indicator mechanism of the Ogilvie air-speed indicator, and below, a diagram of the Morris air-speed indicator.

Clift Air-Speed Indicator.—This instrument is shown in Figs. 3 and 4. The "head," which is shown in Fig. 3, consists of the usual Pitot tube and a static tube provided with a conical cap to increase the suction in the lateral holes in the tube under the cap. A disc of the same diameter as the base of the cone is mounted on the tube so as to leave an annular opening communicating with the lateral holes. The indicating instrument contains a cylindrical chamber divided into two parts by a very light flexible diaphragm of specially prepared leather. This diaphragm, which weighs about $\frac{1}{32}$ oz., carries at its centre a small aluminium disc fitted with a central boss. This boss contacts with a collar on a light spindle which is guided on both sides of the diaphragm. The upper or dial end of this spindle presses against the free end of a triangle cantilever or leaf spring. The dynamic and static tubes of the "head" are connected by tubing to opposite sides of the diaphragm. Any difference of pressure between the two sides of the diaphragm is therefore transferred through the spindle to the cantilever spring, which is thereby deflected. The movement of the spring is transmitted by a rocking lever having an adjustable radius arm in contact with the spring to a multiplying mechanism, such as is used in aneroid barometers, whereby a hand or indicator is given a rotary movement over a dial which may be graduated to read either pressure or velocity. The multiplying mechanism consists of a rocking quadrant rack, which is provided with a slot engaged by a pin projecting from the rocking lever and meshes with a pinion on the spindle carrying the hand. A spiral or hair spring normally restores the hand to the zero position. The instruments are graduated individually in the works for various air pressures, which are read by a delicate tilting water gauge capable of reading to within 0·002 ins. of water. The velocity is given by the equation $v = 57{\cdot}7\sqrt{h}$.

Where v = velocity in feet per sec. and h = corresponding difference of level in water gauge in inches.

The width of the annular gap has been found to affect the constant in the above equation, but as great care is taken in adjusting this width the variation of this constant is negligible with the instruments placed on the market. These instruments have been tested between considerable ranges of temperature with satisfactory results. The inertia of the moving parts is so small that the readings do not appear to be affected by rapid changes of velocity. In conducting an exhaustive test of any instrument the ascending and descending readings should be plotted against the true readings. Any lag due to friction of the parts, fatigue, or to hysteresis is thereby revealed. This has been done for Clift's air-speed indicator, and the results are plotted in Fig. 5. The maximum difference between ascending and descending readings is 3 per cent., or $1\frac{1}{2}$ per cent. on either side of the mean. As, however, the greater accuracy, in flying machine work, is obviously required on the descending scale, the instrument is graduated so that the maximum error on this scale does not exceed $\frac{1}{4}$ mile per hour.

The Ogilvie Air-Speed Indicator.—This instrument is shown in Figs. 6 and 7. Fig. 6 is a photograph of the instrument used by Messrs. McLean and Ogilvie in their successful flight up the Nile to Khartoum. The Ogilvie air-speed indicator is characterised by extreme simplicity. A cylindrical chamber is divided into two parts by a stretched indiarubber diaphragm. The indicating hand is carried by a stout spindle which is pivotally mounted in the centre of a light metal frame bridging across the centre of the upper chamber. A second stout spindle is pivoted in close proximity to the first spindle and with its axis at right angles to it. These spindles act as drums or rollers to a thin silk or other thread, one end of which is connected to the centre of the diaphragm. This thread (see Fig. 9) passes upwards between the spindles and over the second spindle to the lower end of the indicator spindle. It then makes two ascending anti-clockwise turns on the first spindle and its end is connected thereto. The head is of the usual combined

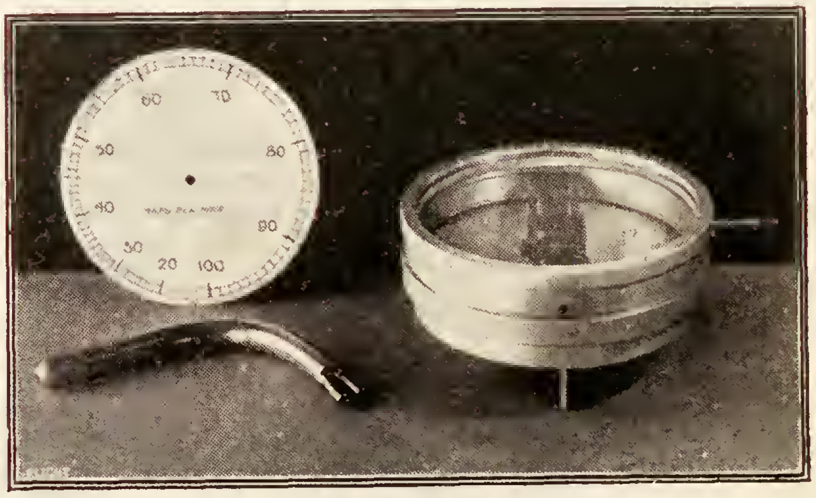


Fig. 6.—Head and details of Ogilvie's air-speed indicator.

concentric dynamical and statical tube type, and its "constant" is stated to be unity. The dynamical tube is connected to the upper chamber and the statical tube to the lower chamber. A difference of pressure between the two sides of the diaphragm causes a pull to be exerted on the thin thread which rotates the spindles against the action of a spiral or hair spring mounted on the indicating spindle. The deflection varies with the difference of pressure, and the dial is graduated in terms of the corresponding velocity. The scale, so obtained, is an "open" one between velocities of 20 and 100 miles per hour.

Hysteresis in the rubber diaphragm, causing the readings on an ascending and descending scale to differ from the true reading, is largely obviated by placing the diaphragm under an initial tension. The instrument has been tested between the limits of 30° below zero and the heat of a tropical sun, and has given satisfactory readings. There appears to be no fear that the indiarubber diaphragm will rapidly perish. Instruments which have been in use for nearly a year show no signs of deterioration. The sensitiveness of the instrument depends of course on the sizes of the piping and head. Usually $\frac{5}{16}$-in. × 24 gauge is used on biplanes and $\frac{1}{4}$-in. × 24 gauge on monoplanes. The head shown in the photograph has a restricted nozzle, but even with this, Mr. Ogilvie says that he saw the hand jump in half a second from 55 to 69 miles an hour during a bad gust in the Sudan.

Instruments of the Clift or Ogilvie type should on no account be blown into, as the zero of the instrument may be thereby upset or the indicating mechanism damaged.

ρv Instruments.—(2) This type, which has been left to the last, will be illustrated in detail by a device developed at East London College by my friend and colleague, Prof. Morris. His device has proved itself so convenient in use, and so sensitive and acccurate in recording changes of velocity, that it can be commended to members of this Society for laboratory work. The device can be converted into a ρv^2 instrument for acting as a dynamical buoyancy meter, but it is not proposed to discuss that question to-night. Instruments of the ρv type consist of two parts, one part being engaged by the air and the other being connected to the first part so as to indicate the change produced in it by the current of air. The electrical resistance of a wire varies as the temperature, and various materials have different temperature coefficients. This is shown by the following table taken from Prof. Morris's paper* which was read before the British Association at Dundee, 1912:—

Material.	Melting Point. Approximate. Deg. Cent.	Electrical Resistance. Temperature Coefficient. Per cent. per Deg. Cent.
Iron	1,505	0·62
Copper... ...	1,062	0·428
Nickel	1,450	0·27 commercial 0·62 electrolytic
Tantalum ...	2,910	0·33
Platinum ...	1,730	0·38
Tungsten ...	2,950	0·51

It will be noticed that iron and electrolytically deposited nickel have the highest temperature coefficients. (Any impurity in the nickel causes a big drop in the temperature coefficient.) If, therefore, an electrically heated wire is placed in an air current its temperature will be lowered and its electrical resistance increased by the cooling effect of the air.

The following principles may be used:—

(1) The potential across the wire being maintained constant, the current flowing in the wire will give a measure of the velocity.

(2) The resistance, and therefore the temperature, being kept constant, the current will also give a measure of the air velocity.

The laws connecting radiation and velocity have been thoroughly investigated by A. E. Kennelly, C. A. Wright and J. S. Van Bylevelt, and their results are published in a paper on "The Convection of Heat from Small Copper Wires." (*Transactions of the American Institute of Electrical Engineers*, Vol. XXVIII, Pt. 1, 1909.) These experimenters found that

(1) The linear convection is proportional to the temperature elevation of the wire.

(2) Between 4·5 and 45 miles per hour the linear convection increases as the square root of the wind velocity.

Prof. Morris found that the most convenient apparatus consisted of a simple Wheatstone bridge made with alternate arms of a material having a high temperature coefficient and the remaining arms of manganin, the electrical resistance of which is practically independent of the temperature. The arrangement is shown in the diagram, Fig. 8. The potential across the bridge was maintained constant. This arrangement corresponds to the first principle enunciated above, and therefore the value of the current gives a measure of the air velocity. The sensitive arms of the bridge in one case were formed of thin platinum wire of No. 40 S.W.G. and 2·62 ins. long, and the constant arms of 6 inch lengths of manganin wire of No. 30 S.W.G. This bridge could be brought into balance in still air by passing a current of 1·4 ampères through it, which gave a temperature rise of about 85° Cent. in the bridge. The battery consisted of a two-volt accumulator, and the millivoltmeter was a "Record" 50 ampère moving coil instrument with its shunt removed.

In another type of bridge, which is independent of the temperature of the air current, the arms consist of four iron wires, the alternate wires being shielded in tubes to form the constant approximately arms of the bridge and the exposed wires forming the sensitive arms.

This apparatus is very useful in exploring the velocity of air flow around a body. It responds rapidly to changes in velocity, and at the same time is perfectly dead-beat, and it lends itself to giving large scale indications. The velocity is read directly on the instrument and the direction is recorded by projecting the image of a vane pivoted on the sensitive wire on to a screen.

In many cases where vertical fans, rudders, or horizontal elevators are placed in the "wake" or shadow of other bodies or planes, the results obtained may be very different from that calculated owing to the wake effect. The author has, on previous occasions and in various ways, pointed out the effect of the wake as regards stability and control. This instrument provides another means of investigating its effect.

The last diagrams, Fig. 9, show the contour velocity lines in the wake of an aerocurve having a camber of 1-10 of the span and set at angles of 0°, 10° and 20°. It was previously used by the author for determining the distribution of pressure on inclined aerocurves, and described in a paper read before the British Association, Dundee, 1912.* It is aerocurve No. 2 in that paper, and has a span of 2·42 inches. The numerals indicate the velocity in miles per hour. A section of the aerocurve is shown in position in all the figures set at the true inclination. All the curves show in a graphic way the shadow cast by the aerocurve. It is obvious that fins or rudders placed in this shadow would not be as "efficient" in action as corresponding ones in a clear run of air. The velocity in the immediate wake increases with the distance behind the rear of the aerocurve, but the maximum intensity of shadow appears to remain approximately in a horizontal line.

In conclusion, the author wishes to thank most sincerely Prof. J. T. Morris, M.I.E.E., and Messrs. E. H. Clift, A.F.Ae.S., F. K. McLean, A.F.Ae.S., and A. Ogilvie, F.Ae.S., for very kindly lending apparatus and supplying information. He would also record his great indebtedness to Mr. B. G. Cooper, A.F.Ae.S., for valuable assistance in obtaining information and apparatus.

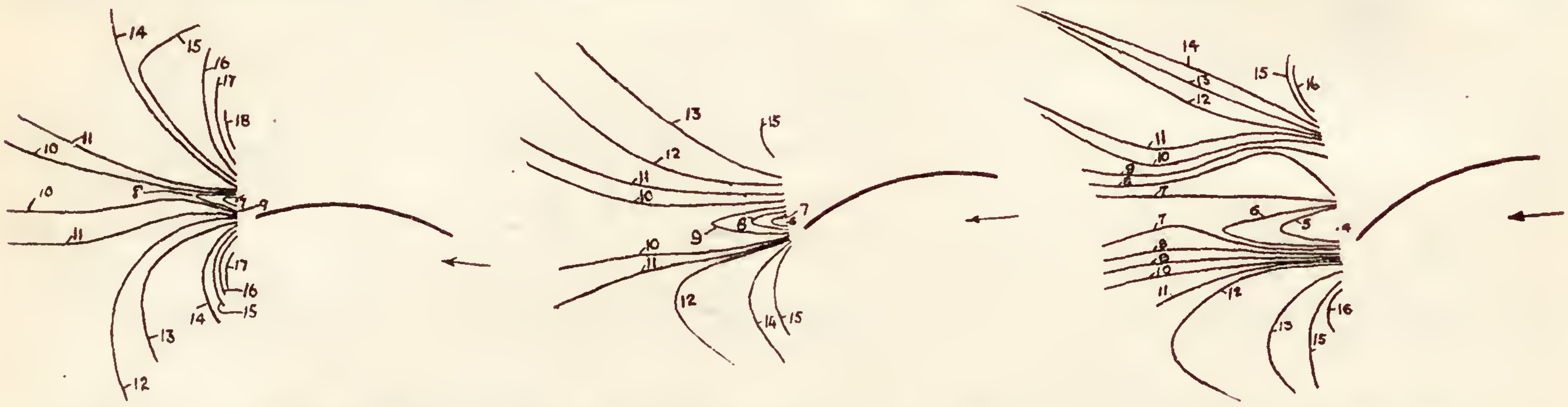


Fig. 9.—Contour velocity lines in the wake of an aerocurve. A – at 0°; B – at + 10°; and C – at + 20°.

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* *Engineering*, December 27th, 1912.

* *Engineering*, September 20th, 1912.

THE FLYING MACHINE FROM AN ENGINEERING STANDPOINT.[*]

By FREDERICK WILLIAM LANCHESTER, M.Inst.C.E.

1. *The Air Considered as the Permanent Way.*—In approaching the subject of the flying-machine from the engineering standpoint, it is desirable to devote attention in the first instance to the air considered as the "permanent way." When the atmosphere is quiescent a gliding model or a flying-machine carves its way through the air in rectilinear flight as if supported on a perfectly-laid track—a far more perfectly laid track than the railway engineer has hitherto shown himself able to lay down. Under such conditions the Aeronautical constructor requires to know the weight and coefficient of traction of the machine, the velocity of flight, and the maximum gradient it is required to climb, the problem then resolving itself into the provision of a screw-propeller of sufficient diameter and appropriate pitch to supply the necessary thrust-reaction, and the fitting of a motive-power engine (and, if necessary gearing) to drive the said propeller at its correct speed. The horse-power needed is calculated just as in any other case of propulsion or traction. In addition, the engineer needs to be able to calculate the stresses necessary to the design of his aerofoil and *fuselage* structure, and to design a suitable alighting chassis. For the present we shall assume that we have to deal with a machine in being, and devote our attention to the peculiarities and properties of the aerial highway to which the machine has to be adapted and to adapt itself. In Fig. 1 is represented the flight-path[†] of a hypothetical machine, plotted from a mathematical equation. The hypothetical machine differs from an actual flying-machine, or glider, inasmuch as it is assumed to be quite small in comparison to the minimum radius of curvature of its flight-path, its whole mass is taken as concentrated at its centre of gravity (consequently it has no moment of inertia about its transverse axis), and it is presumed to experience no resistance in flight, or, alternatively, it is supposed to have a propelling force constantly applied equal at every instant to its resistance. Referring to Fig. 1, it is seen that the straight line flight-path is represented by a horizontal line, path No. 1; here the velocity of the machine is equal to that acquired by a body falling freely through a distance H_n constituting the distance between flight-path No. 1 and the datum line. For this hypothetical machine there is an infinite number of other possible flight-paths, the whole series being represented by the equation $\cos\theta = \frac{H}{3H_n} + \frac{C}{\sqrt{H}}$, from which the samples given are plotted.

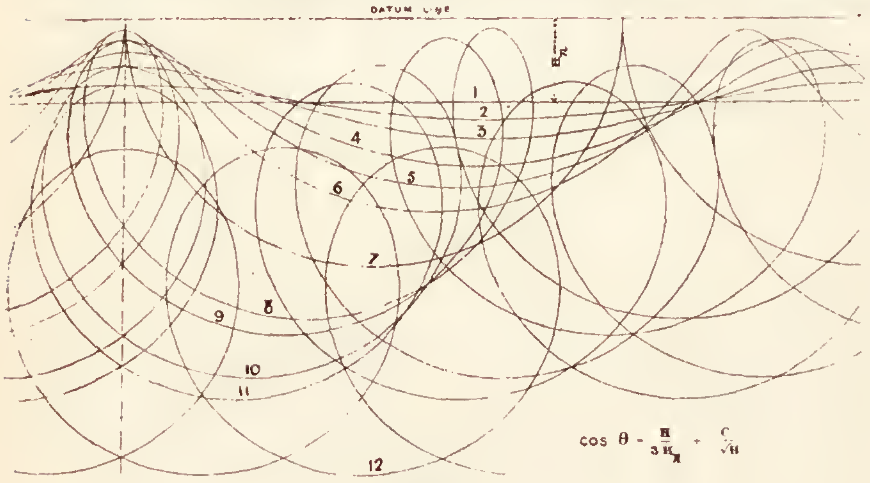

Fig 1.

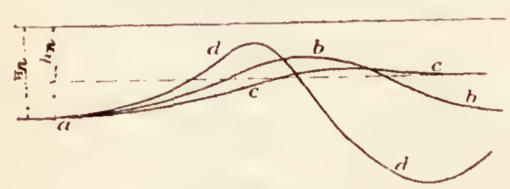

Fig. 3.

It will be seen that the series comprises two notable special cases. Firstly, we have the straight line path No. 1; secondly, the exact semi-circle No. 7.

The flight paths, or "phugoids" Nos. 1 to 6, of less amplitude than the semicircle, are those which are of chief concern from our present point of view, the cases beyond the semicircle, in which the curve has no point of inflection, and in which the machine "loops the loop," are in the main only interesting from the point of view of the mathematician and the student of "trick-flying." These inflected curves have been more fully plotted in Fig. 2. In both Figs. 1 and 2 the velocity at any point is that corresponding to a body falling freely from the datum line. Thus, given the normal or natural flight velocity V_n, the scale of the chart is determined by the calculation of H_n from the equation of the falling body $H_n = V_n^2 \div 2g$.

Although, as already stated, the flight-paths given in Figs. 1 and 2 represent, strictly speaking, a hypothetical machine that only faintly resembles an actual machine, the difference has but little effect on the validity of these flight-path charts. I have shown (see *Aerial Flight*, vol. ii, §§52 *et seq.*) that in the main the effect of moment of inertia about the transverse axis is to cause the amplitude of the oscillation to increase, so that the machine, or glider, will pass by imperceptible stages from one curve to another in the order they are numbered on the chart, eventually leading to instability. I have also demonstrated that the assumption of a constant horizontal propulsive force, in place of a force always in equilibrium with the resistance, has the reverse effect, and tends to damp out an oscillation and diminish the path amplitude. We may thus in any free flight model, or glider, have the flight-path unstable, neutral, or stable,[*] according to which (if either) influence predominates. In an actual flying machine we may also have the flight-path unstable, neutral, or stable, but here experience has shown that a skilled pilot is well able to handle a machine even though its natural flight-path may be unstable; in spite of this, calculation shows that, speaking generally, machines as flown to-day are not far, one way or the other, from the neutral state. From the engineer's point of view it is unimportant whether the flight-path stability is inherent in the machine, or whether, so to speak, the finishing touches have to be given by the pilot himself.

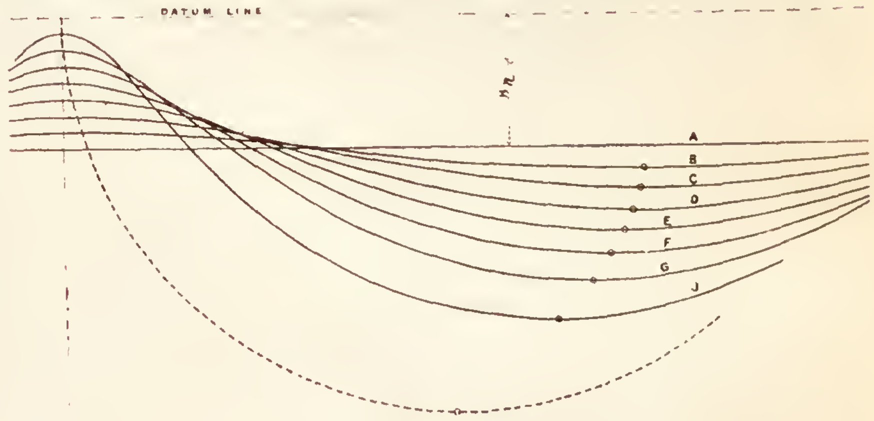

Fig. 2.

The point I wish to make clear at the present juncture is that the curves, plotted from a mathematical equation, do actually apply with reasonable experimental exactitude to models and to machines in flight. Thus, a disturbance acting on any model in free flight will set up periodic undulations in the flight-path, and these have within the limits of experimental observation both the time period and phase length corresponding to their theoretical values in relation to the flight velocity. Some experimental determinations (*see Aerial Flight*, vol. ii, §§ 69), showing the reality of this relation made with models in free flight, are given in Table I.

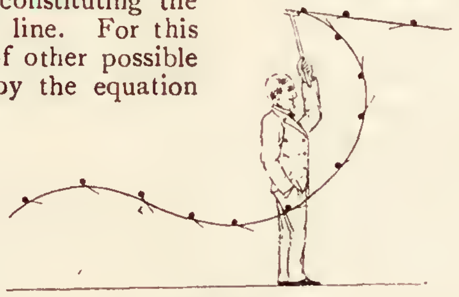

Fig. 4.

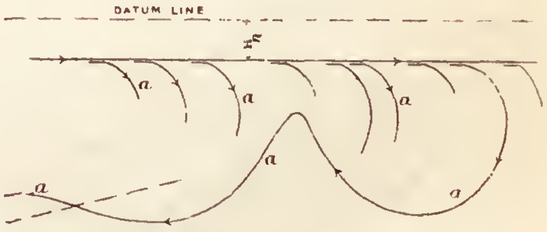

Fig. 5.

TABLE I.

		1.	2.	3.
Flight velocity		14·0	14·0	10·0
Theoretical phase length ...	feet	27·0	27·0	15·5
Measured ,, ...	feet	26·0	—	—
Theoretical time period ...	second	1·93	1·93	1·55
Measured ,, ...	second	1·9	1·83	1·37

The phugoid, or flight-path chart is capable of useful application in more ways than one. Any movement of the tail plane or "elevator," for example, by altering the attitude of the main aerofoil causes the machine to become self-supporting at a lower or higher velocity, that is to say, alters its natural velocity, and we thus may represent such a change in the manner indicated in Fig. 3. Here a machine is presumed flying at a certain velocity corresponding to the height H_n, its elevator at the point *a* is altered to correspond to a lower flight velocity corresponding to a height, h_n; this is equivalent to altering the scale of the chart at that point, and the subsequent path of the machine is represented by the phugoid curve *a b*. This path may undergo damping, either due to the inherent stability of the flight-path or due to the intervention of the pilot, as shown by the line *a c*. In the case of a model of unstable flight-path with no intervention from the pilot, the flight-path becomes one of augmented amplitude, *a d*.

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[*] Paper read before the Institution of Civil Engineers on May 5th.

[†] Reproduced from Fig. 42 of *Aerial Flight*, by F. W. Lanchester, vol. ii

[*] This kind of stability is frequently termed *dynamic stability.*

When a machine is fitted with an elevator (or adjustable tail-plane) of large surface, it is possible for the pilot to take such entire charge of his machine that he appears to be designing his own flight-path curves rather than modifying or damping the natural curves of the equation. It is quite true that this is one way to fly; it is, in fact, the old Wright method of flying, the original Wright machines having been furnished with a ront elevator carrying little or no load. That type of machine, however, may be regarded as a thing of the past. The Wright machine could be "piled up" by inattention or want of skill at any moment, and if once its flight velocity fell below a certain value, either from want of attention on the part of the pilot, or from a wind gust from abaft, or other cause, the pilot was definitely unable to restore his normal flight condition; it is for this reason that the Wright type of machine has been abandoned.[*]

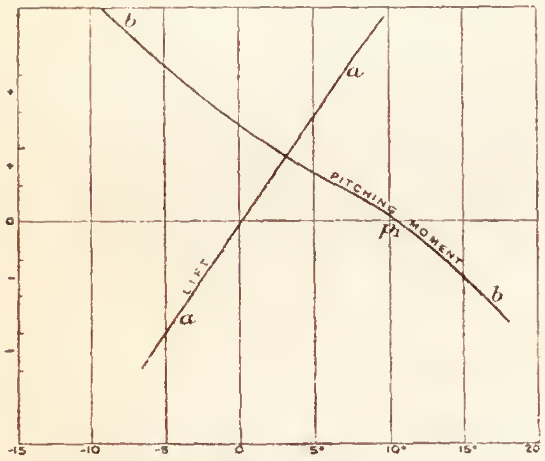

Fig. 6.

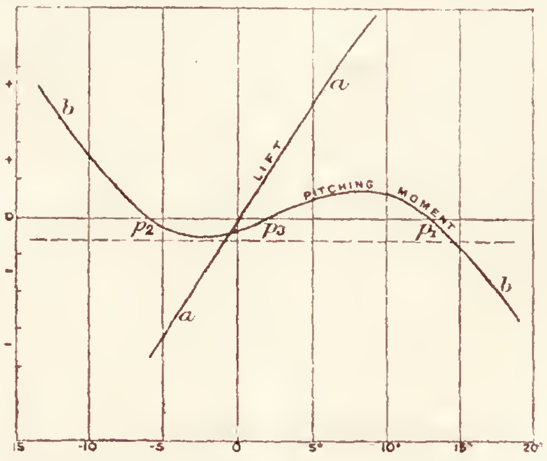

Fig. 7a.

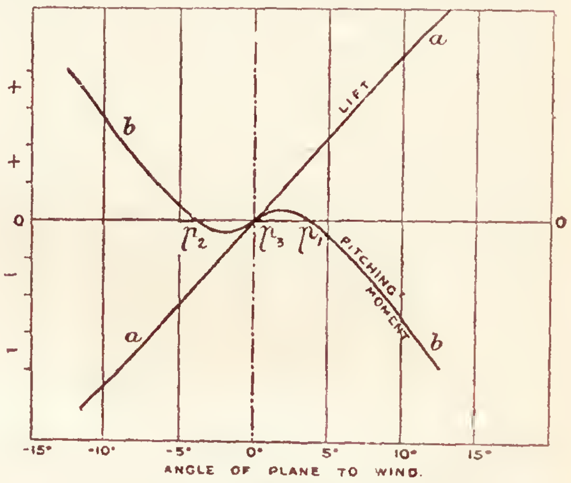

Fig. 7b.

2. *Catastrophic Instability.*—Before entirely quitting this branch of the subject, attention will be directed to a point first raised by me within the last twelve months under the title of Catastrophic Instability. It is a curious fact that, although the author and other investigators had been studying the question of stability by various methods for some twenty years, more or less, and such items as longitudinal stability, lateral stability, and a form known as asymmetric or "rotative" stability, have been "catalogued" and investigated, both theoretically and experimentally, a form of instability which may in practice be far more serious and deadly, has until quite recently escaped notice. There are certain types of flight model, of which the ordinary "ballasted plane" is an example, in which the flight-path is ambiguous. In the case of the ballasted plane[†] the position is quite simple; this type of model is symmetrical, it has no "upside down"; if launched at its correct flight-velocity to travel on flight-path No. 1 (Fig. 1) it is equally capable of travelling on an alternative flight-path intermediate to those numbered 11 and 12, the only determining factor being whether at the moment of launching the pressure reaction is in an upward or downward direction. A very slight want of skill in launching one of these ballasted planes gives at once the inverted flight-path (Fig. 4); likewise a gust or disturbance acting on a model of this kind in flight, may be sufficient to invert the flight-path and determine its downfall. From our present point of view, regarding the air as the "permanent way," the position is as though the model, or machine, were continually crossing a number of facing points arranged, not quite as on a railway, but in a vertical sense (Fig. 5), so that the machine is always in danger of being switched off on to an inverted flight-path, *a a*, if an aerial disturbance of the right kind and sufficient magnitude and duration happen to be encountered.[*]

In my opinion the soundest way to avoid danger from this cause is experiment in a wind channel with scale models, both of the aerofoil and of the machine as a whole, prepared from the working drawings.

According to the evidence that has up to the present been collected the lift diagram for any machine passes without break of continuity from positive to negative values, and the angle of inclination is a single valued function of the pressure reaction *a a*, Figs. 6 and 7. The pitching moment in some cases is a curve of similar character, *b b*, Fig. 6, in other cases it is of the form *b b*, Figs. 7*a* and 7*b*, the latter of which represents the case of the ballasted plane. In Fig. 6 the model may be considered as catastrophically stable, but in Figs. 7*a* and 7*b* there is instability; there are three positions, or attitudes, of the machine, at which the pitching moment is zero, the two outer two, p_1 and p_2, defining respectively the stable positions of normal and upside-down flight, and p_3 marking the critical angle of unstable equilibrium when the machine passes from one state to the other.

In Table II are given results of some experiments recently carried out with a model machine at the N.P.L. These were not directed to the point in question, but incidentally serve as an apt illustration, and roughly form the basis of the plotting, Fig. 7*a*.

TABLE II.

Angle of pitch. Chord as datum.	Pitching moment.
−14	+0·0264
−12	+0·0152
−10	+0·0063
Angle of stable equilibrium upside down.	
− 8	*−0·0015*
− 6	*−0·0059*
− 4	*−0·0049*
− 2	*−0·0014*
Critical angle of catastrophic change of flight-path.	
0	+0·0030
2	+0·0070
4	+0·0102
6	+0·0210
8	+0·0218
10	+0·0127
12	+0·0072
14	+0·0026
Angle of stable equilibrium right way up.	
16	−0·0043
18	−0·0173

In the experimental figures as tabulated, the evidence of catastrophic instability is seen in the column headed pitching moment;

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[*] Practically the whole of the distinctive features of the early Wright machine have disappeared to-day; for example, the tailless machine is a thing of the past, nearly every modern machine is fitted with a tail plane. The forward elevator is obsolete or nearly so. The twin propeller has given place to the single propeller in almost every case. The gear-driven propeller also has been abandoned. The vertical four-cylinder or motor-car type of engine has proved itself inadequate. The exposed position of the pilot, engine, &c., has gone, never to return. The Wright method of launching on runners and alighting on skids also is a thing of the past. The biplane construction and the fore-and-aft vertical surface have to some extent survived, but these features were in no wise new when adopted by the Wright Brothers. The wing warping and vertical rudder (neither feature in itself new), operated by the Wright Brothers from one control lever in common, are nowadays operated from two entirely separate controls.

[†] A rectangular plate of mica, conveniently 0·003 inch thick, 8 inches by 2 inches, ballasted at the centre of the leading edge. Compare *Aerial Flight*, vol. i, p. 231; vol. ii, p. 4.

[*] The disastrous nature of this sudden inversion of the flight-path may be gauged from the fact that it represents in effect a complete reversal of gravity, the machine is accelerated downwards with a force comparable to that previously giving it support, and any loose tools, instruments, or fitments, including the pilot himself, are liable to be jettisoned by the machine, whose subsequent career is an upside-down flight carried out on its own account. The facts on record relating to the fatal accident to Major Merrick at the Central Flying School (October 3rd, 1913), point strongly to catastrophic instability as the cause.

whenever there are three changes of sign the model is catastrophically unstable.

Referring to Fig 7*a*, it may be observed that the character of the pitching-moment curve depends primarily upon the form of the aerofoil, the position of the centre of gravity, and the effective area of the tail member. By altering the angle of the tail plane (or by altering its effective angle by moving the flap known as the elevator), the datum line of Fig. 7*a* is in effect raised or lowered, but the form of the curve itself is not materially changed. It is evident, therefore, that a given machine may be catastrophically stable within certain limits of the adjustment of its elevator, that is to say, referring to Fig. 7*a*, it will be seen that the datum line may either cut the curve once or three times; the range of adjustment of the elevator that results in cutting the curve once leaves the machine catastrophically stable, but when the elevator is adjusted so that the datum line cuts the curve three times the machine is catastrophically unstable. In such a case as that shown by the dotted datum line in Fig. 7*a*, in which the machine is catastrophically stable, the form of the pitching-moment curve is still open to objection. Not only is it always possible for the pilot to bring about catastrophic instability by an otherwise well-intentioned movement of his elevator, but the restoring couple for pitching beyond a small amplitude ceases to follow even approximately the straight line law, a fact that inevitably imperils the flight-path stability. Even when, as illustrated in Fig. 8, the pitching-moment curve, *b b*, never passes the horizontal, and so catastrophic instability is no longer to be feared, the conditions are not satisfactory, since there may be a considerable change of attitude of the machine without giving rise to any commensurate restoring couple.

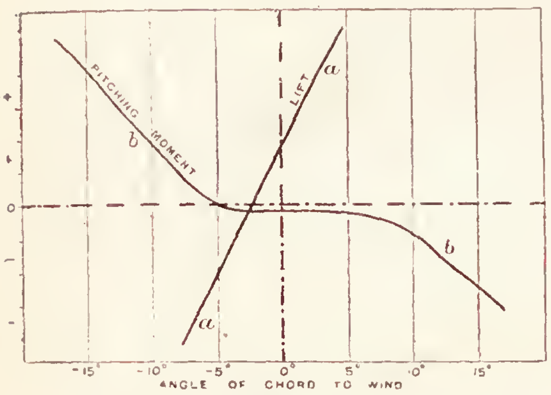

Fig. 8.

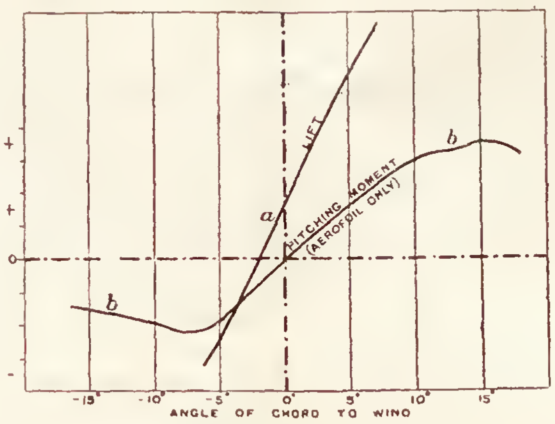

Fig. 9.

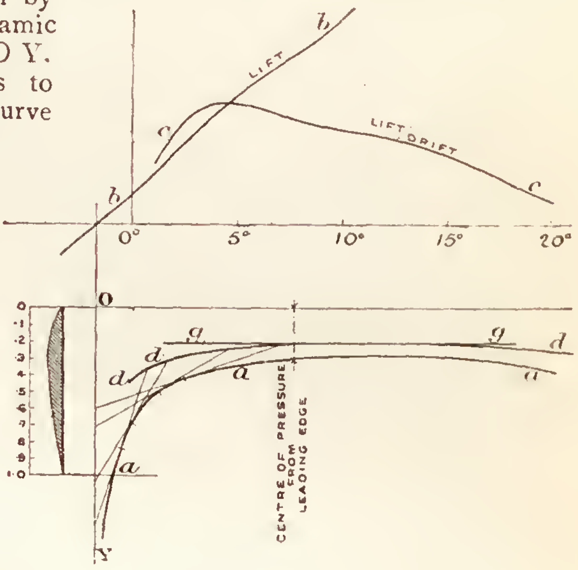

Fig. 10.

The undesirable kink in the pitching-moment curve, shown in Figs. 7*a*, 7*b*, and 8, is due to the movements of the centre of pressure of the aerofoil itself in relation to the position of the centre of gravity. The tail-plane alone will give a pitching-moment curve of the type illustrated in Fig. 6, but the fore and aft change of position of the centre of pressure of the aerofoil, at different angles of attack, gives rise to a pitching - moment curve whose exact character depends upon the position of the centre of gravity. Should this correspond to a positively loaded tail, a curve of the type *b b*, Fig. 9, will result; this, superposed on the tail component, imparts to the pitching-movement curve of the complete machine the kink shown in Fig. 7*a*.

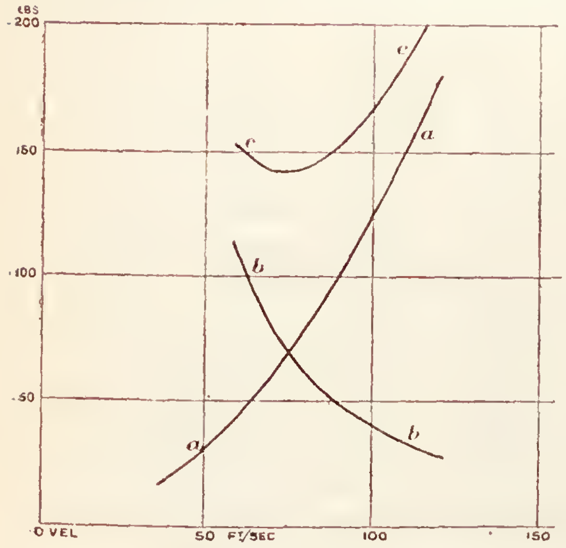

Fig. 11.

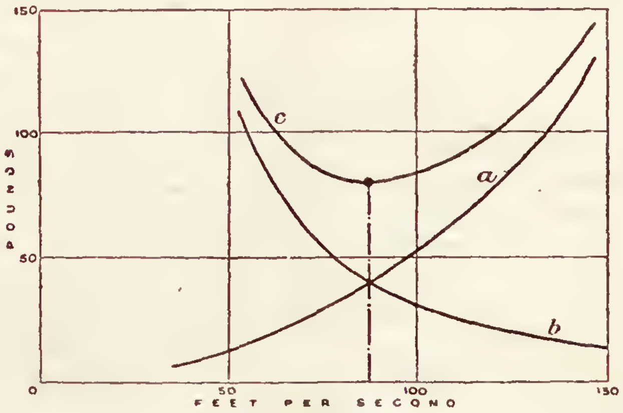

Fig. 12.

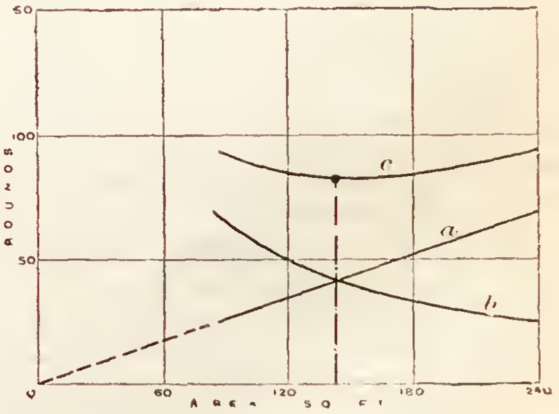

Fig. 13.

In order to definitely make sure of a satisfactory pitching-moment curve for the complete machine, the pitching-moment curve of the aerofoil alone should, at no point, exhibit an inverse trend. To achieve this it is necessary to bring the centre of gravity appreciably in front of the most forward position of the centre of pressure of the aerofoil, so that the tail plane will under all conditions carry a slight negative load. Taking it as a basis that at the worst point the pitching-moment curve for the aerofoil alone shall be horizontal (the form of curve shown in Fig. 8), the geometrical construction given in Fig. 10 may be employed to give a suitable location to the centre of gravity; here the locus of the centre of pressure (as experimentally determined) is given by the line *a a a*, the pressure-reaction curve is shown by the line *b b b*, the dynamic zero being on the line O Y. A number of tangents to the pitching-moment curve are drawn at random from points on the axis O Y, and are produced a distance equal to their own length beyond the point of contact, the extremities of these tangents defining a curve *d d d*. Draw *g g* tangent to *d d d*, then the centre of gravity should be situated on, or forward of, the line *g g*. The location of the centre of gravity on this line gives a pitching-moment curve for the aerofoil alone whose point of inflection is horizontal (as in Fig. 8). If we assume the machine flown at a normal speed corresponding to the maximum lift/drift ratio of the aerofoil (curve *c c c*), the centre of gravity in this particular case is one-eighth of the chord length in advance of the centre of pressure. Assuming the tail length equal to three times the chord (as in the B.E.2 type of the R.A.F.), this is equivalent to a negative load on the tail equal to 0·04 (4 per cent.) of the weight of the machine.* A machine so ballasted may be regarded as absolutely secure from catastrophic instability and as having a pitching-moment curve of an adequate character.

In connection with the present subject it is worthy of remark that in a well-designed aerofoil the most forward position of the centre of pressure is never far-removed from the point of maximum lift/drift ratio;† this fact is of importance, inasmuch as it permits a considerable range of movement round about the attitude of normal flight without introducing grave irregularities in the pitching-moment-curve. Were it not for this the required conditions might frequently be far more difficult of fulfilment than is actually the case.

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* A similar conclusion was reached by the author some eight years ago, based on an entirely different method of investigation. For model experiment a negatively loaded tail was found to be advantageous; the figure 0·035 is given in *Aerial Flight*, vol. ii, p. 335. It is desirable to work with a less proportion of negative load from the point of view of keeping the resistance low; evidently the matter is one for compromise.

† This is not in the nature of a coincidence, a well-designed aerofoil at its attitude of least resistance meets and leaves the stream-lines representing the relative air-flow (in the region of its mid-section) conformably. Under these conditions small changes of attitude one way or the other do not cause any abrupt change in the aerodynamic system. Such expedients as flattening the extremities and giving a reflex curve to the trailing edge are also found to be of service.

3. *The Laws of Resistance.*—Having established the general character of the airway, or track on which the flying machine is sustained, we pass directly to the consideration of the law of resistance, as determining the coefficient of traction on which depends the power expenditure. It is customary, and it is correct, to regard the resistance encountered by a machine in flight as made up of two parts; firstly, the direct resistance, which varies approximately[*] as V^2, namely, that form of resistance common to flying-machines, dirigibles, motor-cars, ships, &c., in other words, the ordinary resistance experienced by any vessel or body in its passage through a fluid; and, secondly, the flight resistance proper which follows an entirely different regime.

So far as the pilot or aviator himself is concerned all the direct resistances may be regarded as of the same kind and grouped together, namely, the sum of the eddy-making and skin-frictional resistances due to the *fuselage*, the alighting chassis and the various struts, stays and spars, whether belonging to the body of the machine or aerofoil; also the engine resistance (if exposed), the radiator, and the frictionally exposed surfaces of the rudders, fins (vertical surface), and of the aerofoil itself. Resistance from all these causes varies approximately as V^2, and so can be represented by an equivalent normal plane, and this equivalent normal plane is one of the resistance constants of any given machine; it may be represented by a graph, *a a*, Fig. 11—a portion of a parabola—covering the range of speed of which the machine is capable.

From the point of view of the pilot the aerodynamic resistance *b b*, which goes to make up the total *c c* (Fig. 11), follows, within limits, the inverse square law, namely, varies as k/V^2, where k is a constant determined by the design of the aerofoil; there is a critical angle which defines the low velocity limit of this law, and at best the inverse square law is but an approximation; it is the correct law to assume for an undefined form of aerofoil, but every individual design has its own particular manner of variation, which must be ascertained by experiment. The experimental determinations for any aerofoil include, with the aerodynamic resistance, the skin frictional, and a certain amount of other inseparable direct resistance, so that if experimental values are taken these resistances should not be again included in the computation of the equivalent normal plane.

From the point of view of the designer things wear a somewhat different aspect, and a sharp line has to be drawn between two different classes of direct resistance. In the first place there is the body resistance, which is taken to include the resistance of all those parts such as *fuselage*, alighting gear, &c., which is independent of the design of the aerofoil. In the second place there is the direct aerofoil resistance, including the skin friction and strut and stay resistances, which are variables depending upon the area and span, and otherwise upon the design of the aerofoil itself. The designer can by sufficiently extending the aerofoil reduce the aerodynamic resistance (as shown by Langley) to as low a value as he pleases, within the limit prescribed by the question of the added weight; but this reduction in the aerodynamic resistance is accompanied by an increase of skin frictional and other direct aerofoil resistance, so that for any given machine and designed velocity there is an extent of aerofoil beyond which it does not pay to go; there is definitely a design of least resistance.

I have shown that, treating the matter from the broad standpoint of general theory, the condition of least resistance is reached when the aerodynamic and direct resistance of the aerofoil are equal to one another (*see Aerial Flight*, vol. i, ch. vii). This is illustrated by Fig. 12, in which (as in Fig. 11) *a a* represents the graph of the direct resistance ($R \propto V^2$), and *b b* that of aerodynamic resistance ($R \propto 1/V^2$), and *c c* is the total (ordinates = resistance, abscissas = velocity.) In Fig. 13 a similar result is shown in which the plotting is given for constant velocity (abscissæ = area), as representing more literally the problem as presented to the designer.

The general theory on which the foregoing result is based depends upon and is subject to the limitations of the $1/V^2$ law of aerodynamic resistance. This law corresponds to the straight-line law as correlating pressure and angle, and is a close approximation between useful limits but breaks down at a certain critical maximum angle (depending mainly upon the aspect ratio), as shown in the examples given in Figs. 14*a* and 14*b*. The square plane follows a straight line law up to about 30°, in the plane of aspect ratio = 6; the limit is about 12°, the breakdown of the law at these limiting angles puts a very definite limit to flying at low speed.

TABLE III—*Values of β (Angle of Trail) for Least Resistance.*

Aspect Ratio.	$\xi = 0·020$.	$\xi = 0·015$.	$\xi = 0·010$.
3	0·189 = 10·8°	0·163 = 9·3°	0·133 = 7·6°
4	0·196 = 11·2°	0·169 = 9·7°	0·138 = 7·9°
5	0·202 = 11·6°	0·174 = 10·0°	0·142 = 8·1°
6	0·206 = 11·8°	0·178 = 10·2°	0·145 = 8·3°
7	0·212 = 12·15°	0·183 = 10·5°	0·149 = 8·5°
8	0·218 = 12·5°	0·189 = 10·8°	0·154 = 8·8°

I have demonstrated that the condition of least resistance implies, for an aerofoil of any given aspect ratio, a definite value of the angle of trail,[*] β, Fig. 15: the chord angle, except where a plane lamina is used, is an accidental quantity, and not, as frequently supposed, one of fundamental importance; calculated values of trail angle β for least resistance are given in Table III. Thus any aerofoil properly designed for least resistance for any given velocity of flight will be correctly designed for every other velocity provided that its load per unit area be varied as the square of the flight velocity.

It thus becomes possible to prepare tables of mean pressure values proper to least resistance for different flight velocities and different values of aspect ratio (Table IV). Tables III and IV are reproduced from my *Aerial Flight*, vol. i, pp. 261, 262 and 271, the variable factors in addition to the flight-speed being the aspect ratio, which is here shown as tabulated for values from 3 to 8, and the coefficient of skin-friction values of which are taken from 0·01 to 0·02 double surface coefficient. These values for skin friction are on the high side, but as an actual fact the values given do fairly represent the total direct resistance that in practice depends upon the area of the foil, and which requires to be included in the useful application of the theory; the higher values, generally speaking, represent more closely biplane conditions, and the lower values are more applicable in the case of the monoplane.

TABLE IV.—*Pterygoid Aerofoil. Load (lbs.) per sq. ft. for Least Resistance.*

	Flight Velocity. ft. per sec.	Values of Aspect Ratio. 3.	4.	5.	6.	7.	8.
$\xi = 0·020$	5	0·017	0·018	0·020	0·022	0·023	0·025
	10	0·068	0·075	0·082	0·089	0·094	0·101
	15	0·152	0·169	0·186	0·200	0·213	0·228
	20	0·270	0·300	0·330	0·355	0·379	0·405
	25	0·390	0·433	0·475	0·511	0·545	0·582
	30	0·610	0·676	0·743	0·800	0·852	0·911
	35	0·830	0·920	1·01	1·08	1·16	1·24
	40	1·08	1·20	1·32	1·42	1·51	1·62
	50	1·69	1·88	2·06	2·22	2·37	2·53
	60	2·44	2·70	2·97	3·20	3·40	3·64
	70	3·32	3·68	4·05	4·35	4·64	4·96
	80	4·33	4·81	5·30	5·70	6·07	6·47
$\xi = 0·010$	5	0·012	0·013	0·014	0·015	0·016	0·018
	10	0·047	0·053	0·058	0·063	0·066	0·071
	15	0·107	0·119	0·131	0·142	0·150	0·161
	20	0·190	0·211	0·234	0·253	0·267	0·287
	25	0·298	0·331	0·366	0·396	0·418	0·450
	30	0·427	0·475	0·526	0·570	0·601	0·645
	35	0·582	0·647	0·717	0·777	0·820	0·880
	40	0·760	0·845	0·935	1·01	1·07	1·15
	50	1·18	1·32	1·46	1·58	1·67	1·79
	60	1·71	1·90	2·10	2·28	2·40	2·58
	70	2·32	2·58	2·86	3·10	3·27	3·51
	80	3·04	3·38	3·73	4·05	4·27	4·59

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[*] The V^2 law, it would appear, in no case exactly represents the actual facts; the departures from this law crop up in various and sometimes most unexpected directions. In the case of resistance due to skin-friction sufficient data exist to enable the degree of departure from the law to be computed; in other cases, as for example, in the pressure reaction experienced by an inclined plane or aerofoil, departures of a different kind have been demonstrated, and are being gradually elucidated by experimental investigation. In spite of these shortcomings, the foundation theory of flight is to-day, and probably will continue to be, based on the V^2 law.

[*] It is not easy to define the *angle of trail* of an aerofoil when the section is one of considerable body; clearly it is something intermediate between the upper and under surfaces, probably more nearly approximating to the former, as shown by the dotted line in Fig. 15.

(*To be continued.*)

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

Wilbur Wright Memorial Banquet.—Members of the Society will be interested to hear that Col. the Right Hon. J. E. B. Seely will honour the Society with his presence at the Royal Automobile Club on the 19th inst. The Right Hon. George Lambert, M.P., Sir H. F. Donaldson, Sir A. Geikie, Lord Montagu of Beaulieu, General Guthrie Smith, Hon. A. Stanley, Col. Squier (United States Embassy), Sir R. H. Brade, Rear-Admiral Sir Charles Ottley, Gen. von Donop, and Gen. Henderson are also amongst those who will be present.

Wilbur Wright Memorial Lecture.—The second "Wilbur Wright Memorial Lecture" will be delivered by Dr. R. T. Glazebrook, C.B., F.R.S., F.Ae.S., on "The Development of the Aeroplane," at the Royal United Service Institution, Whitehall, on Wednesday, the 20th inst., at 8.30 p.m.

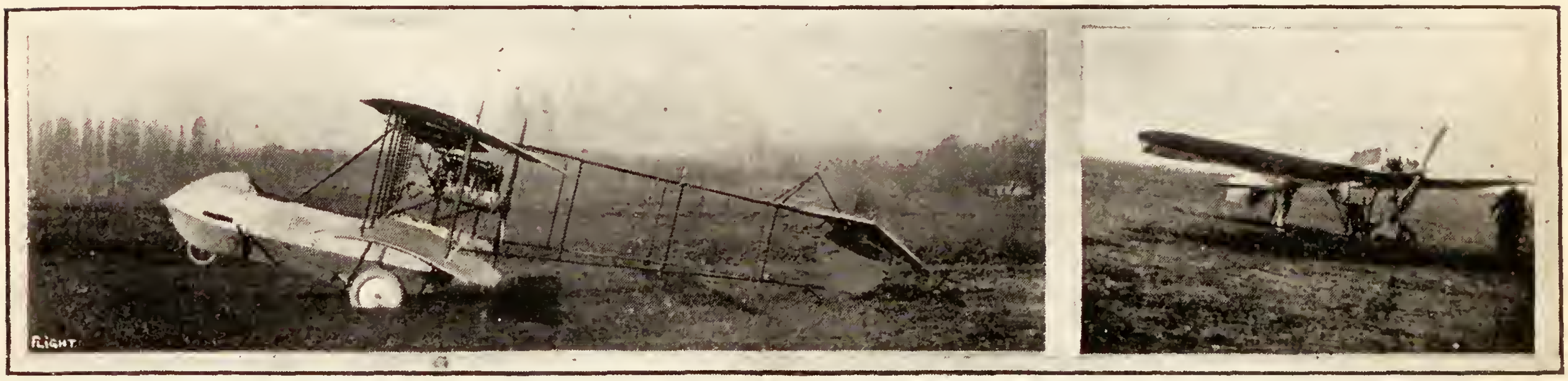
The Right Hon. Lord Sydenham, G.C.M.G., F.R.S., will preside.

B. G. COOPER, Secretary.

FOREIGN AIRCRAFT NEWS.

Record Height on Voisin Seaplane.

WHAT is claimed as a record height for a seaplane was attained by Rugere, at Frejus, on the 7th inst., when testing a Voisin machine, which has a Salmson engine of 120 h.p. It climbed to a height of 2,100 metres (6,890 feet) in 55 mins., and a similar performance was made on Saturday last when carrying a useful load of 300 kilogs.


On the left the latest Otto biplane. Right: Krumsick on a Grade monoplane at the Munster aerodrome.

Gordon-Bennett Race to be held at Buc.

AT last Saturday's meeting of the Committee of the Aero Club of France it was decided that the Gordon-Bennett Race should be held at Buc, and although the date was not definitely settled, it will probably be between the 19th and 26th of September. A great effort was made with a view to the race being held at Vichy, but Buc secured the verdict by a large majority, chiefly on account of the fact that there is there a fully-organised aerodrome, while it is within easy reach of Paris.

Some Modern German Machines.

ON this page we reproduce several photographs showing some modern German machines, sent along by Mr. Ellis G. Frankl and Mr. Roberts, who have recently been visiting Germany making arrangements for looping exhibitions by Mr. Thornely. The photograph of the Rumpler Taube is particularly interesting, as the 100 h.p. Mercedes is specially arranged for working in an inverted position.

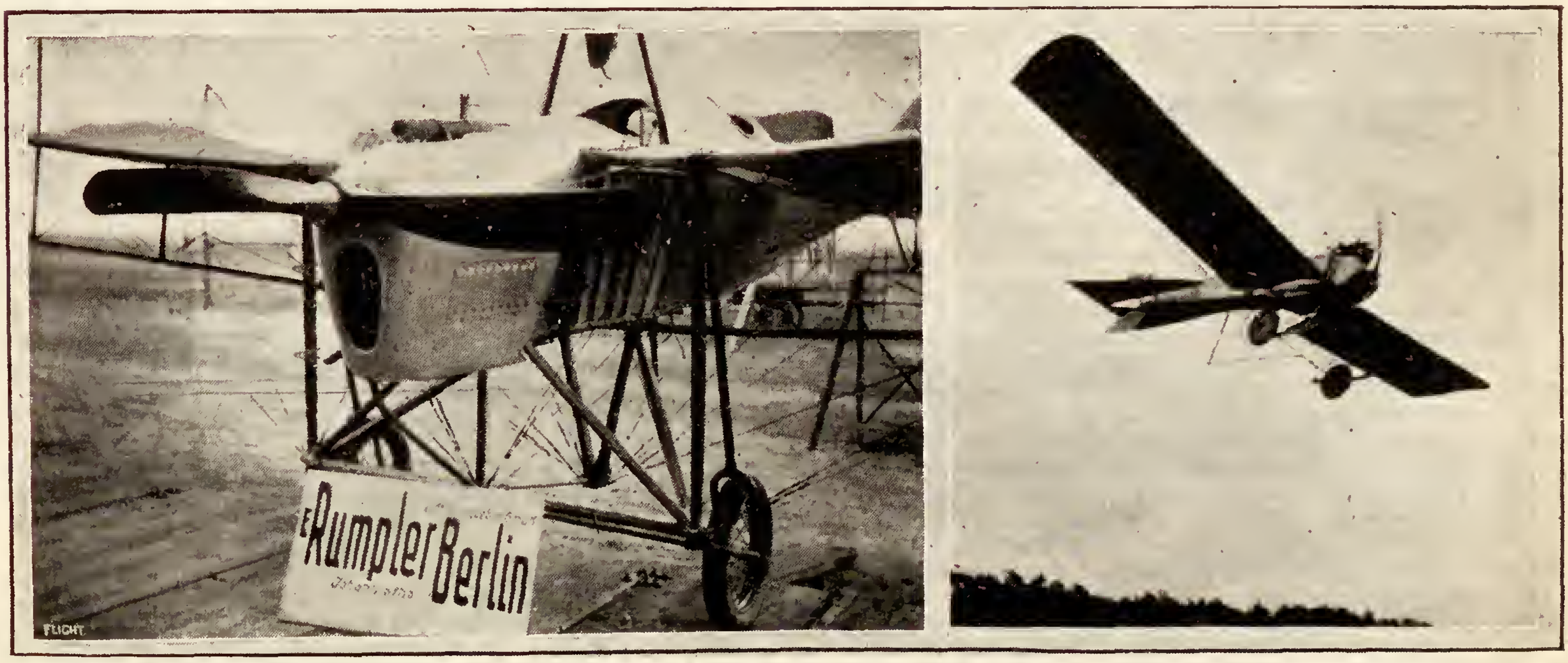
Vidart Retires from Aviation.

AFTER flying for nearly four years, Rene Vidart, who looped the loop fifteen times on Sunday week, has come to the conclusion that flying is too tame for him. He has, therefore, announced his intention of giving it up and going in for motor-car racing. If he fails to secure any of the chief prizes in the forthcoming races, he will then try big game hunting in Africa, or some sport of a similar nature.

Long Flight on a Blériot.

A SPLENDID flight, in spite of adverse weather conditions, was made recently by Lieut. Chabert, who on a Blériot tandem, and accompanied by a mechanic, flew from Lyon to Rheims and back, a round trip of 850 kiloms. The flight called forth a commendation from Col. Bouttieaux, who is in command of the first group of the French flying corps.

Linnekogel and a cinematograph operator on the Rumpler Taube.



Left: A Rumpler Taube with a 100 h.p. inverted Mercedes engine. Right: The latest Fokker monoplane with a 100 h.p. Mercedes engine, flying at the Johannisthal aerodrome.

Garros and Audemars at Buc.

The only competitive event at the meeting at Buc on Sunday last was the *pingouin* race, which was won by Barault, a Blériot pupil. During the afternoon, however, a very fine exhibition of fancy flying was given by Legagneux and Audemars, both on 80 h.p. Gnome-Moranes.

The French Aeroplane Mother Ship.

For some considerable time the cruiser "Foudre" has been utilized as a mother ship for seaplanes belonging to the French Navy, but the machines carried on board had to be slung overboard and started from the surface of the sea. Recently, however, the cruiser has been fitted with a platform over the forward part of the ship, and tests which have been made show that, although it only provides a clear run of a dozen metres, seaplanes can be satisfactorily launched from it. As before, the machines will alight on the sea and be hoisted aboard the cruiser.

Mobilisation Tests in Germany.

A most extraordinary test of the organisation of the German Flying Corps was made last week. Orders were issued on Wednesday that three aeroplanes were to be sent to Doeberitz from the centres at Cologne, Posen, Konigsberg, Halberstadt, Metz, Strasburg, Darmstadt and Graudenz, all about 300 miles away. With the exception of the three from Darmstadt, which were prevented by a storm from starting, all the machines arrived at Doeberitz in good order, in spite of the bad weather. On the 7th inst., in response to further orders, twenty-three of the machines flew in close formation from Doeberitz to Hanover, and only one dropped out. We comment on this manœuvre at greater length on p. 505.

To Recognize German Aeroplanes.

In order to assist in the identification of German machines when in the air, the German Aerial League has drawn up a scheme of marking each machine on the underside of the wings with a D in a circle signifying Deutschland (Germany) followed by a letter or combination of letters. Thus D.F.W. stands for the machine which is now well known over here by that designation, A.L.B. for the Albatros, E for Euler, R for Rumpler, F for Fokker, &c. Up to the present over 50 such marks have been registered.

Double Fatality in Germany.

While making a test flight from Schwerin to Posen on the 9th inst., Lieuts. Faber and Kurtz were killed by the fall of their machine from a height of 200 metres when making a descent at the Kreckow camp near Stettin.

Pegoud at Milan.

On the 6th inst., Pegoud gave an exhibition of looping, &c., at Milan, on the machine which he recently sold to the Italian aviator, dal Mistro, who then accused him of maliciously tampering with it. It was proved, however, that the part which Pegoud removed from the machine was simply a fitting he had attached for his own convenience, and he was acquitted. At the conclusion of his flights the crowd cleared the barriers, and Pegoud was carried shoulder high to his hangar.

Looping at Budapesth.

A tremendous crowd was attracted by an exhibition of looping, &c., which was given by Baron Pasquier on his Rhone-Blériot at Budapesth on the 9th inst. Among those present were the Archduchess Augusta, the Archduke Joseph and Prince Louis of Bavaria. A similar display was given on Sunday last.

New Head of Russian Flying Corps.

General Ropp has been appointed head of the Russian Flying Corps in succession to General Chichkevitch. On paying a visit of inspection to the Sebastopol aerodrome his motor car was met and escorted to the flying ground by a squadron of officers mounted on Nieuports.

Looping in Russia.

On Sunday last Gaber Vlinsky looped the loop and flew upside down over the racecourse at St. Petersburg, while at the Katcha aerodrome, in the Crimea, T. Efimoff, brother of the well-known Russian pilot, M. Efimoff, gave an exhibition of looping the loop, tail slides, &c., on a Blériot-Gnome.

Fatal Accident in Russia.

At the Russian military aerodrome near Sebastopol, on the 9th inst., Lieut. Hartmann was killed as the result of his machine falling from a height of 200 metres.

Military Flying in Morocco, &c.

An *escadrille* of five Farman biplanes piloted by Lieuts. Cheutin, Menard and Battini, and Sergts. Hurard and Benoit set out on Wednesday of last week to make a complete tour, which will total 3,500 kiloms. of the French possessions in North Africa, including Morocco, Algeria, and Tunis. The first day's flight was from Tunis to Ain-Beida, a distance of 287 kiloms., the next day they went on to S. Mila, another 200 kiloms., and on Friday to Chellala, a further 290 kiloms. On Monday, Lieuts. Cheutin and Menard and Sergts. Hurard completed the first stage to Oudjda *via* Le Kneider, a trip of 460 kiloms. The new stage will be to Colomb-Bechar in Morocco, after which they will go to Gabes and then return to Tunis *via* Sfax.

A Fatality in Morocco.

On the 5th inst. two military aeroplanes set out from Meknes to fly to Ito, with a view to establishing a line of stations along the route. One of the machines was piloted by Lieut. Ste. Lague, who was accompanied by Sergt. Bonnereau, while the other was in charge of Sergt. Fabre. The machine of Lieut. Ste. Lague capsized when at a height of 400 metres and crashed to the ground. The pilot was killed but the passenger escaped with slight injuries.

Turkish Officers Arrive at Cairo.

On Wednesday of last week the two Turkish officers, Capt. Salim and Lieut. Kemal, having left Beirut on the 1st inst., progressed on their Blériot monoplane from Jerusalem to Port Said. Further progress was delayed by a mishap at Tel-el-Kebir, but they eventually reached Cairo on the 9th inst.

An Aeronautic Congress in America.

Independent of the Aero Club of America and the Aeronautical Society, an aeronautical congress is being organised in America. At a meeting recently held in New York it was decided that temporarily C. D. Wolcott, Secretary of the Smithsonian Institution, should be president and E. L. Jones, secretary. It is proposed to invite 2,000 scientists to a meeting in August next at the Panama exposition to discuss aeronautics.

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CORRESPONDENCE.

Climbing Speeds of Machines.

[1857]. In letter 1854 your correspondent, Mr. A. M. Coate, raises a point which I should like to be allowed to challenge.

Roughly, his conclusions are that the machine will climb more rapidly against the wind than with it. Your correspondent has, I fear, fallen into this trap. He has neglected the fact that for all considerations connected with an aeroplane, the speed of the machine and that of the axial translation of the propeller *must* be measured *relative* to the air and not to fixed points on the earth's surface.

To quote your correspondent's own figures which are :—Speed of machine, 60 m.p.h. ; wind speed, 40 m.p.h. The earth speed against the wind will be 60 – 40, or 20 m.p.h., whereas with the wind the speed would be 100 m.p.h, the air speed being constant.

On these points alone it will be seen that the climbing *rate* will always be the same, whereas the gradient up which the machine will climb will be flattest when the machine climbs with the wind. I should like to put forth here a theory which to date appears to have escaped notice. It is, that a machine when climbing will be virtually heavier than in horizontal flight. This increase will, however, be the same, no matter what the ground speed of the machine.

S. C. Shepley-Part.

Bedford Park, W.

Instruments at the R.A.F.

[1858] May I correct in your columns a misstatement accidentally made in another paper? The instruments designed at the Royal Aircraft Factory for aeronautical measurements can be obtained by all who desire so to do. The velometer is made by Elliott Bros. and G. Casella. The instrument for measuring gliding angles is made by the Cambridge Scientific Instrument Co., and so is the "Ripograph" which measures the rolling and other movements of an aeroplane.

Any aeronautical constructor asking how to obtain these instruments has been given the above addresses, and certain firms have had each of the above-named instruments in their private use.

The tautness meter was publicly described and is made by the C.S.I. Co.

The petrol flux and oil flux meters used in the engine competition are similarly available, and the drawings have been given to such competitors as asked for them.

May 9th. Mervyn O'Gorman.

Sand Yachts—A Sailing Ground Wanted.

[1859] Will any of your readers who know the locality inform me of any firm broad sands within reasonable distance of London suitable for a sand yacht. They should be uncovered for most of the day, and some portions of them not frequented by children.

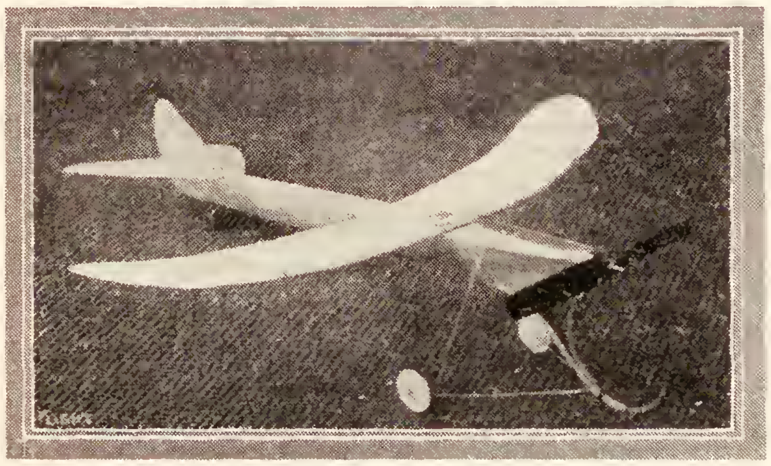
Landlubber.

Models

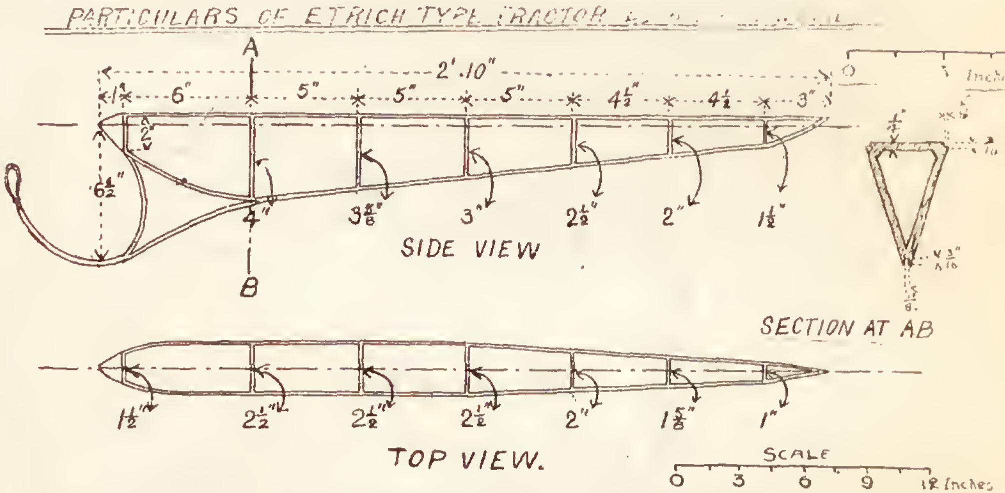
Edited by V. E. JOHNSON, M.A.

The Reigate, Redhill and District Club's Olympia Tractor Models.

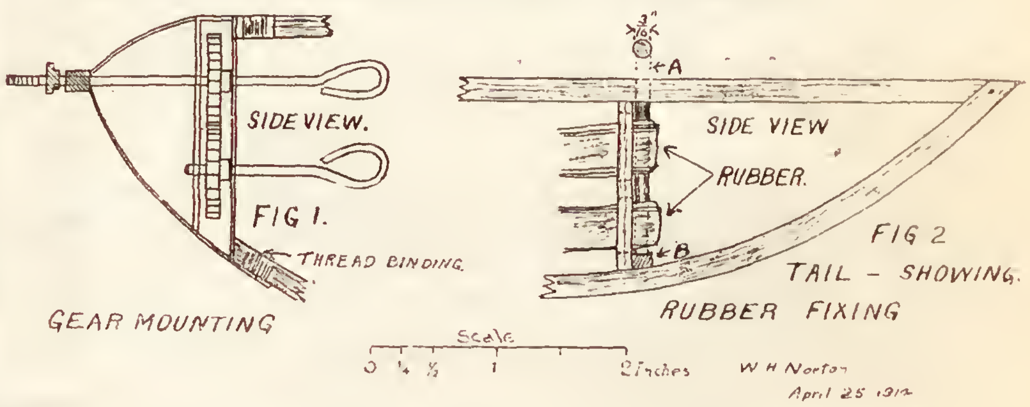
Etrich Type Tractor exhibited by Mr. W. H. Norton.—Length 2 ft. 11 ins. overall, span 3 ft. 3 ins., total surface 298 sq. ins. (M.P. 238, tail 60); weight $8\frac{1}{2}$ ozs.; loading 4 ozs. to the sq. ft.; driven by two skeins (geared) of seven strands $\frac{1}{4}$ in. strip rubber. The *fuselage* (triangular) is built of silver spruce, $\frac{3}{16}$ in. by $\frac{1}{8}$ in. "Formers" are of $\frac{1}{8}$ in. three ply fretted out to required dimensions leaving section of $\frac{1}{4}$ in. The *fuselage* is covered in with Jap silk, doped with Emaillite. The gear is fitted as illustrated in Fig. 1. Bonn's $\frac{11}{16}$ in. gear wheels mounted on 15 gauge cycle spokes, and set in bearings of hard block tin. A frame of 20 s.w.g. piano wire is taken forward to a point in which is fitted a nipple, through which the propeller spindle runs, forming an extra bearing, and being covered in makes a pointed entry, thus obtaining full advantage of the propeller draught. The end of the *fuselage* is built as illustrated in Fig. 2, the curved lower member giving strength to the whole of *fuselage*, and also allowing the air to leave with as little shock as possible. The end "former" is fretted with two separate holes, allowing the two skeins of rubber to be passed through. A piece of $\frac{3}{16}$ in. round cane is passed through at A, and is kept in position by an aluminium receptacle, B. This arrangement is lighter than wire hooks, the tail being where lightness is especially required in this type. The skid is of cane; chassis of 18 s.w.g. wire; wheels, which have special springs, are turned out of $\frac{1}{8}$ in. three ply, then fretted leaving three spokes, covered with Jap silk and doped with Cellon; they are $2\frac{1}{2}$ ins. diameter and the pair weighs 3 drams. The plane is built of 20 s.w.g. piano wire with silver spruce main spar running from tip to tip, tapered each way from centre to give varying camber, it is partly double surfaced with a slight dihedral angle, set with the leading edge (at the body) in line of thrust. Angle at body 1 in 29 positive, at tip 1 in 24 negative braced, covered with Bonn's aero fabric. Tail is of the long triangular form usual in this type, stabilizing only, made of 20 s.w.g. wire covered with Bonn's aero fabric; it is removable to attend to the rubber, which is dropped in with a plumb line. The tractor screw is helical, 16 ins. pitch, $11\frac{1}{2}$ ins. diameter. This model did not fly at Olympia trials, being soaked with rain, but good flights have since been obtained of from 30 to 35 seconds, although not more than 450 turns have at present been given. The stability of the model is extremely good. The drive is central, no arrangements being made with plane or rudder to oppose the torque. It rises off short grass. A straight flight has been obtained in calm air so that it was possible to calculate the efficiency. This flight was 173 yds., with about 23 yds. glide. Taking 150 yds. propeller working with 16 ins. pitch and 450 turns gives an effective pitch of 12 ins., which is 75 per cent. efficiency. The weight of rubber is $1\frac{1}{2}$ ozs.; weight of model, $8\frac{1}{2}$ ozs., a power rate of 1 in $5\frac{2}{3}$.



Mr. W. H. Norton's Olympia model.

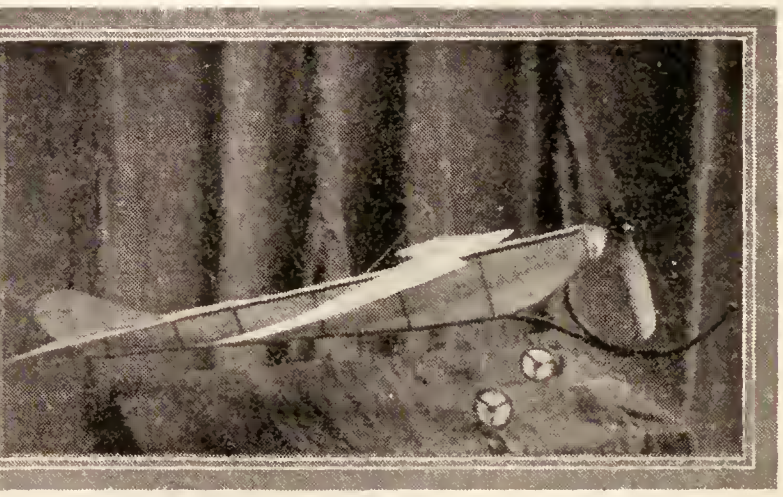


SIDE & TOP VIEW OF FUSELAGE SHOWING CONSTRUCTION



Tractor Monoplane shown at Olympia by Mr. J. L. Sutton. Length 2 ft. 10 ins.; span 3 ft.; total surface 252 sq. ins. (main plane 198 sq. ins., tail 54 sq. ins.); weight 7 ozs.; loading 4 ozs. to 1 sq. ft.; driven by two skeins (geared) of 6 strands of $\frac{1}{4}$ in. strip rubber. The *fuselage* is built of $\frac{1}{8}$ in. square silver spruce on 3-ply formers, and covered with Bonn's aero silk; the skids of cane; the chassis of 18 s.w.g. piano wire; wheels $\frac{1}{8}$ in. 3-ply wood, turned and fretted out, leaving 3 spokes, and covered with lawn doped with Cellon; the gear is Clarke's $\frac{1}{2}$-in. gear; wheels mounted on 15-gauge cycle spokes, set in frame of hard block tin; the main plane (H.P. type) built of 20 s.w.g. piano wire, with silver spruce spar

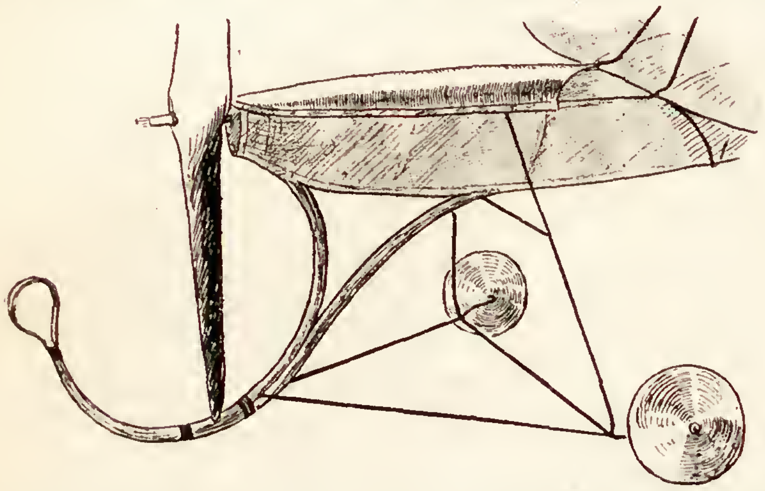
Mr. W. Key's Olympia tractor model.



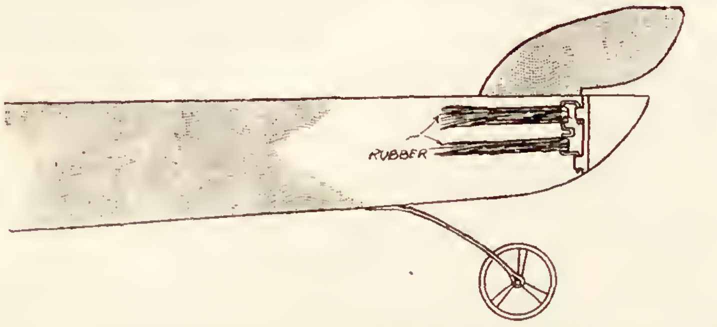
Mr. J. L. Sutton's Olympia model.

tapered to give varying camber and angle of incidence, braced from centre pylon, covered with Bonn's aero silk; tail of 20 s.w.g. piano wire covered with Bonn's aero silk, stabilizing only, and is removable to attend to the rubber motor; the tractor screw is 11 ins. diam. and 19 ins. pitch (not as shown at Olympia). This model did not fly at Olympia trials owing to the *fuselage* and supporting surfaces being saturated, but flights have been obtained of 30 to 40 secs. The propeller drive is central, and no arrangements are made with the wings or rudder to overcome the torque.

Tractor Monoplane exhibited at Olympia by Mr. W. Key. Length 2 ft. 10 ins., span 3 ft.; the main plane has a surface of 192 sq. ins.; the tail an area of 56 sq. ins.; total 252 sq. ins. [Where do the other 4 sq. ins. come in?]. Loading 4 ozs. to the sq. ft.; tractor screw 12 ins. in diam. and 20 ins. pitch; the main plane, which is of the Handley Page type, is covered with Bonn's proofed fabric. On Easter Monday, flights of 32 to 34 secs. were obtained with the machine not fully wound up, flying with the same power as was used in the trials at Hendon, where, owing to the model being soaked with rain, it did not give a very satisfactory account of itself. The propeller drive is central. One sketch shows the chassis and skid arrangements used on the machine, which are very good, and the other, the tail part of the machine, showing the method of fitting in the rubber, with the sides of the body completely covered in, which makes a clean run off for the air, instead of leaving an opening at the sides for fitting in the rubber, which causes a drag. The top part of the body is left open, underneath the tail, and a double wire hook, made as shown in the sketch, which drops into two small pieces of tube. The wheels are cut from ⅛ in. 3-ply wood, and afterwards covered in.



View of chassis and front skid of Mr. W. Key's model.



Tail view showing method of fitting rubber on Mr. Key's model.

Mr. W. H. Nosworthy's Dihedral Biplane.

Mr. J. G. Navarro (58, Berners Street, Leicester), writing *re* the above, says: "As you will see by the enclosed [Patent 27,282, 1910], the above gentleman is not the inventor of this identical biplane. I entered this machine for the 1913 Aero Exhibition, but unfortunately it got damaged in transit. It, therefore, was not exhibited, but a monoplane in its place. This model also includes negative fixed tails and air brakes, two special features of the last Aero Show on the Bristol Co.'s stand by Mr. A. V. Roe respectively, these being embodied in the one machine as you will see from the drawings. They constitute an absolutely fool-proof machine which cannot side-slip or make an involuntary head dive, and is the result of six years' experiment and research work, at present at a standstill for financial assistance. I should be glad if you can find space for the above, and also the drawings." [We regret want of space precludes the publication of the drawings for the present.]

Mr. W. H. Nosworthy also writes pointing out a clerical error which ascribed the prize as awarded to exhibit No. 206, which should have been No. 207. The winning model was, however, *described* correctly. Mr. Nosworthy adds: "It may interest you to know that since the Exhibition I have built a 9-oz. model (biplane hydro.) on the dihedral principle, tail included [and, we presume, floats as well]. This waterplane rises quickly and gives a good flight, alighting easily on its floats. Tractor, 2 ft. 4 ins. span; length, 2 ft. 6 ins." [We should be glad to learn the position of the propeller in this model.]

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

French Kite Meeting.—A series of Kite Competitions will be held on the Inquéterie Race Course, Boulogne, on May 30th and 31st and June 1st. Prizes to the value of 2,000 francs will be given. The competitions are for man-lifting teams, photography, telegraphy, signalling, ship to shore, &c. Full details will be sent by the hon. sec. on application.

Anglo-American Exhibition.—Will all intending exhibitors send in their models addressed to the Aviation Section, Anglo-American Exhibition, Shepherd's Bush, as soon as possible, advising Col. H. S. Massy, Administration Buildings, of their despatch?

Affiliation.—The official programme goes to press during the next few days, therefore all clubs intending to become affiliated should apply at once, sending in the names of gentlemen who will act as official observers, so that the list of clubs, &c., shall be complete in programme.

Gift of Prizes.—Major B. Baden-Powell has presented the team medals for the winners and runners-up in the Farrow Shield Competition, this being for 8 oz. models, as Class 11A at Olympia.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, Leyspring Road).

May 17th, at 6.30 a.m., flying Wanstead Flats; at 10.30 a.m., tractor duration competition. May 24th, twin-screw r.o.g. duration competition, 8-oz. models; 4-oz. loading models must rise off grass.

Paddington and Districts (77, Swinderby Road, Wembley).

May 16th, flying at Sudbury. Competition for r.o.g. average duration. Prizes, silver and bronze medals.

UNAFFILIATED CLUBS.

Finsbury Park and District (32, Ashley Rd., Crouch Hill, N.)

May 23rd, practice flying Finsbury Park from 3 p.m. Speed contest at 4 p.m.

S. Eastern Model Ae.C. (1, Railway Approach, Brockley).

Week-end flying Woolwich Common, Blackheath and Grove Park at usual times. Members are reminded that the first round of this quarter's "Trophy" competition will be flown at the end of this month.

PUBLICATIONS RECEIVED.

L'Essor et l'Atterrissage. By Maurice Percheron. Paris: H. Dunod and E. Pinat, 47–49, Quai des Grands-Augustins. Price 4 frs. 50.

Rendiconti delle Esperienze e Degli Studi. Part I of Vol. III. Rome: Tipografia della R. Accademia dei Lincei.

IMPORTS AND EXPORTS, 1913–1914.

Aeroplanes, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see Flight, January 25th, 1912, and for 1912 and 1913, see Flight for January 17th, 1914:—

	Imports.		Exports.		Re-Exportation.	
	1913.	1914.	1913.	1914.	1913.	1914.
	£	£	£	£	£	£
January	12,097	5,945	4,005	210	1,510	879
February	17,361	28,132	3,447	106	690	441
March ...	20,425	27,731	1,924	1,934	1,042	1,440
April ...	15,593	11,384	5,524	1,175	1,413	1,473
	65,476	73,192	14,900	3,425	4,655	4,233

Aeronautical Patents Published.

Applied for in 1913.

Published May 14th, 1914.

9,028. E. R. Calthrop. Parachutes.
9,376. Neufeldt and Kuhnke and Ges. fur Nautische Instrumente. Hydro-aeroplanes.
23,708. A.E., H.L. and H. O. Short. Aeroplanes.

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FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 282. (No. 21, Vol. VI.) MAY 22, 1914. [Registered at the G.P.O. as a Newspaper.] [Weekly, Price 3d. Post Free, 3½d.]

Flight.

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CONTENTS.

Editorial Comment: PAGE
The Aerial Derby... 531
The Mishaps to the Montrose Squadron 532
Men of Moment in the World of Flight: M. N. Chereau 532
The Third Aerial Derby 534
Flying at Hendon 545
Royal Aero Club Official Notices 548
From the British Flying Grounds 549
Eddies. By "Æolus" 551
R.F.C. Military Wing Mishaps 553
Foreign Aircraft News 555
Flying Machines from an Engineering Standpoint. By F. W. Lanchester... 556
Models. Edited by V. E. Johnson, M.A. 557
Correspondence... 558

EDITORIAL COMMENT.

The Aerial Derby. All greater London will be agog with excitement to-morrow (Saturday) afternoon on account of the race for the "Aerial Derby," which is the one flying event of the year which can be said to be of real, all-round popular interest. Not that there is no popular interest in flying, as the records of Hendon and Brooklands bear witness, but there is no event which gives so much of an open opportunity to the man in the street of seeing aeroplanes in flight over a long cross-country course. The promotors of the Aerial Derby did a far greater service to aviation than even they possibly knew when they decided upon its inauguration three years ago, at a time when there were many scoffers at such an "absurdity" as an aerial "Circuit of London." Of necessity, this course affords a chance, literally, to millions of seeing the machines at some point or other during the race, and thus there is aroused a widespread interest in the Derby itself, and what is even of more importance, in the possibilities of aircraft generally. We have always insisted on the point that part of our one-time backwardness in aviation was due to the fact that the people generally had, through lack of proper opportunities, failed to grasp the essential fact that the aeroplane had well emerged from the realms of pure experiment and had become a machine of vast potentialities, particularly in the scheme of national defence. It is more than pleasing to be able to record the conviction that we have left behind us that state of backwardness. Not that the time has come when we can rest on our achievements, for much still remains to be done, much remains to be discovered, before aerial science will have said its last word—that time is still far off, even if it should ever arrive. Even in relation to our possible rivals for world supremacy, the situation is not at all without anxiety, though this much may be said: that we are in a far better position to-day than when it fell to us to comment upon the "Aerial Derby" of last year. Not only are we actually stronger in the air than we were at that time, but it is incontestable that the Government itself has since then thoroughly awakened to the importance of aviation, and, moreover, our flying men and aeroplane constructors have done things in the meantime which have demonstrated to the world that they are second to none. With regard to the Government attitude towards aviation, we need only refer to the marked difference in the treatment accorded by the authorities to the race of last year and that of this. In 1913, it will be remembered, endless difficulties were raised with regard to the "prohibited" areas which occur in any course which is laid to pass round London. In the early stages of the organisation the extreme step was taken of placing a virtual ban on the race, so that at one time it was most improbable that its organisers would be able to hold it at all in the manner projected by the donors of the trophy. After endless negotiation, and exasperating delays, the authorities so far gave way that the race was held as late as September, instead of in June as originally intended.

This year, however, there has been, so far as we are aware, no difficulty raised on the part of the authorities, who more than ever seem disposed to give to aviation all the encouragement possible. To our mind, much of this altered attitude is due to such races as this one for the "Aerial Derby," which have had an almost incalculable educative value in relation to the general public, the net result of it all being that there has been created an intelligent volume of opinion which has produced at least some effect on development. It has shown the authorities that matters affecting aerial defence are appreciated by the public in a measure approximating to those relating to other branches of national defence, and this must have had at least some effect upon policy. It makes all the difference when a responsible Minister can approach Parliament for the money for essential works, whether of defence or of any other kind, with the knowledge that he has behind him a strong volume of public opinion. Without it he may succeed in his object—with it, he is in an almost impregnable position. It is for these reasons, apart altogether from the sporting interest of such contests—which is very great—that we welcome so important a race as that which is to be flown to-morrow. As we have said, although much has been done towards the education of the public in aerial matters there is much more remaining to be done, and there is no better way of carrying out the good work than by affording the people these opportunities of coming into real, live touch with the movement. Many will see the race to-morrow afternoon who cannot in the ordinary way visit the flying grounds—many who will see the machines in flight have never seen an aeroplane before, and will thus receive an impression of the reality of man-flight that they would get in no other way, to the manifest good of the movement.

* * *

The Mishaps to the Montrose Squadron.

It was perhaps inevitable that comparisons should be made between the unfortunate ending of the "aerial mobilisation" of the Montrose squadron of the R.F.C. and the somewhat similar test which was recently so successfully carried out in Germany. The one was marvellously successful—the other, a tragic unsuccess. Those who have indulged in gloomy comparisons, however, would have done well to consider all the facts before passing a judgment adverse to our own gallant officers of the R.F.C. It should be remembered, in the first place, that the German "mobilisation" took the form of a simple point-to-point journey, which is a far simpler affair than that to which the Montrose squadron was committed. We have no manner of doubt that if the squadron had simply been ordered to fly from its home station to Salisbury Plain in a straight-away flight, the whole of the machines would have arrived without serious mishap. But what was being attempted was a far different thing. The journey was to be done in a series of short flights, accompanied by the road transport of the squadron, a task which entailed numerous landings *en route*, which thus vastly enhanced the chances of mishap. Again, it must be remembered that climatic conditions in these islands are, generally speaking, much worse than they are on the Continent. As a matter of fact, it was those same climatic conditions which were the cause of the accidents. Fog and ground-mist are things which are quite beyond the control of man, but which have to be reckoned with, on almost every day of the year, and, as we have seen, are only too likely to play havoc with the man and machine so unfortunate as to be compelled to make a landing in them. We deplore the accidents as much as anyone, but we hold most strongly that they imply no doubt whatever of the skill or ability of the magnificent *personnel* of the R.F.C.

* * * *

NORBERT CHEREAU.

HAVING completed his studies at Rennes University, Norbert Chereau turned his attention to art, but the cycle trade presented an irresistible attraction and eventually claimed him. Like many others, he seemed to naturally drift into the motor trade, and in 1893 came to England, where he became interested in the Blériot motor lamp business, subsequently becoming the London Manager. Having taken the keenest interest in the early flying experiments of M. Blériot, he naturally took charge of the arrangements for the memorable crossing of the Channel in July, 1909. After this he relinquished the lamp business to devote himself entirely to aeronautics and established the Blériot branch in England, with the flying school at Hendon. Under his guidance the business developed rapidly, and the latest move has been the opening of new works for the production of British-built Blériots at Brooklands, to which place the flying school has been transferred.

Since the first Channel crossing Mr. Chereau has been connected with many famous flights, and is well posted on all motor and aviation matters.

THE HAWK.

The roll call of the Transport Section of the R.F.C. at the Montrose depot at 4.30 a.m. on Sunday last week, in connection with the flight to the south.

MEN OF MOMENT IN THE WORLD OF FLIGHT

MR. NORBERT CHEREAU.

THE THIRD AERIAL DERBY.

TO-MORROW (Saturday) the Third Aerial Derby is to take place, starting from the London Aerodrome, Hendon, at 4.15 p.m. The prizes for the race, which is open to the world, are the *Daily Mail* Gold Cup, and the "Shell" £250 prize for the fastest time, the "Shell" Trophy and £100 for the winner of the sealed handicap, £75 for the second, and £25 for the third.

THE FIRST AERIAL DERBY, JUNE 8TH, 1912.—The machines in line for the starting at the Hendon Aerodrome.

The first Aerial Derby, it will be remembered, took place on June 8th, 1912, and was flown over a course of 81 miles, starting from the London Aerodrome, Hendon. The turning points were: Kempton Park, Esher Station, Russell Hill, Purley, Purfleet, Epping and High Barnet. Out of the fifteen pilots entered for this race only seven started, and of these only four completed the course. Mr. T. O. M. Sopwith, who was the first man home, was at first disqualified owing to it having been wrongly reported that he had flown inside one of the control marks, but ultimately he was awarded the prize. Mr. Sopwith, who was flying a 70 h.p. Blériot monoplane, completed the course in 1 hr. 23 m. $8\frac{2}{5}$ s. Mr. Hamel, who was also flying a 70 h.p. Blériot, made the next best time, completing the course in 1 hr. 38 m. 46 s., whilst Mr. W. Moorhouse covered the distance of 81 miles in 2 h. 0 m. 22 s., on a 50 h.p. Radley-Moorhouse monoplane.

It will still be remembered that Mr. Maurice Guillaux, when he seemed to have the race in his hand, just failed to reach home on his little 45 h.p. Caudron monoplane through running out of petrol when in sight of the Hendon aerodrome.

The Second Aerial Derby, which was to have been held on June 14th, 1913, had to be postponed owing to the fact that the authorities had refused to grant exemption from the regulation concerning flying over prohibited areas. Ultimately, however, a committee, appointed by the Royal Aero Club, succeeded in

Sopwith on his Blériot, arriving back at the London Aerodrome on Saturday, June 8th, 1912, the winner of the First Aerial Derby.

THE SECOND AERIAL DERBY, HENDON, SEPT. 20th, 1913.—View of the machines in line ready for the start.

obtaining the necessary permission, and the race was held on September 20th. The course was slightly different from that of the previous year, the turning points being: Kempton Park, Epsom Racecourse, West Thurrock, Epping, and Hertford. Out of the fifteen machines entered eleven started, whilst nine completed the course.

The race was won by Mr. Gustav Hamel on an 80 h.p. Morane-Saulnier monoplane. Mr. Hamel covered the distance of 94½ miles in 1 hr. 15 mins. 49 secs. Second was Mr. H. Barnwell on the 120 h.p. Martinsyde monoplane, who completed the course in 1 hr. 18 mins. 44 secs.; whilst Mr. H. Hawker, on an 80 h.p. Sopwith biplane, was third, his time being 1 hr. 25 mins. 24 secs.

A comparison of the speeds of the winners for the two years shows an increase from 58·5 miles per hour, which was the speed at which Mr. Sopwith covered the distance, to 75 miles per hour, as being the speed of Mr. Hamel's Morane. It should be understood, however, that these figures do not necessarily represent the actual flying speeds of the respective machines, since the degree of accuracy

"Flight" Copyright.

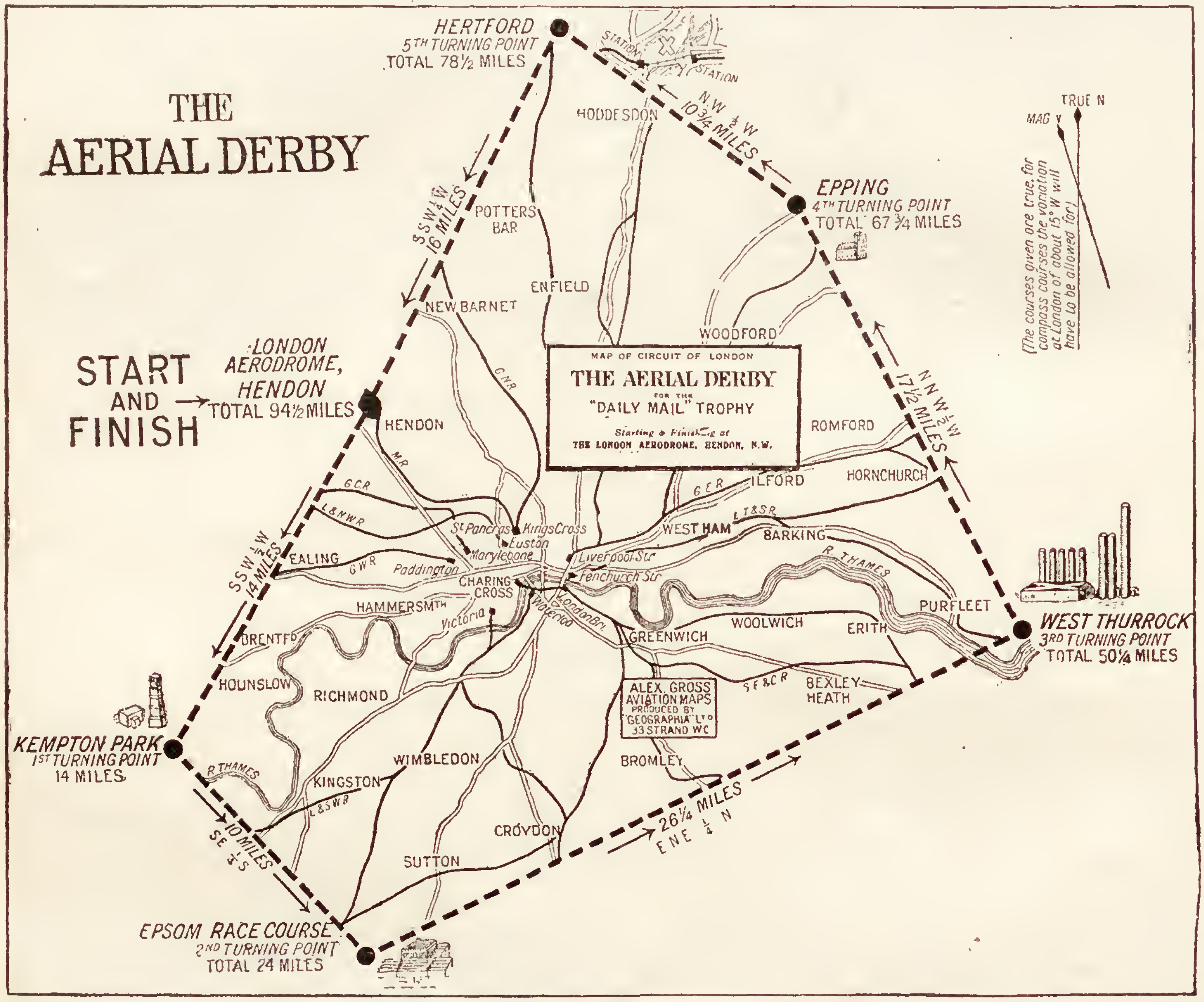
Gustav Hamel finishing and winning the Second Aerial Derby at Hendon on Saturday, Sept. 20th, 1913, on his Morane-Saulnier monoplane.

THE THIRD AERIAL DERBY.—Table of Pilots, Machines, &c.

No.	Pilot.	Machine.	Type.	Engine. h.p.
1	Dr. F. Hansen G.	Caudron ...	Bi. ...	35 Statax
2	R. H. Carr B.	Grahame-White	Bi. ...	50 Gnome
3	M. Zubiaga Sp.	Caudron ...	Bi. ...	60 Gnome
4	P. Verrier F.	H. Farman ...	Bi. ...	80 Gnome
5	J. Blatherwick B.	Martinsyde ...	Bi. ...	65 Antoinette
6	L. A. Strange B.	Blériot... ...	Mono.	80 Gnome
7	J. Alcock B.	M. Farman ...	Bi. ...	100 Sunbeam
8	W. R. Ding B.	Handley Page	Bi. ...	100 Anzani
9	S. V. Sippe B.	Bristol... ...	Bi. ...	80 Gnome
10	F. Goodden B.	Morane ...	Mono.	80 Gnome
11	L. Noel F.	Grahame-White or Morane ...	Bi. ... Mono.	100 Gnome 80 Gnome

No.	Pilot.	Machine.	Type.	Engine. h.p.
12	Lord Carbery B.	Morane ...	Mono.	80 Le Rhone
13	H. Blackburn B.	Avro	Bi. ...	80 Gnome
14	F. P. Raynham B.	Avro	Bi. ...	80 Gnome
15	R. H. Barnwell B.	Vickers ...	Bi. ...	100 Gnome
16	V. Waterfall	Martinsyde ...	Mono.	120 Austro-Daimler
17	—	Morane ...	Mono.	80 Gnome
18	H. Busteed B.	Bristol... ...	Bi. ...	80 Gnome
19	—	Sopwith ...	Bi. ...	80 Gnome
20	H. Pixton B.	Sopwith ...	Bi. ...	100 Gnome
21	Gustav Hamel B.	Morane ...	Mono.	160 Gnome

B. = British.   F. = French.
G. = German.   Sp. = Spanish.



Sketch map of the circuit for the Third Aerial Derby on Saturday, May 23rd, showing the districts over which the competitors will be flying. The controls over which the competitors must pass at the various turning points are defined as follows:

KEMPTON PARK.—Turning point is square chimney, 230 ft. high, just north of Kempton Railway Station, very dark brown brick, with low building, filter beds and connecting reservoir. In the neighbourhood is a lower chimney (round) with two very large reservoirs.

EPSOM RACECOURSE.—Turning point is the Grand Stand which is at the top of Epsom Downs, making a conspicuous landmark.

WEST THURROCK.—Turning point is the cement works on north bank of the Thames near top of the bend three miles east of Purfleet and slightly to the east of West Thurrock Church. The works consist of a long rectangular buff-coloured building, with a large diagonal white cross on the roof. Five factory chimneys stand in line at equal distances behind the building, flanked by two taller chimneys and a very high one further to the right.

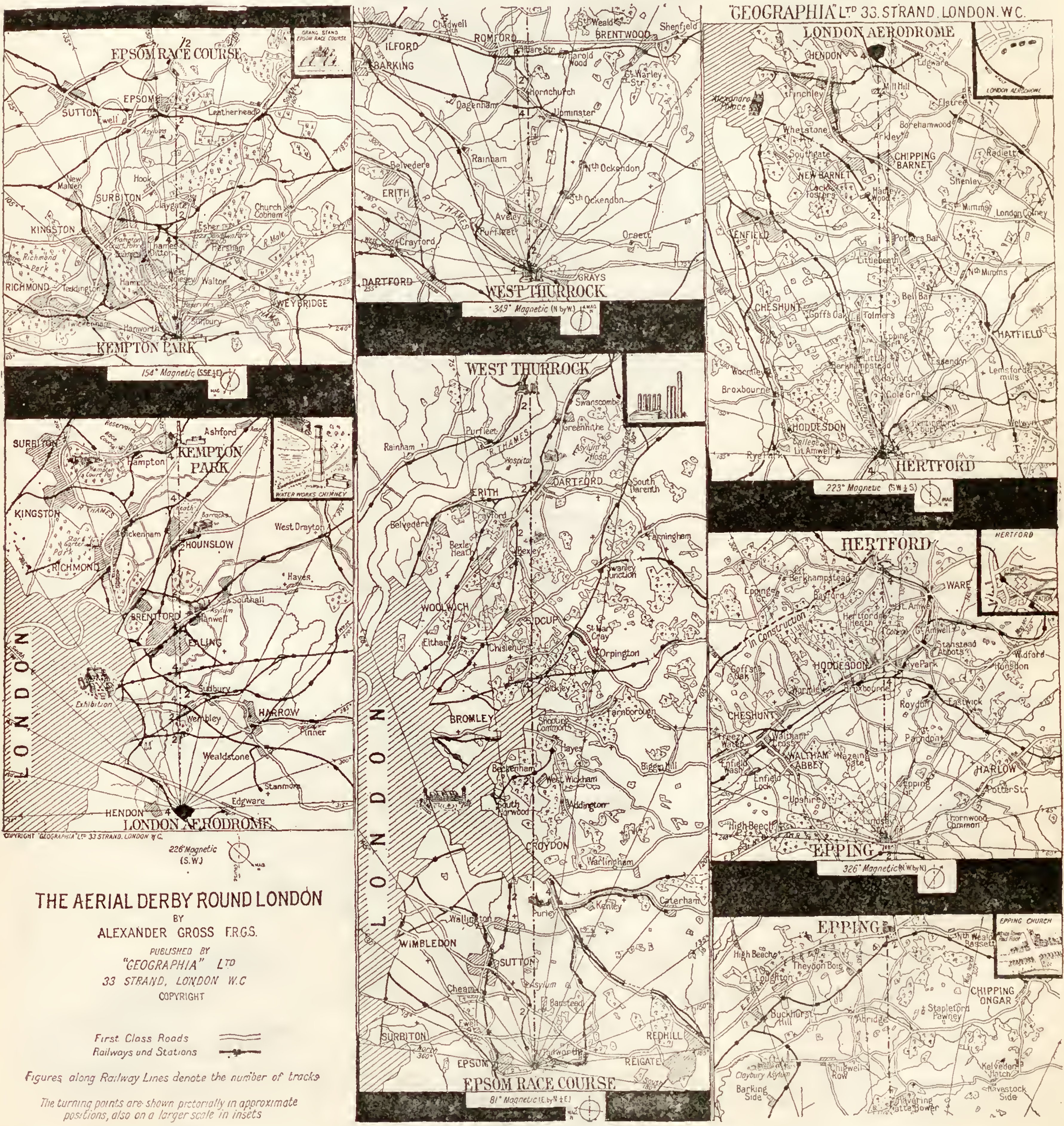
EPPING.—Turning point is Epping Church in centre of Epping village on west side of London Road. 200 yards south of church is a solitary water tower 120 feet high.

HERTFORD.—Turning point is the large field immediately north of the town adjoining the railway stations, and enclosed on the north, east and west by streams. The actual point will be marked by a large white cross.

with which the pilots follow the course, and the proximity at which they round the turning points, naturally affect the total time of the course. However great was the increase in speed from the race of 1912 to that of 1913, there is every possibility that this year's race will show an even greater increase in speed, for not only do several of the competitors know the course, which is the same as last year's, but nearly all of them have the added advantage of another year's flying experience. Besides, the machines of to-day are—taking it all round—a great deal faster than were those of a year ago, so that, given a clear day which will enable the competitors to follow the course fairly accurately, several of the entrants should reduce the time taken in covering the course to about an hour.

In addition to the *Daily Mail* Gold Cup and the Shell £250 for the fastest time, a Sealed Handicap for the Shell Trophy and a £100 prize will be run off in connection with the race, whilst the second and third men will receive £75 and £25 respectively. This Sealed Handicap will give a sporting chance to the slower machines.

The accompanying list of pilots and machines, as well as the illustrations, are in accordance with the official entries for the race this year, but it is possible that at the last moment one or two pilots or individual machines may be changed. The sketch map of the course showing the different turning points and the reduced facsimile of the route map for the Aerial Derby as used by the various pilots should enable our readers to follow the event closely in their respective districts, whilst the silhouettes will facilitate identification of the machines as they will appear when flying overhead. In addition to these maps and silhouettes, we publish portraits of the pilots, as well as short illustrated descriptions of the various machines.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EPSOM RACE COURSE
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154° Magnetic (S.S.E.½E.)
LONDON AERODROME
226° Magnetic (S.W.)
WEST THURROCK
349° Magnetic (N by W.)
81° Magnetic (E by N ½ E)
HERTFORD
223° Magnetic (S.W. ½ S.)
EPPING
326° Magnetic (N.W. by N.)
WATER WORKS CHIMNEY
EPPING CHURCH
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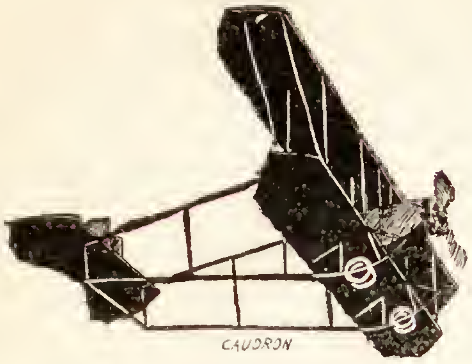
First Class Roads
Railways and Stations
Figures along Railway Lines denote the number of tracks
The turning points are shown pictorially in approximate positions, also on a larger scale in insets

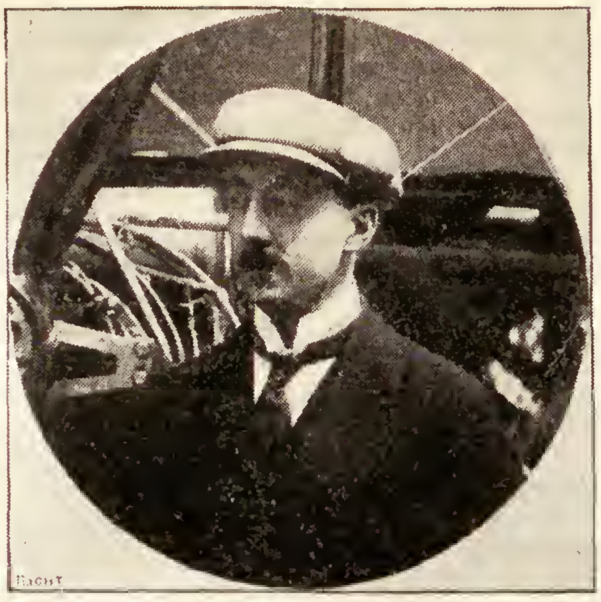
Reduced map as used by the Aviators competing in the Aerial Derby, showing each section distinctly. The original of the Map is about five feet six inches in length, on which the rivers, streams, lakes and reservoirs are coloured most conspicuously in blue, woods and parks in green. The Map is designed by Alexander Gross, F.R.G.S., and published by "Geographia," Ltd., 33, Strand, W.C.

THE PILOTS AND HOW TO RECOGNISE THE MACHINES.

No. 1.



Pilot:
Dr. F. Hansen.



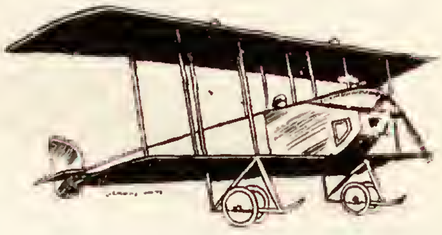
No. 1. The 35 h .p. Caudron Biplane.

This machine is of the tractor type, but may be easily identified by the very short *nacelle* and by the tail booms, of which the lower ones are continued forward to form the skids.

No. 2. The 50 h.p. Grahame-White Tractor Biplane

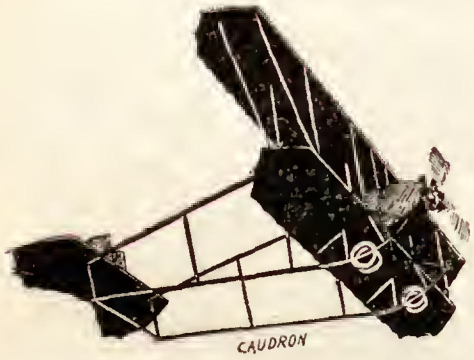
may be recognised by the comparatively great gap between the main planes, and also by the small size of the tail planes. The *fuselage* is similar to that of the Morane monoplane.

No. 2.



Pilot:
Mr. R. H. Carr.

No. 3.



Pilot:
Mr. M. Zubiaga.

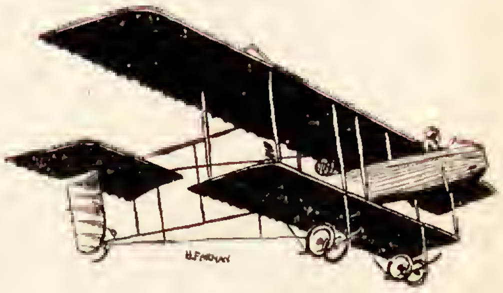
No. 3. The 60 h.p. Caudron Biplane

is somewhat similar to machine No. 1, but may be identified by means of its *nacelle*, which is differently shaped from that of the above-mentioned machine.

No. 4. The 80 h.p. Henry Farman Biplane

will be easily recognised by the *nacelle*, which projects out in front of the main planes, of which the upper one has a considerable overhang. This machine is of the engine-behind type.

No. 4.



Pilot:
Mr. P. Verrier.

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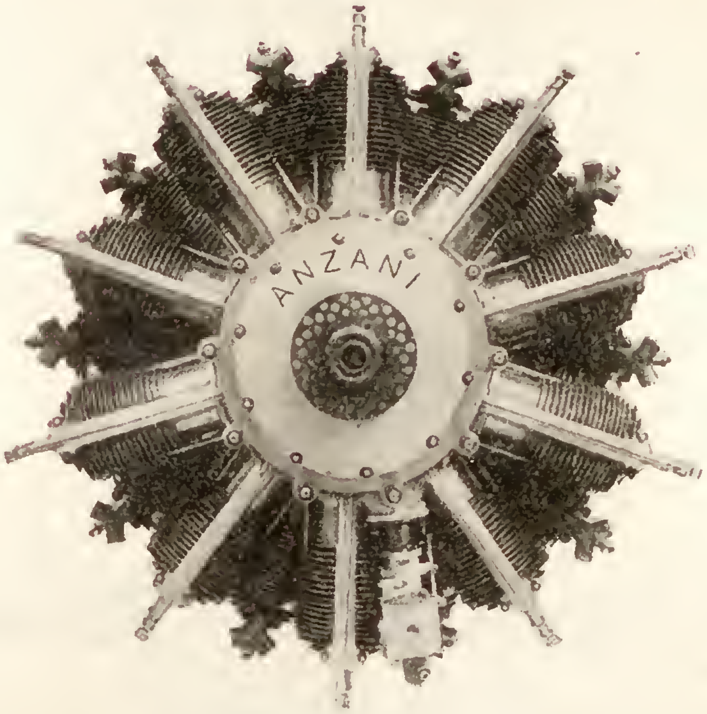

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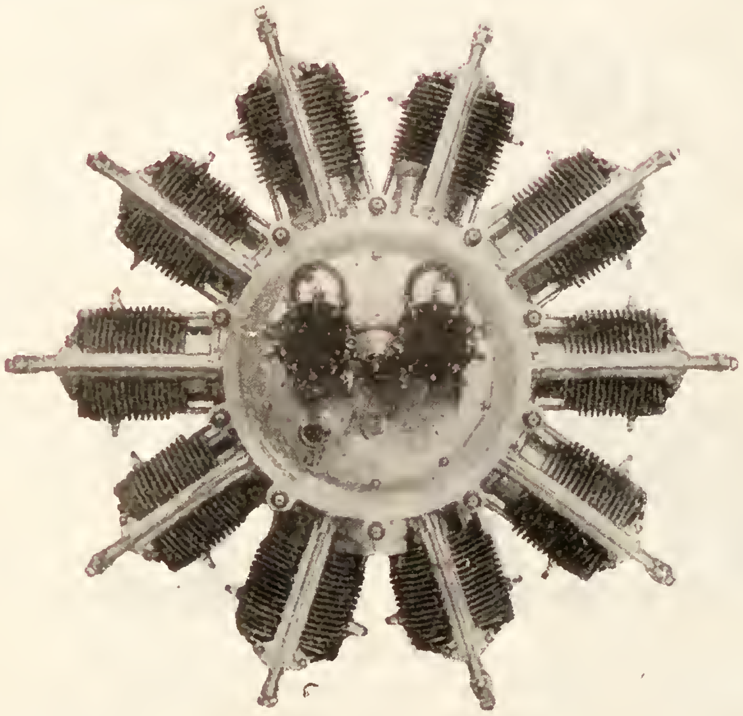
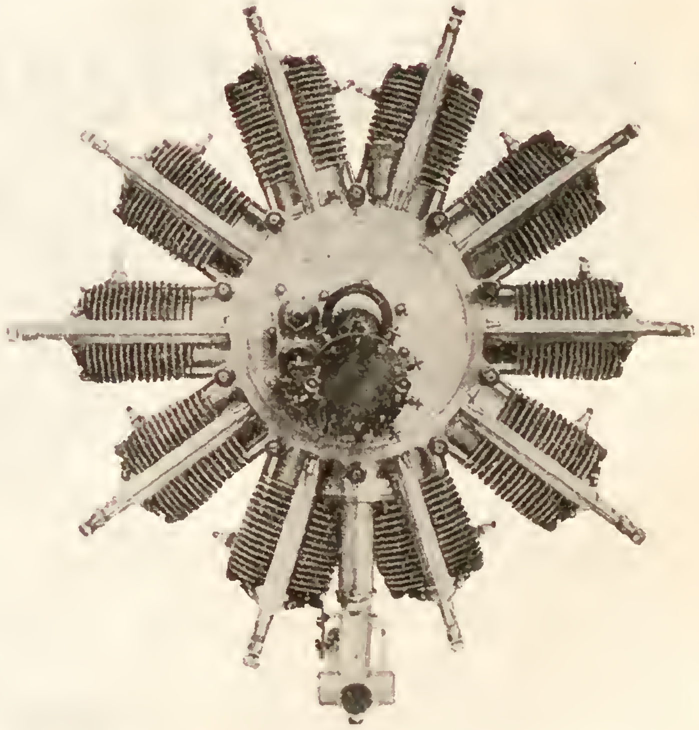


125 h.p. 10-Cylinder.



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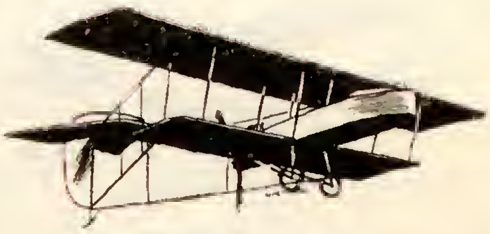
THE PILOTS AND HOW TO RECOGNISE THE MACHINES.

No. 5. The 65 h.p. Martinsyde Biplane

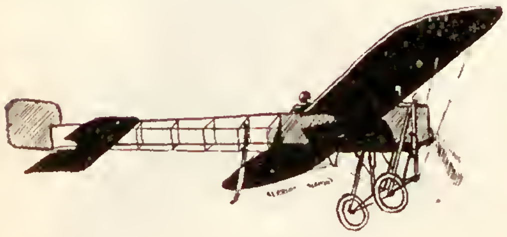
looks somewhat similar to the Henry Farman biplane when in the air, but may be differentiated from the latter machine by means of its chassis, which has no skids, and by the different shape of its tail planes.

No. 5.



Pilot:
Mr. J. Blatherwick.

No. 6.



Pilot:
Mr. L. A. Strange.

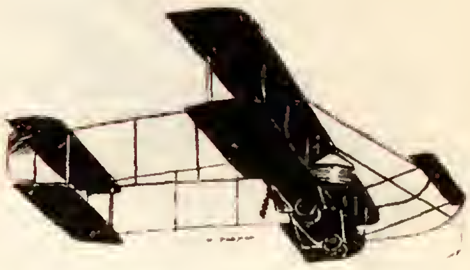
No. 6. The 80 h.p. Blériot Monoplane

will be easily recognised, as it has rounded wing tips and differs from the other monoplanes entered in that the rear portion of the *fuselage* is left uncovered.

No. 7. The 100 h.p. M. Farman Biplane.

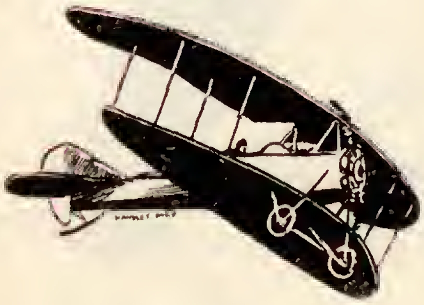
This machine will be readily recognised, as it is the only one in the race having a front elevator.

No. 7.



Pilot:
Mr. J. Alcock.

No. 8.



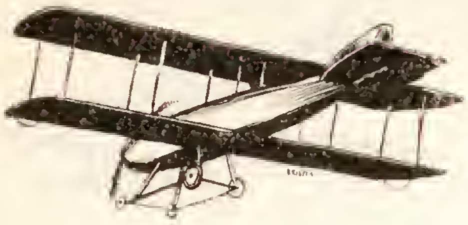
Pilot:
Mr. W. R. Ding.

No. 8. The 100 h.p. Handley Page Biplane

will be one of the easiest machines to identify, owing to the peculiar shape of its wings, which, as will be seen from the silhouette, are crescent-shaped.

THE PILOTS AND HOW TO RECOGNISE THE MACHINES.

No. 9.



Pilot :
Mr. S. V. Sippe.

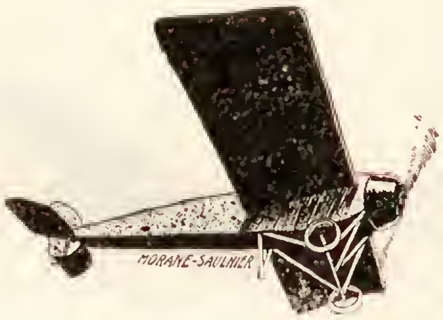
No. 9. The 80 h.p. Bristol Biplane

will be somewhat difficult to distinguish from machine No. 13, the Avro biplane, but may be identified by its peculiar four-wheeled chassis.

No. 10. The 80 h.p. Morane Monoplane.

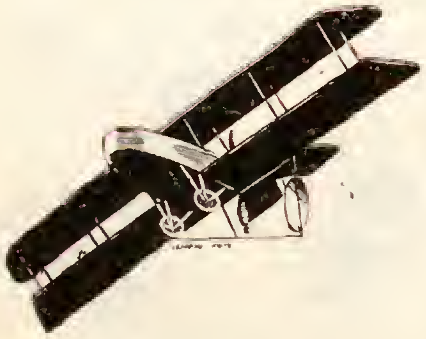
The best means for identification of this machine is its straight, angular wing tips and its landing chassis, which, as will be seen from the accompanying silhouette, has no skids.

No. 10.



Pilot :
Mr. F. Goodden.

No. 11.



Pilot :
Mr. L. Noel.

No. 11. The 100 h.p. Grahame-White Biplane.

This machine will be somewhat difficult to distinguish from the Henry Farman if flying at a great altitude, but differs from the latter in that its chassis has no skids.

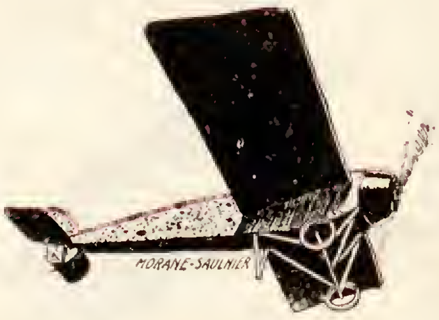
or

The 80 h.p. Morane Monoplane
similar to No. 10.

No. 12. The 80 h.p. Morane Monoplane

is similar to machine No. 10.

No. 12.



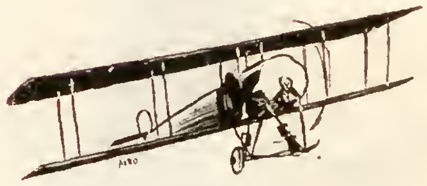
Pilot :
Lord Carbery.

THE PILOTS AND HOW TO RECOGNISE THE MACHINES.

No. 13. The 80 h.p. Avro Biplane

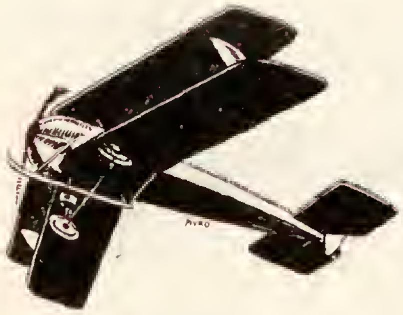
is of the tractor type, and has an all-enclosed *fuselage*. It may be recognised by its chassis, which has a single central skid and two wheels.

No. 13.



Pilot:
Mr. H. Blackburn.

No. 14.



Pilot:
Mr. F. P. Raynham.

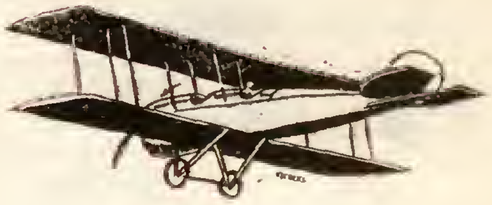
No. 14. The 80 h.p. Avro Scout.

This machine will be easily recognised from the shape of its wings, which slope backwards so as to form a V.

No. 15. The 100 h.p. Vickers Biplane

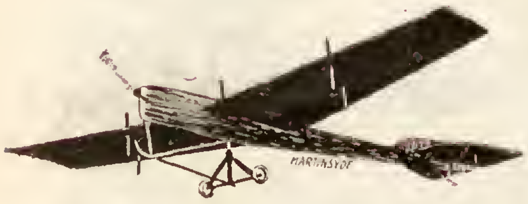
is a small, fast tractor machine which will be a little difficult to distinguish from the Bristol machine No. 18. However, it has a considerably deeper and wider *fuselage* than has the Bristol.

No. 15.



Pilot:
Mr. R. H. Barnwell.

No. 16.



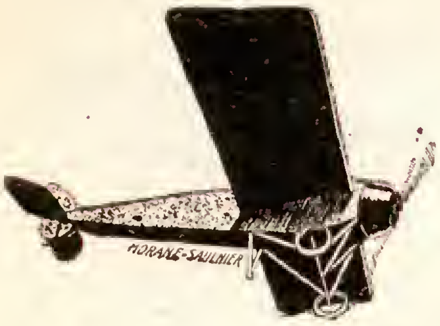
Pilot:
Mr. V. Waterfall.

No. 16. The 120 h.p. Martinsyde Monoplane.

This machine is easily distinguished from the other monoplanes entered by its tapering wings, which are set at a dihedral angle and by its long narrow *fuselage*.

THE PILOTS AND HOW TO RECOGNISE THE MACHINES.

No. 17.



Pilot:
Not announced.

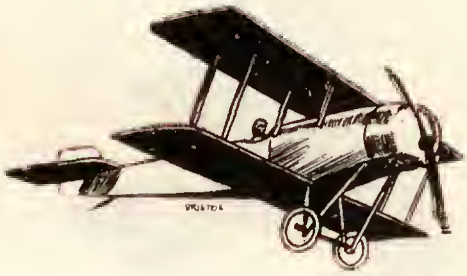
No. 17. The 80 h.p. Morane Monoplane

is exactly similar to Nos. 10 and 12

No. 18. The 80 h.p. Bristol Biplane,

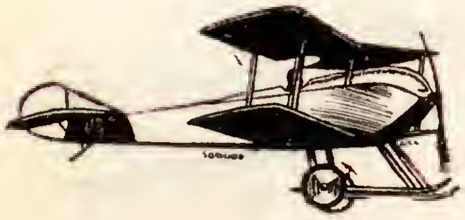
as has already been explained, will look, when flying at a height, somewhat similar to the Vickers biplane, but may be identified by its narrower *fuselage*.

No. 18.



Pilot:
Mr. H. Busteed.

No. 19.



Pilot:
Not announced.

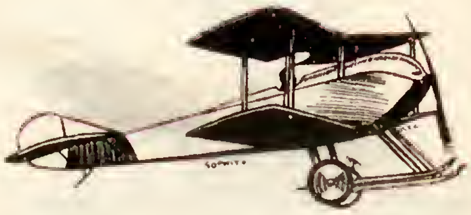
No. 19. The 80 h.p. Sopwith

is a small fast machine, somewhat similar to the Vickers and Bristol, but has a wider and deeper *fuselage*, and may be identified by its chassis, which differs from that of the two above-mentioned machines in that two skids are fitted.

No. 20. The 100 h.p. Sopwith Biplane

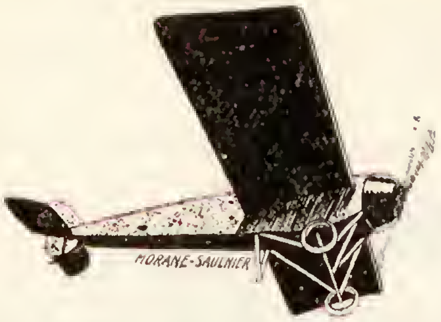
is similar in outward appearance to No. 19, from which it differs only in engine power.

No. 20.



Pilot:
Mr. H. Pixton.

No. 21.

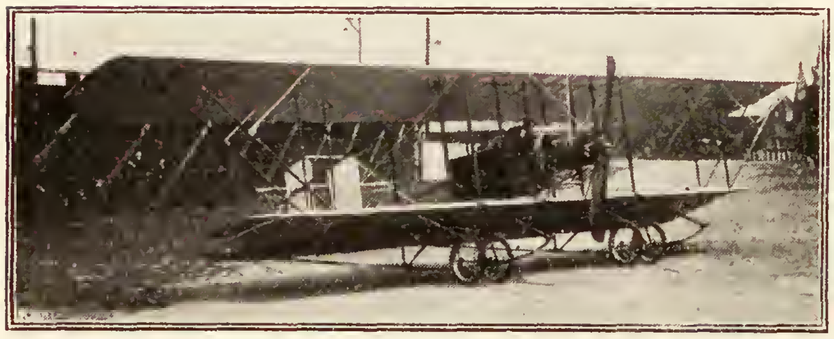


Pilot:
Mr. Gustav Hamel.

No. 21. The 80 or 160 h.p. Morane Monoplane

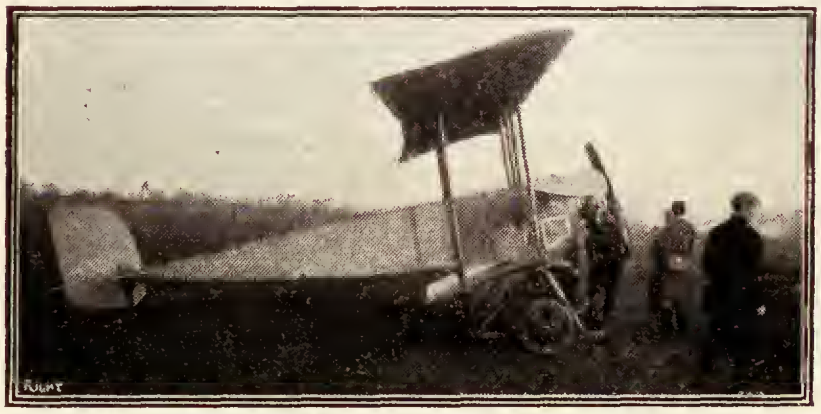
will be similar in outward appearance to the other Moranes entered.

THE MACHINES AND HOW TO RECOGNISE THEM.



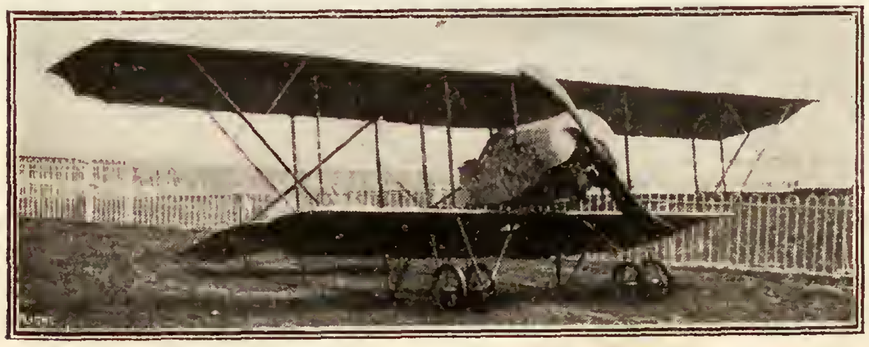
The 35 h.p. Caudron Biplane (No. 1).

No. 1. The 35 h.p. **Caudron Biplane.**—This machine is a standard type Caudron biplane, already familiar to our readers through descriptions in FLIGHT. The only alteration is that a different type *nacelle* has been fitted in order to accommodate the 35 h.p. Statax engine. Great interest will attach to the performance of this machine, since it is the first public appearance of the Statax engine. It will be remembered that a small engine of this type was exhibited at the last Olympia Aero Show, when it was described in these columns.



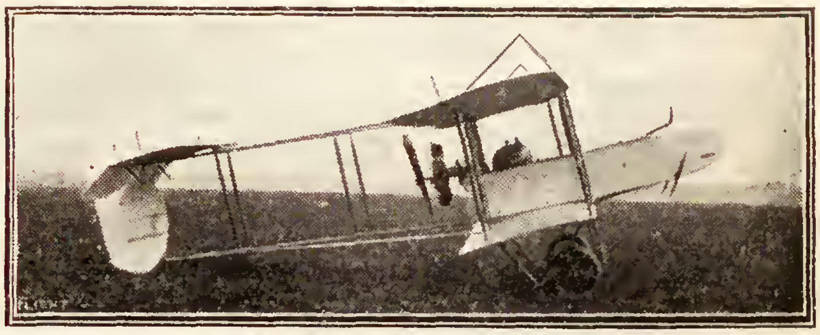
The Grahame-White Tractor Biplane (No. 2).

No. 2. The 50 h.p. **Grahame-White Biplane** is the machine which is familiar to our readers under the pet name "Lizzie." It is on this machine that Mr. R. H. Carr has for the past few weeks been giving such successful demonstrations of looping the loop.



The 60 h.p. Caudron Biplane (No. 3).

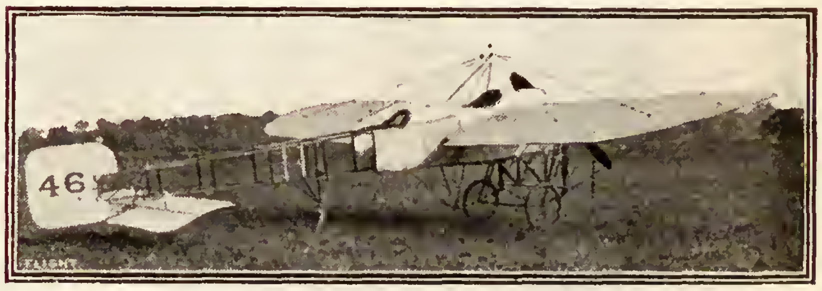
No. 3. The 60 h.p. **Caudron Biplane** is similar in its general arrangement to the Statax-engined Caudron, with the exception that it has a standard type *nacelle*. The engine, a 60 h.p. Gnome, is partly enclosed in the usual way by an aluminium shield.



The Henry Farman Biplane (No. 4).

No. 4. The 80 h.p. **Henry Farman Biplane** is a standard type Henry Farman. It was on a similar machine that M. P. Verrier recently flew from Hendon to Monaco. The engine, as our readers are, of course, aware, is mounted in the rear of the *nacelle*, thus constituting this machine to be of the "pusher" type.

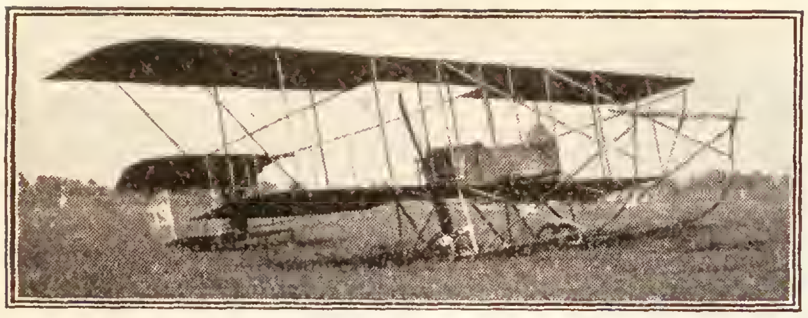
No. 5. The 65 h.p. **Martinsyde Biplane.**—Although this machine follows more or less standard practice as regards its general arrangement, its performance will be watched with interest, since it is the first time that it appears in public. It is built of steel practically throughout, with the exception of the wings and the engine bearers. The engine used is a 65 h.p. Antoinette, mounted in the rear of the *nacelle*.



The Blériot Monoplane (No. 6).

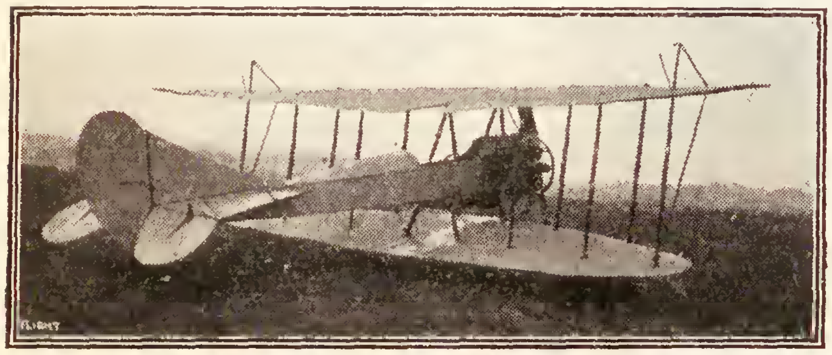
No. 6. The 80 h.p. **Blériot two-seater** is already so well known as to need little description here. The pilot's and the passenger's seats, it will be remembered, are arranged tandem fashion, the passenger occupying the rear seat, just behind the trailing edge of the wings, from where he obtains an excellent view of the country beneath.

No. 7. The 100 h.p. **Maurice Farman Biplane** is the identical machine on which Mr. Jack Alcock has been doing such a great amount of excellent flying during the past months. Instead of the 70 h.p. Renault engine usually fitted on the Maurice Farman biplane, this machine is equipped with a 100 h.p. Sunbeam engine, which of course increases its speed considerably.

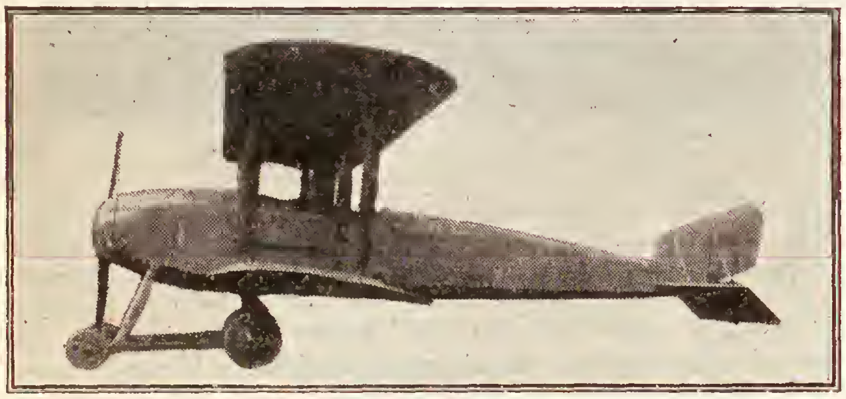


The Maurice Farman Biplane (No. 7).

No. 8. The 100 h.p. **Handley Page Biplane** is the same machine on which Mr. E. R. Whitehouse, and later Mr. W. R. Ding, have been doing such good flights. Some time ago, it will be remembered, Mr. Ding damaged the chassis of this machine on landing. The new chassis fitted is of a different type, consisting of two pairs of V struts, from which is slung the single tubular axle. A very effective silencer has been fitted to the 100 h.p. Anzani engine, so that the machine cannot be heard when flying at an altitude of a few hundred feet.



The Handley Page Biplane (No. 8).



The Bristol Two-seater Biplane (No. 9).

No. 9. The 80 h.p. **Bristol Biplane** is a standard Bristo tractor machine, and is similar to the machines exhibited at the last Paris and Olympia Aero Shows. Although these machines have done a great amount of flying in the west of England, and on Salisbury Plain, they are not so well known to Londoners as they deserve to be, and should, therefore, be watched with interest by those of our readers who will watch the Aerial Derby, either from the starting place at Hendon Aerodrome or from one of the turning points.

The Morane Monoplane (Nos. 10, 12, 17, 21).

Nos. 10, 12, 17 and 21. The **Morane-Saulnier Monoplanes** are similar to the machines flown so successfully by Hamel, Noel and the late M. Marty, to mention just a few of the pilots who favour this machine. As scale drawings and a detailed description of the Morane-Saulnier monoplane have already appeared in the columns of FLIGHT, it is unnecessary to describe the machines in detail here. Suffice it to say that they are very fast, and as at least three of them are equipped with 80 h.p. engines, they should be particularly well matched. There is a possibility that Mr. Hamel will be using a 160 h.p. Gnome in his Morane, but failing to obtain this engine in time for the race, he will in all probability use the ordinary 80 h.p. type.

The Grahame-White Military Biplane (No. 11).

No. 11. The 100 h.p. **Grahame-White Military Biplane** is the machine exhibited at the last Olympia Aero Show. As it has not yet been thoroughly tried, there is the possibility that Mr. Louis Noel will change this machine at the last moment for an 80 h.p. Morane, in which case the total number of Moranes flying in the race will be five. The military biplane is mainly characteristic on account of the main planes, of which the outer portion is slightly swept back. The *nacelle* is also of a somewhat peculiar shape, being, so to speak, of streamline form flying with the pointed end foremost. The engine, a 100 h.p. Gnome, *monosoupape*, is totally enclosed by an aluminium shield. The landing chassis is of a simpler type than one usually finds in biplanes of the "pusher" type, and is somewhat similar to the chassis of the Morane-Saulnier monoplane.

The Avro Biplane (No. 13).

No. 13. The 80 h.p. **Avro Biplane** is very similar to the machine on which Mr. F. P. Raynham did his famous glide from Brooklands to Hendon. This machine is very fast and possesses a good speed range. The engine, which is mounted in the nose of the *fuselage*, is totally enclosed by an aluminium shield.

The Avro Scouting Biplane (No. 14).

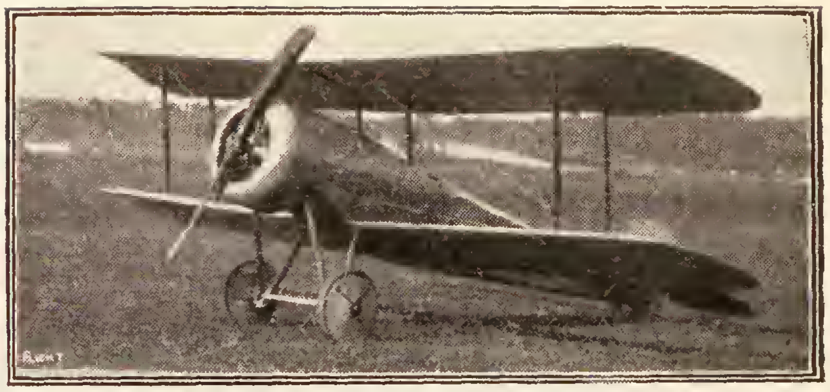
No. 14. The 80 h.p. **Avro Scouting Biplane** was, it will be remembered, exhibited at the last Olympia Aero Show. It is mainly characteristic on account of its main planes, which slope backwards so as to form a V, as seen in plan. This machine, which was fitted at the time of the Show with air-brakes for the purpose of reducing the speed when landing, is expected to be very fast, as the angle of incidence is very small and the planes are perfectly flat on the under surface.

No. 15. The **100 h.p. Vickers Biplane** was also exhibited at the last Olympia Aero Show, and belongs to the small fast scouting type tractor biplane class. As this machine has not been flown in public up to the time of going to press, the speed is not known, but it is anticipated that the machine will prove very fast indeed.

The Martinsyde Monoplane (No. 16).

No. 16. The **120 h.p. Martinsyde Monoplane** differs in minor details only from the machine flown by Mr. R. H. Barnwell in last year's Aerial Derby, when, it will be remembered, Mr. Barnwell obtained second place, so that this machine should, barring mishaps, be in the first batch home. It is equipped with a 120 h.p. Austro-Daimler engine.

No. 18. The **80 h.p. Bristol Biplane** is similar to the machine exhibited at the last Olympia Aero Show, on which some time ago Mr. Busteed flew from Salisbury Plain to Brooklands in 27 mins., and as this new machine is, if anything, faster than the old one, it should stand an excellent chance of being one of the first to finish the course.



The Bristol Scout (No. 18).

Nos. 19 and 20. The **Sopwith Biplanes**, of which one is fitted with an 80 h.p. engine, whilst the other has a 100 h.p. motor, are very similar to the biplane on which Mr. Pixton won the Schneider race at Monaco recently, with the exception, of course, that it is fitted with a land chassis. As these small Sopwith biplanes are very fast indeed, they should provide a very close race with some of the other really fast machines entered.

The Sopwith Scout (Nos. 19 and 20).

* * *

FLYING AT HENDON.

1912.

Mr. T. O. M. Sopwith, the winner of the first Aerial Derby, June 8th, 1912.

A quick-starting contest was the principal event at Hendon on Thursday afternoon of last week, in addition to which there were numerous exhibition and passenger flights. Proceedings opened shortly after 3 o'clock with flights by N. Howarth and W. Birchenough on Grahame-White 'buses, and Louis Noel on the 80 h.p. Blériot with passengers. R. J. Lillywhite took up a rather weighty passenger (about 16 stone) on the bi-rudder 'bus, with the result that the passenger's seat collapsed, and had to be mended before further passengers could be taken up. R. H. Carr then ascended on the 100 h.p. G.-W. aerobus with Claude Grahame-White and two lady friends as passengers, and a little later F. W. Goodden made his first public appearance on the 80 h.p. Morane-Saulnier monoplane. His flight, which lasted about 20 mins., was a splendid example of a fine combination of man and machine. The latter has just been turned out at the G.-W. works, and is certainly an excellent job. Noel informed the writer that this new "80" is much nicer to fly than the previous ones, being exceedingly easy on the controls. As for Goodden, he flew the machine as if he had been flying it all his life, and his landing—a decidedly tricky matter on this type of machine—was very neat. In the meanwhile, Carr made another ascent on the aerobus, taking as passengers two members of the St. John Ambulance Corps and two pilots, A. E. Barrs and Chas. Weber, the latter taking some photographs when aloft. By this time the passenger's seat on the bi-rudder 'bus had been mended, and Lillywhite got to work again, whilst E. Norris made a flight on 'bus 109. Carr then took up three passengers on the aerobus, and Goodden took up his first passenger on the Morane-Saulnier. The quick-starting contest then took place. Each competitor was allowed two tries, the first with his engine running slow at the start, and the second with the engine "all out." The former starts were made opposite the sixpenny enclosure, and the latter opposite the judge's box. The results were as follows :—

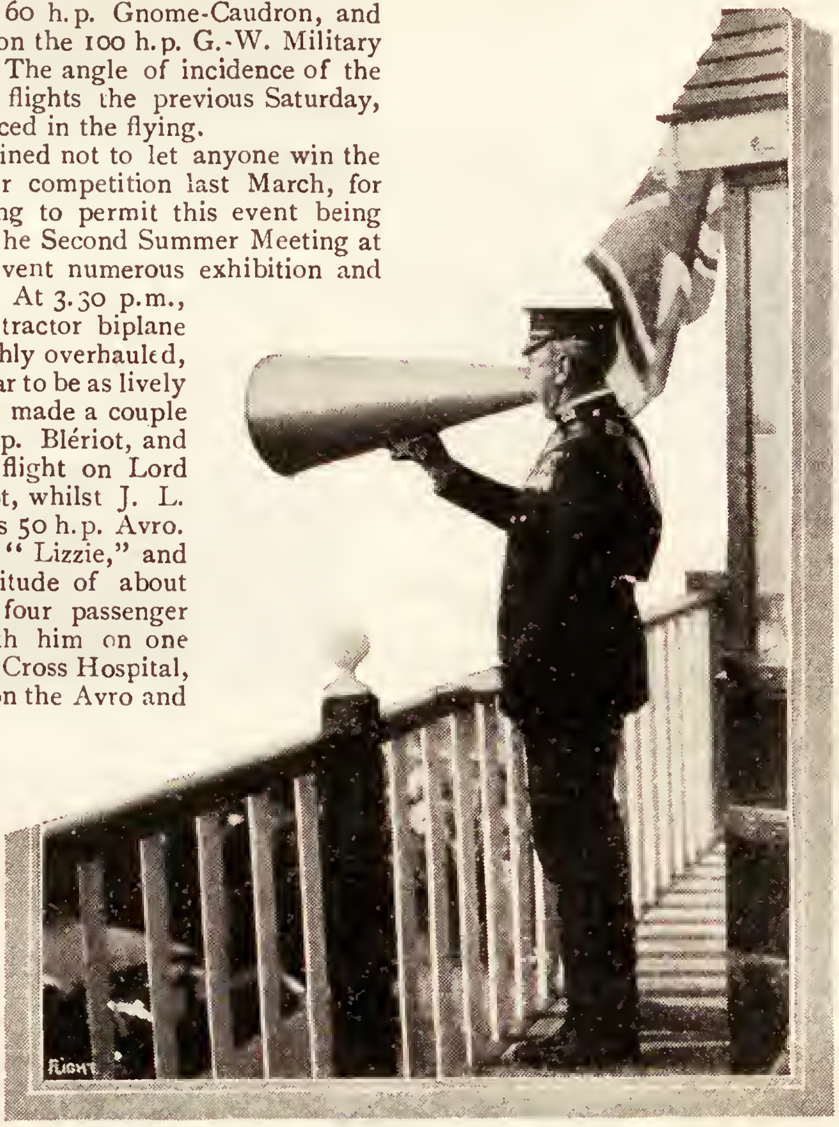
	1st Attempt.		2nd Attempt.		Average.	
	ft.	in.	ft.	in.	ft.	in.
1. R. H. Carr (50 h.p. G.-W. 'bus) ..	161	4	94	0	122	8
2. R. J. Lillywhite (50 h.p. G.-W. 'bus)	178	6	96	3	137	4½
3. Louis Noel (50 h.p. G.-W. 'bus) ...	171	0	115	3	143	1½
4. W. Birchenough (50 h.p. G.-W. 'bus)	193	0	128	0	160	6
5. N. Howarth (50 h.p. G.-W. 'bus)...	215	0	128	0	171	6

1913.

Mr. Gustav Hamel, the winner of the second Aerial Derby, September 20th, 1913.

Whilst the above contest was in progress, J. L. Hall and Marcel Desoutter made exhibition flights, the former on his 50 h.p. Avro, and the latter on Lord Edward Grosvenor's 50 h.p. Blériot. After the contest M. Osipenko made a flight on 'bus 109, and Birchenough took up a passenger on the bi-rudder 'bus, the machines then being returned to the hangars. Later in the evening, however, M. Zubiaga came out on his 60 h.p. Gnome-Caudron, and Louis Noel made a 10-minute flight on the 100 h.p. G.-W. Military biplane with Norris as passenger. The angle of incidence of the tail had been altered since the trial flights the previous Saturday, and a marked improvement was noticed in the flying.

The elements appear to be determined not to let anyone win the Shell Trophy, which was put up for competition last March, for once again the wind was too strong to permit this event being flown on Saturday afternoon last at the Second Summer Meeting at Hendon. It did not, however, prevent numerous exhibition and passenger flights from being made. At 3.30 p.m., R. H. Carr brought out the G.-W. tractor biplane "Lizzie," which had been thoroughly overhauled, but in spite of which it did not appear to be as lively as it used to be. Louis Noel then made a couple of passenger flights on the 80 h.p. Blériot, and Marcel Desoutter put up a 6-min. flight on Lord Edward Grosvenor's 50 h.p. Blériot, whilst J. L. Hall came out shortly after on his 50 h.p. Avro. Carr next ascended once more on "Lizzie," and made two loops, each at an altitude of about 1,000 ft. After this Noel made four passenger flights on the Blériot, taking with him on one occasion Dr. A. Evans, of Charing Cross Hospital, and flights were also made by Hall on the Avro and F. W. Goodden on the 80 h.p. Morane-Saulnier. Goodden remained aloft for half an hour, climbing several thousand feet. Whilst he was flying Carr took up a passenger on the Blériot, and Lillywhite made a 10-minute flight on the bi-rudder 'bus. Shortly after 5.30 p.m. Desoutter left for Brooklands on the 50 Blériot, the journey taking him about 15 mins., although we did not learn of his safe arrival until several hours later. Carr then made a couple of passenger flights on the Blériot, and Lan Davis flew his 50 h.p. Avro. Carr gave another looping display on "Lizzie," making in all three loops at altitudes varying from 800 to 1,000 ft. Noel and Goodden each took up a passenger, and two more flights by Lan Davis on the Avro brought the proceedings to a close. At 7.40 p.m. Hamel arrived on his 80 h.p. Morane with Lady Duff as passenger. He had left Brooklands in the morning for Reading, and from there he went on to Oxford, where he witnessed a polo match and gave a looping display. He then returned to Reading, and was received by the Lord Chief Justice, Lord Reading, after which he continued on to Hendon.



An important personage at Hendon Aerodrome—the megaphone man.

Sunday afternoon was an exceptionally busy one, and the large attendance of visitors saw plenty of flying. The proceedings opened with a looping display by R. H. Carr on "Lizzie," and exhibition and passenger flights by Birchenough on the bi-rudder 'bus, Goodden on the 80 h.p. Morane-Saulnier, Noel on the 80 h.p. Blériot, and Carr on the aerobus. Lady passengers were very much in evidence during the afternoon, the greater number of whom were taken up by Noel on the Blériot. Goodden made several flights on the Morane-Saulnier, with and without passengers, and Lillywhite also made about four flights on the bi-rudder 'bus with passengers, at one time flying high and descending with a fine spiral. Carr gave a second looping demonstration later in the afternoon, and also took up three passengers on the aerobus; Claude Grahame-White made a flight in the same machine with three passengers shortly after. Other flyers were Lan Davis on the 50 h.p. Avro, E. F. Norris and M. Osipenko on 'bus 109, N. Howarth on the bi-rudder 'bus, and M. Zubiaga on the 60 h.p. Caudron. Later in the evening Carr made a high flight on the aerobus with four passengers, and E. Baumann made a fine flight on the 100 h.p. Handley Page biplane. This machine has been fitted with a new and stronger chassis, consisting of two pairs of V struts of steel tube streamlined with wood, and another new feature is the fitting of a silencer to the engine. Baumann flew for half an hour, reaching an altitude of 6,000 ft., the machine flying very steadily and the engine being remarkably silent. After landing, Baumann handed the machine over to W. R. Ding, who made several circuits.

THE KING AND THE R.F.C.

THE very real interest which is taken by H.M. the King in the work of the Royal Flying Corps was again strikingly evidenced on Tuesday last, when a whole afternoon was spent in inspecting the equipment and *personnel* of the corps at the Aircraft Park, Farnborough. As their Majesties left the Royal Pavilion two machines were manœuvring overhead, and while from one a message was sent by wireless telegraphy that the Royal party was on its way, from the other several photographs were taken. The King rode across the common and Laffan's Plain, while the Queen and Princess Mary made their way by motor car. At the Aircraft Park, where the Royal Party was received by Brigadier-General Henderson (Director General of Military Aeronautics), and Lieut.-Col. F. H. Sykes, commanding the Military Wing R.F.C., twenty-seven machines of various types, each with pilot and attendant mechanics, were ranged in two rows, and after they had been inspected, each one in regular rotation made a circular flight of about five miles. While the inspection was in progress the King was shown several of the photographs, which had been secured from mid-air, of his ride across the common, the prints being shown to His Majesty fourteen minutes after the machine landed. A demonstration of wireless telegraphy from and to an aeroplane in the air was also witnessed by the Royal party. The R.F.C. recruits under training were inspected and then a move was made to the airship sheds, where their Majesties were received by Capt. Sueter (Director of the Naval Air Department) and Com. E. A. D. Masterman (Commanding Naval Wing R.F.C.). After examining the details of the dirigibles, the "Parseval," officially known as No. 4, was brought out and made a cruise of 12 miles or so, the eleven passengers on board including Lord John Hamilton, a member of the King's suite.

Then the Royal party was conducted through the workshops of the Royal Aircraft Factory by the superintendent, Mr. Mervyn O'Gorman, great interest being taken by His Majesty not only in the processes of construction but also in the arrangements at the factory for the testing of both aeroplanes and engines. Subsequently Major Clive Wigram, one of the King's private secretaries, went for a flight of about a dozen miles on one of the new R.E. biplanes, and during the trip the machine flew for some distance without the pilot touching the controls. The King returned to the Royal Pavilion about 6 p.m.

The Atlantic Flight.

PARTICULARS of Mr. Gastav Hamel's proposed attempt to cross the Atlantic, starting from Newfoundland, are now available for publication. The machine which he will use is the new large Martinsyde monoplane to which reference was made in the columns of FLIGHT some time ago, when we were not at liberty to state the purpose for which this machine was being built. In its general lines, the new Martinsyde monoplane resembles previous machines of that make, excepting, of course, that it is of much greater dimensions, the span being about 65 ft. and the overall length about 45 ft. The engine to be used will be a 215 h.p. Sunbeam. No floats will be fitted, but two bulkheads in the *fuselage*, in addition to the main planes, will keep the machine afloat should it have to come down on the sea, whilst a telescopic "distress" mast will be carried, for signalling use under such an emergency. This practical attempt has been made possible by the generous financial backing of that well-known sportsman, Mr. Mackay Edgar, who has done so much to uphold British supremacy in motor boating.

The start for the South of the R.F.C. No. 2 Squadron, Montrose, at 5.30 a.m.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Diary of Events.

May 23 ...	Aerial Derby. Hendon Aerodrome.
June 10 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
June 27 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
July 11 ...	International Correspondence Schools Race, London–Paris–London. Hendon Aerodrome.
July 11 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
Aug. 1–15	*Daily Mail* £5,000 Circuit of Britain Race. Starting from Southampton Water.
Aug. 22–29	Gordon-Bennett Eliminating Trials. Salisbury Plain.
Sept. 20–29	Gordon-Bennett Aviation Race. Buc, France.

AERIAL DERBY. HENDON AERODROME.

To-morrow, Saturday, starting 4.15 p.m.

Members of the Royal Aero Club are admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards. The Membership Card admits the Member only, motor cars must be paid for.

Balloon Contests at Hurlingham.

The Club has arranged the following Balloon Contests from Hurlingham Club, Fulham, for this year:—

June 10th...	Hare and Hounds Race for Cup presented by Mr. John Dunville.
June 27th...	Long Distance Balloon Race for Cup presented by Mr. A. Mortimer Singer.
July 11th...	Hedges Butler Challenge Cup.

Members are admitted free to Hurlingham on the above dates, on production of their Club Membership Cards.

Daily Mail Circuit of Britain Race, £5,000.

Date of Contest	August 1st to 15th.
Starting Place	Southampton.

Entries.—The Entrance Fee is £100 per aircraft, and entries will be received up to 12 o'clock noon, May 30th, 1914. The Entrance Fee of £100 is payable either in one sum or as follows:—

£50 by noon on May 30th, 1914.
£50 by noon on June 20th, 1914.

Late entries will be received up to 12 noon, June 30th, 1914, in which case the Entry Fee will be £150.

The Entry Form, which must be accompanied by the Entrance Fee, must be sent in to the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

Full particulars can be obtained from the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

International Correspondence Schools Race. London–Paris–London.

(*Under the Competition Rules of the Royal Aero Club.*)

Organised by the Royal Aero Club and the Aero-Club de France.

Starting and finishing at the Hendon Aerodrome, Hendon, N.W.

SATURDAY, JULY 11TH, 1914.

PRIZES.

Fastest Time...	1st Prize: £500.	Presented by the International Correspondence Schools.
Handicap ...	1st Prize: £300.	Presented by the Royal Aero Club.
	2nd Prize: £150.	Presented by the International Correspondence Schools.
	3rd Prize: £50.	Presented by the International Correspondence Schools.

REGULATIONS.

1. *Date of Contest.*—The Race will start from the London Aerodrome, Hendon, on Saturday, July 11th, 1914, and competitors will leave the starting line in the order of their respective handicap times, the limit man starting at 5 a.m.

2. *Qualification of Competitors.*—Both the entrant and pilot must be duly entered on the Competitors' Register of the Royal Aero Club. Pilots must hold an aviator's certificate issued by the Royal Aero Club or other Club affiliated to the International Aeronautical Federation.

3. *Entries.*—The Entrance Fee is £5 per aircraft, and entries will be received up till 12 noon, Saturday, June 27th, 1914. Late entries will be received up to 12 noon, Saturday, July 4th, 1914, in which case the Entrance Fee will be £10.

The Entrance Fee will be returned to each competitor who completes the course by 10 p.m. on Saturday, July 11th, 1914.

The Entry Form, which must be accompanied by the Entrance Fee, must be sent to the Secretary of the Royal Aero Club, 166, Piccadilly, London, W.

4. *Course.*—The Course is from London to Paris and back, starting from the London Aerodrome, Hendon, *via* Harrow, Epsom and Boulogne to Buc Aerodrome, near Paris, and the return journey is from the Buc Aerodrome, near Paris, *via* Folkestone, Epsom and Harrow to the London Aerodrome, Hendon. In passing Harrow, Epsom and Boulogne on the outward journey and Folkestone, Epsom and Harrow on the home journey, competitors must fly sufficiently low for their numbers to be easily verified by the Observers at these points.

Should no competitor have completed the course by 10 p.m. on Saturday, July 11th, 1914, the Royal Aero Club reserve to themselves the right to extend the period or declare the race off.

5. *Order of Starting.*—Competitors will be started at their respective handicap times. Each aircraft will be allotted a number, which must be conspicuously displayed under the wings or planes of the aircraft in a position approved by the Officials.

6. *Starting.*—Each competitor, with his aircraft, must be on the starting line ready to start fifteen minutes before his time of starting.

7. *Timing.*—Competitors will be timed from the given order to start from the London Aerodrome until their return thereto, crossing the finishing line in flight. The winner of the Prize of £500 shall be the entrant of the competitor who shall have properly completed the course in the fastest time. The winners of the Handicap Prizes shall be the entrants of the competitors who shall have properly completed the course in the fastest respective handicap times.

8. *Arrival in Paris.*—Competitors will be required to make a compulsory stop of one hour at the Buc Aerodrome. The time of arrival of each competitor will be taken at the moment of alighting within the boundary of the Aerodrome. This stop of one hour may be utilised for replenishments and such repairs as are allowed. On the return journey competitors will be officially restarted at the expiration of one hour from the time of their alighting. Any time spent in the Aerodrome beyond the one hour will count as flying time.

9. *Repairs.*—Individual replacements and repairs to the aircraft and motor may be made *en route* or at Buc Aerodrome, but neither may be changed as a whole.

10. *Handicapping.*—The handicapping will be carried out by the handicappers appointed by the Royal Aero Club. In order to assist the handicappers, each competitor will be required to make speed tests over a measured course. The number of tests will be at the discretion of the handicappers, and these speed tests will be carried out on the day preceding the race as follows:—

Competitors must have their aircraft completely erected at the London Aerodrome, Hendon, N.W., not later than 10 a.m., on Friday, July 10th, 1914, and the pilot and aircraft must be at the disposal of the Officials at and from that hour until 6 p.m. for such Speed Tests. After the tests have been completed, no alterations or adjustments to any part of the aircraft may be made except with the permission of the Officials. This shall not be taken to include general adjustments of the motor.

Any competitor not complying with these regulations will render himself liable to disqualification, unless he has first received from the handicappers a certificate exempting him from such speed tests.

11. *Stoppages en route are not prohibited.*

12. *Shed Accommodation.*—The aircraft of competitors who are not already tenants at the London Aerodrome will be housed free of charge from 9 a.m. on Thursday, July 9th, 1914, till 6 p.m. on Monday, July 13th, 1914.

13. Competitors must be equipped with life belts or other appliances for keeping themselves afloat.

GENERAL.

1. A competitor by entering thereby agrees that he is bound by the regulations herein contained, or to be hereafter issued in connection with this competition, and by The Royal Aero Club Open Competition Rules.

2. The interpretation of these regulations or of any to be hereafter issued shall rest entirely with the Royal Aero Club.

3. The competitor shall be solely responsible to the officials for the due observance of these regulations, and shall be the person

with whom the officials will deal in respect thereof, or of any other question arising out of this competition.

4. A competitor by entering waives any right of action against the Royal Aero Club, the International Correspondence Schools, Limited, or the Grahame-White Aviation Company, Limited, for any damages sustained by him in consequence of any act or omission on the part of the officials of the Royal Aero Club, the International Correspondence Schools, Limited, or the Grahame-White Aviation Company, Limited, or their representatives or servants or any fellow competitor.

5. The aeroplane shall at all times be at the risk in all respects of the entrant and/or the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself or to his aircraft, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the Royal Aero Club, the International Correspondence Schools, Limited, or the Grahame-White Aviation Company, Limited, in respect thereof.

Mortimer Singer Long Distance Balloon Contest.

Mrs. A. Mortimer Singer, on Saturday last, the 16th inst., made an ascent in connection with this Contest. The start was from Battersea and the descent was made in the vicinity of Launceston in Cornwall, a distance of nearly 200 miles. This ascent will qualify for the Cup, which will be awarded for the longest distance made by a balloon in one flight up to December 31st, 1914.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Monday, last week, fine. The following machines were up:— No. 31 Henry Farman, 150 Avro, 104 Sopwith, 34 Short, 50 B.E., 3 Short and 2 Short, 16 Avro; Lieut. Littleton to Whitstable.

Tuesday fine. No. 66 Short gun machine, 2 Short, 104 Sopwith, 36 Deperdussin, 49 and 50 B.Es., 24 Bristol and Deperdussin.

Wednesday fine. No. 50 B.E., 31 Henry Farman, 2, 3 and 62 Shorts, 43 Bristol Tractor 80 H.P., 150 Avro.

Thursday fine. Nos. 62, 2 and 10 Shorts, 43 Bristol Tractor, 31 Henry Farman, 49 and 50 B.Es., 150 Avro, 40 Caudron.

Friday fine. Lieut. Davis and passenger on 43 Bristol Tractor cross country, 104 Sopwith, 150 Avro, 153 and 43 Bristol, 49 B.E. and 50 B.E., 66 Short gun machine, 31 Henry Farman, 2 and 62 Shorts.

Saturday rather windy. No. 31 Henry Farman, 104 Sopwith, 49 and 50 B.Es., 43 and 153 Bristols, 2 Short, 150 Avro. The First Lord, Mr. Winston Churchill, paid a visit to the Naval school during the day.

Mr. Victor Mahl, who has just secured his pilot's certificate on a Sopwith machine. It will be remembered Mr. Mahl was the mechanician who assisted Mr. Howard Pixton recently during his flight at Monaco in connection with the Schneider Cup, &c.

Sunday fine but windy. Mr. Hamel on monoplane with Mr. Winston Churchill as passenger arrived from Hendon about 5 p.m., stopping about half an hour, then later leaving for Isle of Grain (looping over Sheerness Harbour).

Civilian Flying.—Monday and Tuesday, Mr. Alec Ogilvie was out on both his machines the 25 and 50 Wright.

Brooklands Aerodrome.

On Monday morning last week, Lieut. Rabagliati passed his *brevet* tests in good style on a Bristol biplane, rising to 450 ft. for the altitude. The Bristol and Vickers schools were at work. Lieut. Collett, R.N., flew to Gosport on the D.F.W. biplane. M. Verrier (with Mr. Brown as passenger) arrived on a Henry Farman biplane *en route* for Farnborough. In the afternoon Lieut. Robin Grey (with an air mechanic as passenger) came in on Sopwith biplane No. 319 from Farnborough, returning there after a short stay. Mr. Pixton made a couple of flights on the Sopwith "scout." Lieut. Granville arrived from Farnborough on H.F. No. 339, returning there after a short stay. Lieut. Wilson also came from Farnborough on the 50 h.p. Avro No. 290, returning later. Mr. Mahl was out with Mr. Pixton for tuition on the 80 h.p. standard Sopwith. Mr. Barnwell flew across country with a passenger on the Vickers gun 'bus, rising to 3,500 ft. *en route.* Vickers and Bristol pupils again out. Mr. Mahl doing straights and long hops on 80 h.p. standard Sopwith. Wind variation between zero and 26 miles an hour.

Mr. Mahl was doing straights on 80 h.p. standard Sopwith on Tuesday morning. Mr. Barnwell took up a passenger on the Vickers gun-carrying biplane. No. 4 Sopwith "scout" arrived. In the afternoon, Lieut. Wilson in from Farnborough on Sopwith No. 329, returning there. Mr. B. C. Hucks out on his "looping" Blériot, completing six loops and flying upside down for three-quarters of a mile. Mr. Mahl doing straights up to 500 ft. on the 80 h.p. standard Sopwith. Vickers and Bristol schools again at work. Mr. Mahl circuits and figure of eight on 80 h.p. Sopwith. Mr. Pixton on No. 3 Sopwith "scout." Wind between zero and 24 miles an hour.

On Wednesday morning, Bristol and Vickers pupils out. Mr. Mahl for 20 mins. flight (up to 2,500 ft.) on the 80 h.p. Sopwith. Departure of Mr. B. C. Hucks' "looping" Blériot. In the afternoon, Mr. Pixton out on Sopwith "scout," Mr. Barnwell for solo flights on 70 and 50 h.p. Vickers biplanes. Vickers and Bristol school work. Mr. Pixton to Farnborough on No. 4 Sopwith "scout." Wind variation 0 to 22 miles.

Three *brevets* were passed in good style on Thursday morning, respectively by Mr. Peter Liddell (Vickers biplane, altitude 600 ft.), Mr. R. M. Murray (Vickers biplane, record altitude of 3,200 ft.), Mr. Victor Mahl (Sopwith biplane, altitude of 1,000 ft.). Vickers and Bristol pupils out. In the afternoon Mr. Barnwell testing new 50 h.p. Vickers biplane. Mr. Mahl for two good flights on the 80 h.p. Sopwith. Arrival of Mr. Hamel and passenger from Winchester. Solo flight by Mr. Hamel, including one loop, one turnover, and one tail-slide. Bristol and Vickers pupils out.

Vickers and Bristol pupils out Friday morning. Mr. Mahl on 80 Sopwith. Lieut. Lawrence with passenger from Farnborough on B.E. No. 239, afterwards returning there. Mr. Mahl out again on 80 Sopwith, carrying two passengers second time. In the afternoon, Mr. Busteed arrived from Farnborough on the 80 h.p. Bristol "scout," on which he had accomplished a fine performance, having been officially tested at 97½ miles per hour (fast) and under 40 m.p.h. (slow), the machine climbing 3,500 ft. in the excellent time of 4 mins. This machine is, therefore, the fastest machine in England at the present time, and the fastest of its size in the world. Mr. Hamel out on his "looping" Morane, doing two loops and one tail-slide, afterwards taking up Lady Juliet Duff as a passenger. Mr. Busteed out again on Bristol "scout." Wind variation 0-20 m.p.h.

On Saturday, too windy for school work. Mr. Hamel left for Oxford with Lady Juliet Duff as passenger. Mr. Barnwell passenger carrying on Vickers gun 'bus. M. Marcel Desoutter arrived from Hendon on Lord Edward Grosvenor's 50 h.p. Blériot. Mr. Busteed out on the Bristol "scout."

Mr. Busteed was first out on Sunday on the Bristol "scout," flying strongly and well in a gusty wind, the machine proving to be a veritable "space-eater." Messrs. Barnwell and Knight were out on Vickers biplanes. Mr. Skene (who recently accomplished some fine "looping" flights at Buc) flew to Aldershot and back on Lord Edward Grosvenor's 50 h.p. Blériot. The winners of the ballot for the free passenger flights—Mrs. Gerrie, of Shepperton, and Mr. John Flores Lingeman, of St. Margaret's-on-Thames—were taken up by Messrs. Barnwell and Knight on Vickers biplanes.

Bristol School.—Monday last week Merriam and Stutt were out with Capt. Walcot (2), Mr. Lagrange, Lieut. Mills (2), Mr. Gresley (3), and Mr. Hay (4), as passengers. Lieut. Rabagliati then completed the tests for his certificate, flying splendidly throughout.

Jullerot, Merriam and Stutt on Tuesday took the following pupils for tuition:—Lieut. Bonham-Carter (3 flights), Mr. Lucas (3), Mr. Lagrange (2), Mr. Gresley (4), Mr. Parker (3), Capt. Walcot (1), Lieut. Mills (2), Lieut. Richard (2), Mr. Eastwood (1). The weather was too windy for solo flying by pupils.

Wednesday, passenger tuition was given to Mr. Gresley (6), Mr. Eastwood (2), Lieut. Richard (2), Mr. Lagrange (3), Mr. Racine Jacques (4), Capt. Walcot (1), Mr. Parker (4), Lieut. Bonham-Carter (3), and Lieut. Mills (1). In the evening Stutt made a test, but the weather was too bad to continue.

Thursday, Merriam and Stutt were out with Mr. Parker (4), Mr. Eastwood (3), Mr. Gresley (3), and Mr. Racine Jacques (2). Solos were executed by Capt. Waloot (1), Mr. Lagrange (3), Mr. Racine Jacques (4), and Lieut. Mills (2).

Jullerot and Stutt were out Friday with Mr. Eastwood (5), Mr. Gresley (5), Mr. Parker (2), Mr. Lagrange (2), Capt. Walcot (1), solo flights made by the following pupils: Mr. Lagrange (3), Mr. Parker (2), Lieut. Mills (4), Capt. Walcot (2), Mr. Jacques (1).

Vickers School.—Instructors at work during last week, Barnwell, Knight, Elsdon and Webb.

Monday, with instructor, Major Phillips, Lieuts. Wood-Smith and Tennant, Messrs. Murray, Wilson, Parker and Steinbach; Lieut. Leighton and Mr. Murray solos, also Mr. Liddell, all biplane.

With instructor Tuesday, Major Phillips, Lieut. Wood-Smith and Messrs. Wilson and Steinbach. Messrs. Liddell and Murray solos, Lieut. Tennant and Mr. Collins with instructor.

Wednesday, with instructor, Lieuts. Tennant and Wood-Smith, and Major Phillips and Messrs. Steinbach, Wilson, Collins and Parker. Messrs. Liddell and Murray solos. Barnwell testing new school biplane.

Thursday, with instructor, Major Phillips and Messrs. Steinbach, Wilson, Collins and Parker. Major Phillips and Lieut. Wood-Smith solos. Messrs. Liddell and Murray both for *brevets* in excellent style.

Friday, with instructor, Messrs. Steinbach, Wilson, Collins and Parker. Major Phillips, Lieut. Wood-Smith and Mr. Collins solos.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Messrs. Cowley, Shepherd, Peck, Y. Y. Liu, Moore, P. Robinson straights with Instructors Birchenough and Howarth. Mr. Smiles and Major Piercy solo circuits, figures of eight, &c. Messrs. Winter, Howett and Palmer rolling with Instructor Barrs.

Tuesday, Messrs. Robinson, Howett, Shepherd and A. Boyesen straights with Instructors Birchenough, Howarth and Lillywhite. Mr. Cowley solo straights.

Wednesday, Mr. Peck, Messrs. Weber, Y. Y. Liu, Carpenter, Shepherd, North, Howett, Lowe, Moore, Robinson, A. Boyesen and Carpenter, straights with Instructors Birchenough, Lillywhite, Howarth and Barrs. Mr. Moore solo straights and circuits. Mr. Cowley solo straights. Mr. Smiles solo circuits, figures of eight, &c.

Thursday. Mr. Smiles solo circuits, &c., afterwards going in for and passing *brevet* tests. Messrs. Y. Y. Liu and Wyles rolling with Instructor Barrs. Messrs. Howett, Carpenter, Peck, Palmer, Weber, Winter, Boyesen straights with Instructors Birchenough, Howarth and Barrs. Mr. Cowley solo straights.

Friday. Major Piercy solo straights, circuits, &c. Messrs. Peck, Shepherd, Weber, Cowley, Wyles, Lowe, A. Boyesen, Moore straights with Instructors Birchenough and Barrs.

British Caudron School.—The Caudron school was out at 4 a.m. Monday, last week, under the instruction of W. T. Warren and Rene Desoutter. Mr. Curtis doing circuits and figures of 8, getting in good three-quarters of an hour's flying. Mr. Curtis went for his *brevet* tests, which he took in excellent style, doing his figures with clock-like regularity, at a height of 900 ft., also doing his *vol plané* in excellent style. Mr. Garvin also doing circuits and straights on a *brevet* machine, getting in good half-hour's flying. Instructors W. T. Warren and Rene Desoutter put in some excellent flying while testing school machines.

Tuesday, school out in the evening, under the instruction of W. T. Warren and R. Desoutter. W. T. Warren test flight. Mr. Garvin doing circuits and landings from 150 ft., getting in good three-quarters of an hour's flying.

At 4.30 Wednesday, school out under the instruction of W. T. Warren and R. Desoutter. W. T. Warren flight on *brevet* machine, Mr. Garvin on same doing straights and half circuits. Mr. Macgregor doing half circuits and straights, flying for three-quarters of an hour. Mr. Warren gave Mrs. Buller first instruction on machine, Mrs. Buller finding it strange after Breguet machine on account of foot work. R. Desoutter flight.

Thursday, school out at 4.40 a.m. under the instruction of W. T. Warren and R. Desoutter. W. T. Warren flight. Mr. Garvin doing circuits. Mr. Macgregor half circuits, improving. Mrs. Buller doing straights and progressing with rudder. R. Desoutter flight 10 mins.

At 4.30 a.m. Friday, school out under the instruction of W. T. Warren and R. Desoutter. Mrs. Buller doing straights. Mr. Macgregor doing straights and half circuits. R. Desoutter flight.

Hall School.—Monday, last week, gale and rain stopped work. Tuesday, J. L. Hall out several times on Avro. H. C. G. Allen six good straight flights on his 35 Anzani-Blériot mono. Wednesday, in morning Miss Sophie d'Elsa straights on Penguin.

Thursday, Messrs. Gearing eight straights on Caudron. A. L. Brookes six good flights at 20 ft. to 50 ft. Arcier six straights at 40 ft. Haines four straights on Penguin, Miss Dulcibella Clifford and A. Charig 12 mins. each with J. L. Hall on Avro.

Friday, in morning, Miss Sophie d'Elsa straights on Penguin. A. Charig half-dozen straights on Penguin, making good progress for a beginner. J. L. Hall out on Avro during day enacting scenes for Clarendon Film Co.

Mr. Clappen, who it will be remembered took his ticket last year on a Blériot, and has been instructor at the Blériot school for a considerable time, has now joined the Hall school as instructor. He was out several times during the week testing No. 1 Caudron. E. Palmer, who is ready for pilot's certificate, has been unfortunately ill the last fortnight, but hopes to be back again shortly.

Shoreham Aerodrome.

Pashley School.—B. F. Hale passed the certificate tests on Monday last week. The figure 8's were done in perfect style, landing right on the mark each time, and the glide was equally successful, alighting within 25 ft. of the mark.

Mr. Mortimer was also doing excellent circuits.

Messrs. Pashley have made several runs to Worthing and landed on the sands, one with the leading man at the Theatre Royal.

Hucks and Manton at Norwich.

In glorious weather Mr. B. C. Hucks, as well as his understudy, Mr. Manton, gave looping demonstrations at Hethersett Racecourse, near Norwich, on Thursday, Friday and Saturday of last week. On Thursday, in his 80 Blériot, Mr. Hucks commenced with his usual steeple-chasing and vertical banks, and afterwards he gave four passenger flights. After the tea interval he looped many loops, and flew upside-down. About 7 p.m. the new looping machine was brought out, and after being duly strapped in Mr. Manton rose to nearly 3,000 ft., made a fine "S" dive, followed by a loop. Climbing again he made two more loops and then landed. On Friday a similar programme was carried out. On Saturday, Messrs. Hucks and Manton gave a combined demonstration of trick-flying; circling in unison and arousing considerable enthusiasm. A cross-country race to Trouse Viaduct was then flown, resulting in a victory for Manton by a few yards. Mr. Hucks, after tea, got out his looper, and gave a wonderful exhibition, while Manton made five loops. Mr. Hucks closed the proceedings with another passenger flight.

On Friday, Lieut. Baumann flew over from Yarmouth Air Station on his Maurice Farman biplane, landed at the Hethersett Racecourse, witnessed the day's flying, and in the evening left again for Yarmouth.

Amongst the spectators on Friday were Squadron Commander Gregory and Lieut. Kershaw from the Air Station at Yarmouth.

London to Liverpool on a Blériot.

On Sunday last, Mr. T. Elder Hearn flew from Hounslow to Liverpool. He made a stop at Wolverhampton for petrol and lunch, and later in the afternoon went on to Liverpool, flying along the Mersey, round the tower at New Brighton, and landing at the Childwall Polo Grounds.

Miss Trehawke Davies' Cross-Channel Trip.

For the sixth time, Miss Trehawke Davies crossed the Channel on the 14th inst. Piloted by Mr. Crawshay, on a Blériot machine, the start was made from Hendon at 11.53 a.m., and Hardelot reached at 2.14 p.m. It was proposed to go on to Buc, but motor trouble entailed a stop at Champagne, 35 kil. north of Paris.

To Help the Benevolent Fund.

It may be recalled that Mr. Hucks recently announced his intention of charging 6*d.* for his autograph, the proceeds to be devoted to the Aviation Benevolent Fund. For this purpose a special stamp has been prepared, which has, by the way, been printed by the Dangerfield Printing Co. and presented by them to the fund. These stamps are affixed wherever Mr. Hucks signs his autograph, and they have created quite a brisk demand.

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by

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EDDIES.

ALTHOUGH it has not been generally known, Marcus D. Manton, who it will be remembered, has joined B. C. Hucks, has been quietly practicing looping for some time past, and on Thursday of last week he gave a public demonstration of looping and upside down flying at Norwich. Going up to a considerable altitude, he made first three loops, and then, after having climbed another few hundred feet, two more loops in quick succession. The reception accorded him was so hearty as to be almost painful, Manton informs me. The crowd broke out of the enclosure and surged round him; and instead of reaching the tea tent for which he was heading, he was carried a quarter of a mile away. The other day Manton and Hucks arranged a nice little race, each flying one of the looping machines, which are both of approximately the same speed. It was very amusing, Manton says, to see the other Blériot bobbing up and down as the machines rose and sank on the air waves, and he had an excellent chance of watching it, as the machines were flying side by side and very close together.

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Harold Blackburn tells me of a rather exciting experience he had recently, when testing a new 80 h.p. Avro biplane near Manchester. Starting from a field at Bellevue, he lost sight of the field in which were H. V. and A. V. Roe and their men; and as his tanks were full, and he did not know the locality very well, he decided—to use his own expression—that he might as well be hanged for a sheep as a lamb, and so he set out for Harrogate, trusting to fly into fine weather. After flying for about an hour without sighting the ground, he came down very gingerly, and found himself over some very high hills, which he took to be the Pennines. He, therefore, concluded that his compass must have been quite wrong, as it had not been tested in the new machine; and so climbing again, he flew on, steering by an occasional glimpse of the sun, and finally came out of the mist close to Mansfield after two hours' flying with one cylinder hot.

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Evidently Messrs. Perry, Beadle and Co., who, it will be remembered, exhibited a very original flying boat at the last Olympia Aero Show, do not intend to confine themselves to hydro-aeroplanes, for last week, when I was at Brooklands, a small Perry, Beadle tractor biplane, fitted with a 45 h.p. Anzani engine, was being unloaded from a lorry. I gather that this machine will be tested shortly at the Brooklands Aerodrome.

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I hear that M. Louis Blériot has just laid down a very expensive plant for the commercial manufacture of *monocoque* type *fuselages*, so that it appears that M. Blériot considers this form of construction worth developing. Several of these machines have been built for experimental purposes, and it was not until after extensive tests that it was decided to lay down the above mentioned plant.

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This year's Aerial Derby promises to be an uncommonly good race, for the majority of the machines entered are fairly well matched. The two Sopwiths, the Bristol, Avro and Vickers scouts are all very fast machines. Whilst the three or four 80 h.p. Moranes are all naturally of practically the same speed. There are also one or two "dark horses" in the way of new and untried machines, which may provide some startling performances. In all probability nearly all of the machines entered will start in the race, so that I should recommend all of our readers who can possibly manage to do so, to endeavour to see the race either from the starting point at the Hendon Aerodrome or from one of the turning points.

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It was an unexpected pleasure to see Mr. W. Brock (who, it will be remembered, put up some remarkable performances on the little 35 h.p. Dep. during last year, and who later joined the Grahame-White firm), at Hendon on Saturday last, for I knew that he went across the "pond" some time ago, and that he was hardly expected back so early. Asked whether he had grown to like this country so well that he preferred it to his native land, he said that although England was "a cute little toy country," it was not exactly geographical preferences that had brought him back so soon.

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It appears, according to Brock, that things aviatic don't look particularly rosy on the other side. The trouble seems to be that the Wright Company will not make a definite statement as regards the royalty which they intend to claim on machines built by other firms. Brock informs me that there are a number of people who would be quite willing to pay a reasonable royalty, provided that they were able to ascertain beforehand what the said royalty would amount to, but it is naturally difficult to secure capital when there is no guarantee that the Wright Company will not claim the whole of the profit.

The public, Mr. Brock says, has lost all interest in aviation, and the only way in which public enthusiasm could be aroused again would be by putting up some startling performances on a really good machine, such as, for instance, one of the best of British machines. But then, who would risk the wrath of the Wright Company in the form of a prohibitive royalty?

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It, therefore, seems that the Wright Co. is the bugbear of aviation, at least, as far as America is concerned; and Mr. Brock has now returned to this country to try and find a scope for his abilities. I should not think that he would have much difficulty in doing so, for although Brock does not possess that faculty which is so highly developed in some of his compatriots—that of advertising himself—those who know him best realize that he combines great practical experience with a sound knowledge of the theory of flying, in addition to being a thoroughly reliable pilot.

Brock showed me some designs for a machine intended for the Gordon-Bennett race, which he would like to have had some American firm enter for, but which was out of the question under the present conditions in that country, and I can only hope that some British firm will "discover" him and benefit by his abilities.

"ÆOLUS."

WILBUR WRIGHT MEMORIAL BANQUET.

THE annual banquet in connection with the Wilbur Wright Memorial Lecture of the Aeronautical Society was held at the Royal Automobile Club on Tuesday evening, at which Maj.-Gen. R. M. Ruck, the Chairman of the Society, presided. Among those present were: Col. Seely, M.P., Lord Montagu of Beaulieu, the Hon. Arthur Stanley, Brig.-Gen. D. Henderson, Col. F. H. Sykes, Brig.-Gen. Guthrie Smith, Lord Dunboyne, Maj.-Gen. von Donop, Col. Rawson, Col. Capper, Capt. Murray Sueter, R.N., Major the Hon. Claude Brabazon, Sir William Beardmore, Sir John Shelley, Sir H. Donaldson, Sir Archibald Geikie, Dr. Stanton, Sir Chas. Ottley, Sir R. H. Brade, Lieut. A. Gibb, Lieut. Robertson, Dr. Hankin, Messrs. L Bairstow, Mervyn O'Gorman, H. J. Tennant, M.P., Dr. A. P. Thurston, Messrs. H. T. Baker, M.P., A. E. Berriman, A. G. Bloxam, F. H. Bramwell, Griffith Brewer, G. W. Beatty, A. Graham Clark, B. G. Cooper, J. S. Critchley, W. Duddell, C. Gordon Bell, C. G. Grey, J. E. Hutton, Cedric Lee, F. K. McClean, Alec Ogilvie, F. Handley Page, J. H. Patterson, H. E. Perrin, G. F. Sharp, G. Holt Thomas, C. C. Turner, &c.

After the loyal toasts had been disposed of, Mr. Griffith Brewer presented a Report on the Wilbur Wright Memorial Fund, which amounted to £550. He said that in 1912 a fund of £400 was raised for the purpose of awarding educational premiums under certain conditions: and, at the time, it was agreed that the balance remaining at the end of five years should be returned to the subscribers; but Lord Northcliffe had promised to give £100 if the four donors would allow their subscription to be permanently transferred to the Memorial Fund. He had great hopes that in the year 1917, the latter fund would amount to £1,200, which had been suggested as a desirable capital sum for such a purpose.

The toast of the "Imperial Forces" was proposed by Lord Montagu of Beaulieu, and responded to by Rear-Admiral Sir Chas. Ottley and Major-General von Donop, the former observing that the strength of a nation should not be measured by machines alone, but by the personnel, and he believed that the same spirit animated the members of the Royal Flying Corps as was present with the men who had won the battles of the past century.

General Henderson, in proposing the toast of "Flying," observed that much had been done in development of the machines for military and commercial purposes, but he much regretted that, with few exceptions, flying had not appealed as a sport to the gilded youth of the nation, who seemed to be imbued with the idea that they owed a sort of debt to Society to die in their beds.

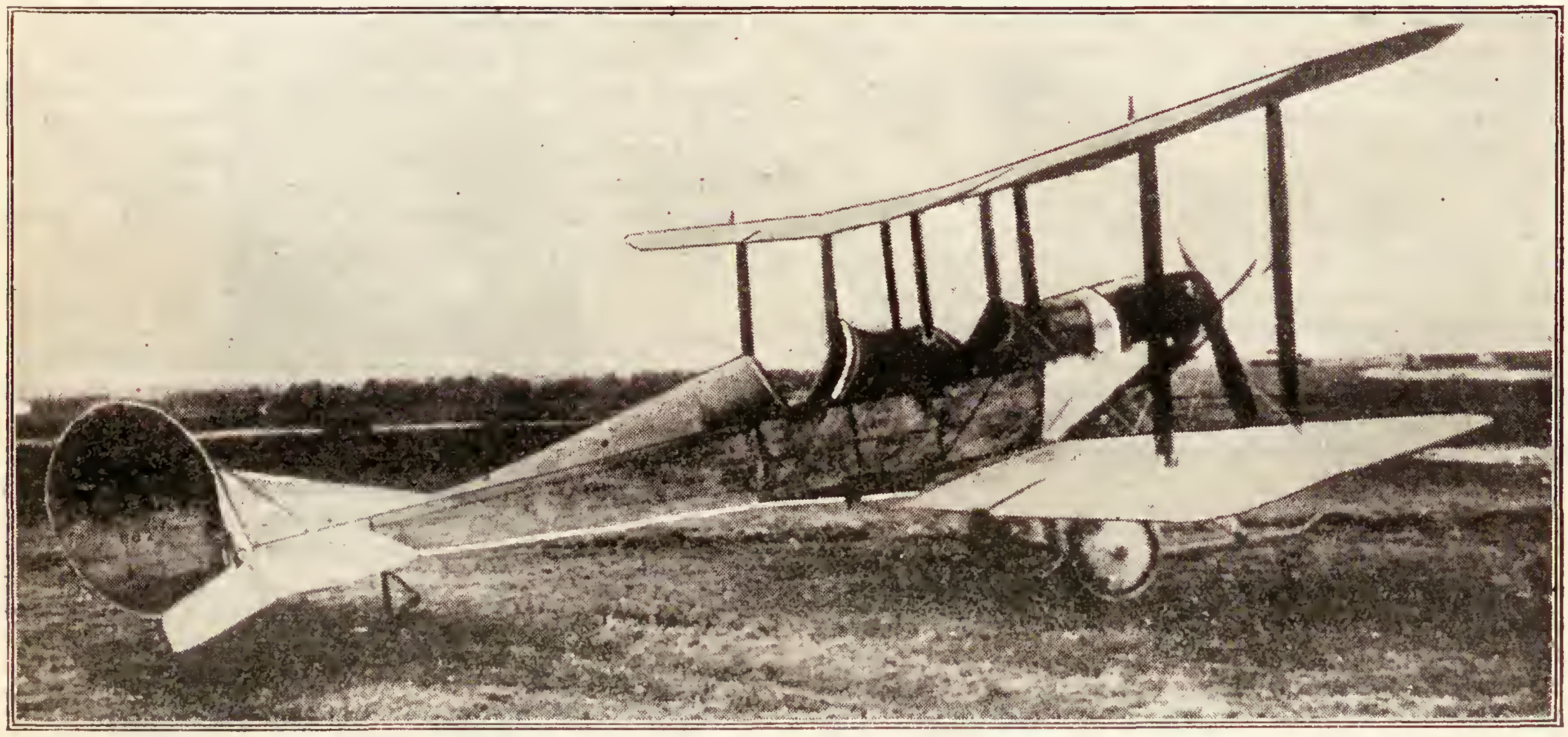
Col. Seely, in replying, called attention to the great strides made within the last year in military aviation, and commented upon the fact that over 600,000 miles had been covered by Service flyers during the past year. Wilbur Wright would have been astounded at this, as flying men would now go up any day of the year, no matter what might be the weather conditions, provided that sufficient cause were shown. The endurance of modern machines had greatly increased, and, in his opinion, the problem of the stable aeroplane had now been solved. On the preceding Friday he took part in a demonstration on an Army machine (R.E. 1) at Farnborough at a height of 2,000 ft. On reaching this elevation, the pilot (Mr. E. T. Busk) abandoned all control and sat with his hands behind his head while he (the speaker) steered the machine. He was pleased to say that the aeroplane automatically took the right banking at every turn, and in gusts, with a 28-mile per hour wind, the machine righted itself without any attention from the pilot. This was, to him, an immense achievement, and the society should be congratulated upon the fact that the two men who were chiefly responsible for it, were numbered amongst its members; but, he said, there still remained one great problem—namely, that of alighting safely. During the past year, while the number of Service machines had more than doubled, the number of aeroplanes owned by private persons for any purpose—sporting or commercial—had practically been halved. He attributed this partly to the difficulty of alighting, and we should not rest until we could say that in the matter of conquering the air, Great Britain was first.

Col. Capper, whose name was also coupled with the toast, briefly responded, recalling his experiences during a visit to the Wright brothers at Dayton in the middle of the last decade.

Sir Archibald Geikie and Mr. Duddell replied to the toast of "Kindred Societies," which was proposed by Mr. Mervyn O'Gorman, Mr. Duddell remarking that the assistance and co-operation of other Societies and Institutions, that was so much desired and emphasised by the proposer, was no one-sided affair; as he himself had derived much benefit from the work done at the N.P.L. in connection with wind tunnel experiments. Other people used impregnated fabrics besides aeronautical engineers, and anything that had been done to improve the quality of steels and increase the durability of engines would ultimately react beneficially upon other branches of engineering.

The toast of "The Visitors" proposed, in cordial terms, by Mr. Berriman and responded to by Sir H. F. Donaldson, brought a very pleasant and highly successful evening to a close.

* * * *



The Army aeroplane, R.E. 1 which was flown before the King and Queen, on Tuesday last, by Mr. E. T. Busk, with Major Clive Wigram as passenger. It was this machine that was referred to by Col. Seely at the Wright Memorial Banquet, and by Dr. Glazebrook in his lecture on Wednesday before the Aeronautical Society, on the "Development of the Aeroplane." In general appearance the R.E. 1 resembles the B.Es., and its stability is not due to any radical departures in design, but must be explained, we think, by careful scientific proportioning of surfaces and distribution of weights. From the accompanying photograph it will be seen that *ailerons* are fitted to both planes, presumably more in order to inspire confidence on the part of the pilot than because they are actually needed.

THE R.F.C. MILITARY WING MISHAPS.

The Catastrophe at Northallerton.

The accident which occurred at Northallerton on Friday of last week, in which Lieut. John Empson and Air-Mechanic George Cudmore, of No. 2 Squadron Military Wing R.F.C., was the subject of a coroner's inquest at Lonesome Hill, Northallerton, on Saturday.

Major C. J. Burke, in command of No. 2 Squadron, said they left Montrose on Monday morning, and everything went well until leaving Seaton Carew on Friday morning. It was perfectly clear when the witness left Seaton Carew. He could not say when Lieut. Empson left. The machines were always examined and overhauled before a flight. Lieut. Empson was perfectly competent. The witness went north as soon as he left Seaton Carew, as he saw fog and mist arising when five miles out. They had general instructions to follow to the effect that in the event of fog no landing had to be effected on the landing ground.

The Coroner said he thought the instructions might be made a little more explicit. If the airmen saw fog arising, could they not descend where it was clear?

Major Burke replied that this would be impossible, as the fogs moved about, the air being clear at one moment and dense at the next. From his investigation, it was clear that the machine overturned on its back after striking a hedge. He believed the two men were *vol planing* very fast at the time.

Dr. Tweedy stated that when he saw Lieut. Empson he was dead, being inside the wreckage on his back with his knees drawn up. His head was severely crushed, and he had received internal injuries. Death was instantaneous.

Dr. Carter stated that the base of Cudmore's skull was fractured and he had internal injuries, either of which would have caused immediate death.

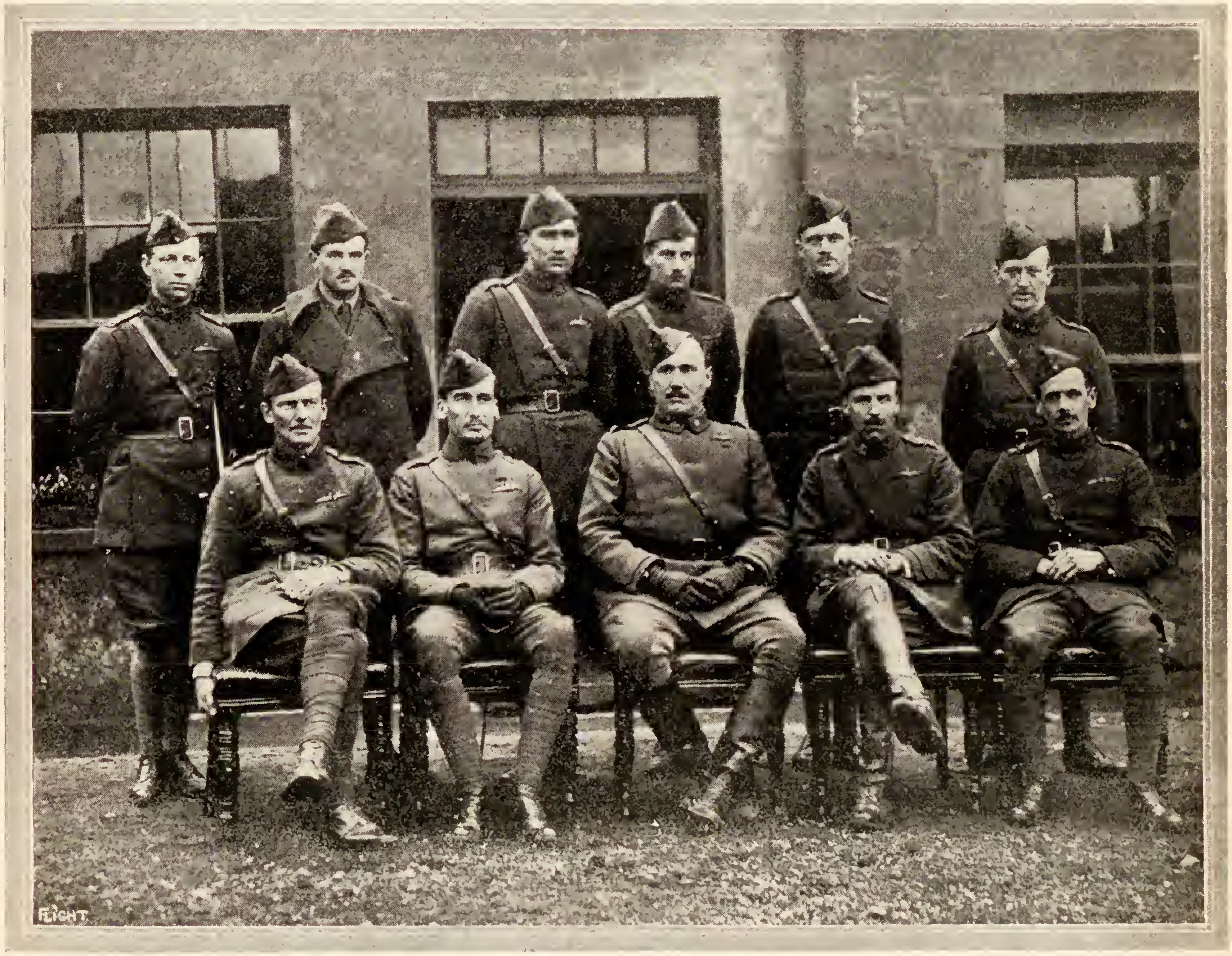
The jury returned a verdict of "Accidental death," and expressed sympathy with the relatives.

The Farnborough Smash.

An inquest was held on the 14th inst. at the Connaught Military Hospital by Mr. Hugh Foster, deputy-coroner for Aldershot, on the bodies of Captain E. V. Anderson, flight commander of No. 5 Squadron Military wing, R.F.C., and Air-Mechanic Carter, who were killed in the collision on Tuesday. Lieut. C. W. Wilson, of the same squadron, who was injured in the collision, was unable to attend.

Major J. F. A. Higgins, commanding No. 5 Squadron, said that Capt. Anderson and Lieut. Wilson were both good pilots. The machines which they used were of the ordinary Sopwith type, and were practically new. The witness himself had piloted both machines. Capt. Anderson had flown similar tractor biplanes for several months, but this was his first flight in a Sopwith machine. Although the Sopwith machines had been in the squadron for some time they had not been used much because slight structural alterations were being made, so slight that in the case of Capt. Anderson's machine they involved only the addition of a wire. The alterations had no effect upon them.

Lieut. Wilson started on a trip to Brooklands about 4 o'clock. Just before 5, Capt. Anderson started for a short flight in order to get used to the machine, and up to a minute before the accident he



Officers of No. 2 Squadron, R.F.C., Montrose, who have just had such a trying experience in their journey from Montrose to the south. From left to right, standing: Lieut. Harvey Kelly, Lieut. Empson (who was killed last week), Lieut. Corballis, Lieut. Noel, Lieut. Rodwell, Lieut. Mastyn. Seated: Capt. Todd, Capt. Dawes, Major Burke, O.C., Capt. Waldron, Lieut. Dawes.

was flying perfectly. After Capt. Anderson started the witness saw Lieut. Wilson's machine coming back. The latter might then have been 2,000 ft. up, but Capt. Anderson's biplane was a good deal lower. The witness paid no further attention to the flying until he heard an exclamation. Then he saw that one of the machines was spinning round horizontally, apparently with a broken wing, while the other seemed to be dropping vertically to the ground. On his arrival at the scene of the accident he found both machines wrecked, Lieut. Wilson lying down and Capt. Anderson and Air-Mechanic Carter dead.

Replying to questions, Major Higgins said that when machines were started from different points they could not tell every pilot which machines were already in the air, but Capt. Anderson knew that Lieut. Wilson had gone to Brooklands. At certain angles pilots might have some difficulty in seeing straight ahead, and there was sometimes a difficulty in seeing upwards because of the top plane, but pilots were always careful to dip at intervals in order to enlarge their field of vision. The witness explained the international rule which forbade pilots to approach within 50 metres of another machine, and the regulations governing meeting, passing, and overtaking. The area hidden from the pilot was not very large, and it was conceivable, although not very likely, that another machine might keep within that area. He was afraid that that had happened on this occasion. He was perfectly certain that the two pilots did not see each other until too late to avoid a collision.

Sergeant Mallett said that as the machines came into collision Mr. Wilson's lower left wing seemed to catch the tip of the upper right wing of Captain Anderson's biplane. Then after they had travelled about 200 yds. both machines fell.

Sergeant Mallett and Sergeant Patterson also stated that they inspected the machines and that both were in perfect order before the flight.

Major A. R. Greenwood, R.A.M.C., gave evidence that the necks of both airmen were broken.

The jury decided that there was no need to adjourn for Mr. Wilson's evidence, and returned a verdict of "Accidental death."

* * * *

ROYAL FLYING CORPS.

The following appointments were announced by the Admiralty on the 13th inst. :—

Lieuts. J. T. Babington to the "Pembroke," additional, for Isle of Grain Naval Air Station, and F. E. T. Hewlett, to the "Pembroke," additional, temporary, both as Flight Commanders. To date May 6th.

The following appointments were announced in the *London Gazette* of the 15th inst. :—

R.F.C.—Military Wing.—The undermentioned appointments to take effect from April 28th, 1914 : To be Flying Officers, and to be seconded : Capt. Lionel E. O. Charlton, D.S.O., Lancashire Fusiliers ; Lieut. Augustus C. E. Marsh, Royal Artillery ; Lieut. Amyas E. Borton, Black Watch (Royal Highlanders) ; Lieut. Hyacinth J. A. Roche, Royal Munster Fusiliers ; Lieut. Robert J. F. Barton, Royal Scots Fusiliers ; Lieut. Wilfrid R. Freeman, Manchester Regiment ; Lieut. William H. C. Mansfield, King's (Shropshire Light Infantry) ; Lieut. Charles B. Spence, Royal Artillery ; and Second Lieut. William R. Read, 1st (King's) Dragoon Guards.

To the Reserve : Capt. Robert A. Boger, Royal Engineers ; Capt. Hugh C. T. Dowding, Royal Artillery ; Lieut. Alexander F. A. Hooper, Prince of Wales's (North Staffordshire Regiment) ; Lieut, William F. MacNeece, Queen's Own (Royal West Kent Regiment) ; Lieut. Hugh F. M. Worthington-Wilmer, Royal Scots (Lothian Regiment) ; and Second Lieut. William F. R. Dobie, Gordon Highlanders.

Capt. Lionel E. O. Charlton, D.S.O., Lancashire Fusiliers, a Flying Officer, to be a flight commander. Dated May 1st, 1914.

The following were announced by the Admiralty on the 19th inst. :— Staff Surgeons Charles J. O'Connell, to the "Pembroke," additional, for Calshot Naval Air Station. To date May 27.

The following appointment was announced in the *London Gazette* of the 19th inst. :—

R.F.C.—Military Wing.—Second-Lieut. Alan Hartree, Royal Artillery, from the Reserve, to be a flying officer, and to be seconded. Dated May 3rd, 1914.

ROYAL FLYING CORPS (MILITARY WING).

War Office summary of work for week ending May 16th, 1914 :—

No. 2 Squadron.—No. 2 Squadron Aircraft, and complete with Mechanical Transport and *personnel*, under the command of Brevet Major C. J. Burke, left Montrose on Monday, the 11th inst., on its journey to Netheravon, Salisbury Plain, to take part in the R.F.C. Military Wing Concentration Camp.

The itinerary has been as follows :—

Monday, 11th inst., left Montrose, arrived Edinburgh.
Tuesday, 12th inst., left Edinburgh, arrived Berwick.
Wednesday, 13th inst., left Berwick, arrived Blythe.
Thursday, 14th inst., left Blythe, arrived West Hartlepool.

The Aircraft and Mechanical Transport arrived to scheduled time at the points mentioned.

On Friday, the 15th inst., during the flight from West Hartlepool to York, the machines ran into a thick bank of fog. Three were wrecked and one was damaged in alighting. One of these accidents was the cause of the deeply-regretted deaths of Lieut. Empson and Air-Mechanic Cudmore. On the fog clearing, Major Burke concentrated the Squadron at the Knavesmire, York, where it was halted for the week-end as originally arranged. It will proceed, *via* Lincoln, Northampton, and Oxford to Netheravon this week.

No. 3 Squadron.—Numerous cross-country reconnaissances took place during the week. The pilots of all three "Flights" were out daily.

No. 4 Squadron.—A considerable amount of flying was carried out by all the Officer, N.C.O. and A.M. pilots, including reconnaissances over Salisbury Plain and the surrounding country.

No. 5 Squadron.—The pilots of this squadron were, during the early part of the week, engaged daily in reconnaissance flights.

No. 6 Squadron.—All three "Flights" were fully occupied in practising observation over the country round Aldershot. Several new officers reported themselves for duty with this squadron at the termination of their course at the Central Flying School on the 9th.

Nos. 1 and 7 Squadrons.—The organisation of the two newly-formed squadrons was proceeded with, and instructional work, lectures on aircraft, engines, &c., were carried out.

Aircraft Park.—Aircraft Park is kept fully occupied with overhauling engines, both aircraft and mechanical transport, and with general repair work.

Headquarter Flight.—Experimental work of various kinds from aircraft and free balloons was continued.

General News.—The Royal Flying Corps (Military Wing) has suffered severely during the week. Owing to fatal accidents whilst flying, two officers, Capt. E. V. Anderson of the Black Watch, and a Flight Commander in No. 5 Squadron, and Lieut. J. Empson, of the Royal Fusiliers, and a Flying Officer of No. 2 Squadron, lost their lives. In each case the air mechanic in charge of the engine was also killed—Air-Mechanic Carter, of No. 5 Squadron, and Air-Mechanic Cudmore, of No. 2 Squadron. The former was with Lieut. C. W. Wilson, with whose machine Capt. Anderson's collided, and the latter was with Lieut. Empson. Lieut. Wilson received injuries to his jaw, and is progressing favourably.

The funeral of the late Capt. Anderson and Air-Mechanic Carter took place at Aldershot on the 15th inst. Besides all the Officers of the Black Watch and all the Officers, Warrant Officers, Non-commissioned Officers and Men of the Royal Flying Corps (Military Wing), at Farnborough, a large contingent of the Royal Flying Corps (Military Wing) from Netheravon (Nos. 3 and 4 Squadrons) was also present. In addition, the funeral procession included Col. Marker, representing Sir Douglas Haig, General Lomax, Commanding the 1st Division, and representatives from every unit serving in the Aldershot Command.

The funeral of the late Lieut. Empson took place near Staddlethorpe on Wednesday, and that of Air-Mechanic Cudmore on Thursday, at Manchester.

Messages of sympathy have been received from the Prime Minister and the First Lord of the Admiralty.

* * * *

British Army Aeroplanes.

Replying to questions in the House of Commons, Mr. Harold Baker, Financial Secretary to the War Office, stated last week that the War Office at present has 176 aeroplanes, of which 70 are under repair ; 136 machines are of British manufacture. It would not be in the public interest to state how many are fitted with wireless telegraphy or photographic apparatus.

South Africa and Aviation.

It is announced that six officers, Capt. Wallace (in command), Lieuts. Emmett, Creed, Turner, Van der Spuy and S. Williams, of the South African Union Defence Force, have arrived in England to undergo a course of training at the Central Flying School.

Long Flight by Naval D.F.W.

Leaving Gosport at 7.30 a.m. on Wednesday of last week, in the face of pouring rain and a N.E. wind, Lieut. C. H. Collet, R.M.A., of the Naval Wing R.F.C., made a splendid flight of 7½ hours across England on an all-steel 100 h.p. D.F.W. Arrow biplane. The machine carried a useful load of 1,400 lbs., including 125 gallons of petrol, oil and water, sufficient for a flight of 15 hours. The landing was effected between Hull and Grimsby.

FOREIGN AIRCRAFT NEWS.

Guillaux Beats a Record.

BY cable it is reported that last week at Sydney, N.S.W., Guillaux on a Farman-Gnome machine succeeded in improving the height record for waterplanes by going up to an altitude of 2,133 metres.

Verrier Secures the Pommery Cup.

ALTHOUGH it appeared that the period for the first of the new series of Pommery Cups would pass without any contest, five machines were entered at the last moment, these being a H. Farman by Verrier, two Blériots by Pierron and Lenoir respectively, a Nieuport by Bonnier and a Borel by Chemet. Bonnier started from Villacoublay on the 13th, but he had to stop at Angouleme after covering 400 kiloms. The next morning he went on to Bordeaux, and after replenishment continued in the direction of Spain, but had to give up at Caudes after covering another 70 kiloms. Verrier started from Buc on his Henry Farman, and after a stop at Noyon flew to Genthin in Germany. Lenoir was the only other competitor to start, and he landed at Tours. Verrier thus secured first place with his flight of 830 kiloms.

Aeroplanes at French Review.

AT the review at Satory on the 18th inst., in connection with the King of Denmark's visit to Paris, flights were made by two escadrilles, one composed of six Blériots, and the other of six Caudrons, while the dirigible "Eugene Montgolfier" cruised overhead.

From Paris to Sweden.

LAST week Dr. Thulin succeeded in completing a journey from Paris to Landskrona in Sweden on his 80 h.p. Rhone-Morane. The journey of 1,200 kiloms. was completed in 15 hours' flying time, and stops were made at St. Quentin, Brussels, Cleves, Bremen, and Lubeck.

Bobba Flying Again.

BOBBA, the well-known French pilot, after having given up flying for a year, has decided to return to it, at any rate while doing his period of military training. He is at present practising at the Morane military school at Villacoublay.

Last Sunday at Buc.

THE attraction arranged for last Sunday at the Blériot aerodrome at Buc was a series of matches between Legagneux on his 80 h.p. Clerget-Nieuport and Prevost on a 80 h.p. Rhone-Deperdussin. In the speed test Prevost won easily in 10 mins. 12⅖ secs., while Legagneux's time for the 20 kiloms. was 11 mins. 16⅗ secs. In the landing competition Legagneux was first—320 metres from the mark, beating Prevost by 121 metres, while in the 15 kiloms. handicap Legagneux had a walk-over, Prevost's machine being upset by a gust of wind as it was starting and breaking its propeller. During the afternoon a display of fancy flying was given by Cuendet, a *chef pilote* at the Blériot school.

An Aviator in the French Chamber.

THE French Chamber of Deputies now includes an aviator among its members. M. Pierre Flandin, who qualified on a Maurice Farman at Juvisy in March, 1912, having been elected to represent Avallon.

A Long Reconnaissance.

STARTING from Angers on the 17th inst., Lieuts. Volmerange and Gabriel and Sergeant Clement made a reconnaissance over Poitiers and the neighbourhood. The outward journey took 1 hr. 24 m. and the return 2 hours.

Flying to Orders.

IN response to orders from his superior officer, Sergeant Mouilleres started off from Chalons on his M. Farman on the 16th inst. His first call was at Amiens, the 200 kiloms. being covered in 3 hours 5 mins. He then went on to Buc, taking 2 hours 10 mins. for the 150 kiloms. Covering another 180 kiloms. in 2 hours 55 mins., Troyes was reached, while the return journey to Mourmelon was made in 2 hours.

Three New Loopers.

AT the Blériot school at Buc, on the 13th inst., Barault looped the loop four times. The Italian pilot Dal Mistro, who was taught by Pegoud in Italy, was also practising looping.

On the 14th inst. Lord Carbery looped at the Morane school at Villacoublay, while in Italy, A. de Dominicis looped on a Caudron.

The Sanchez-Besa Back at Issy.

THE Sanchez-Besa biplane, which paid a surprise visit to Hendon on the 3rd inst., returned to Issy on the following Friday. The round trip from Paris, *viâ* Boulogne, Eastchurch, Hendon and Boulogne, represented a distance of about 650 miles, throughout which the machine was piloted by M. Laporte, who carried M. Sanchez-Besa as passenger.

Woman's Parachute Descent from Aeroplane.

AT Nevers, on Sunday last, Mme. Cayat de Castella repeated her exploit of descending from an aeroplane by means of a parachute designed by her husband. She made the ascent suspended by a a belt under the *fuselage* of a Goupy biplane, piloted by Pelletier, and jumped off when the machine was at an altitude of 800 metres.

A Trip by Crombez.

SERGT. CROMBEZ, who is now attached to the Belgian army, on the 16th inst. on his new monocoque machine, went from Taintignies to Brasschaet, covering the 165 kiloms. in 1 hr. 15 mins.

600 Kiloms. in Sweden.

ON the 15th inst., Dr. Thulin, on his Rhone-Morane monoplane, flew the 600 kiloms., from Malmoe to Stockholm, in 4 hours 20 mins.

Sweden to Denmark by Aeroplane.

BY the aid of Dr. Thulin's Morane, Lieut. Blixen Finecke was able to ride in races in Sweden and Denmark on the 17th inst. After a race at Gothenburg, he left at 2.15, and, piloted by Dr. Thulin, flew the 135 miles to Klampenborg racecourse, near Copenhagen, arriving ten minutes before his race was timed to start.

Four German Officers Killed.

ON arriving at Halberstadt from Doeberitz on the 17th inst., a monoplane capsized when at a height of 300 metres and fell to the ground. Both the pilot and the passenger, Lieuts. Fellinger and Wiegand were killed instantly.

While taking part in the Prince Henry competition on Sunday, the machine piloted by Lieut. Walz fell near Pforzheim. The pilot was seriously burnt, while the passenger, Lieut. Mueller, was killed on the spot.

Also on Sunday, another Prince Henry competitor, Lieut. Kolbe, met with disaster at Hechtsheim, near Mayence, while flying from Cologne to Frankfort. The monoplane was apparently caught by a gust of wind and capsized when at a height of 400 metres. The pilot was severely injured in the head, while the passenger, Lieut. Rohde, died from his injuries in hospital the following evening.

Fatal Accident in Russia.

WHILE flying at the Sebastopol aerodrome on the 15th inst., the Russian military pilot, Semichkura, fell with his machine and was killed.

An Exhibition at Turin.

ALTHOUGH it is not very large, the exhibition of flying machines, engines and motor boats which was opened at Turin on the 17th inst. is very interesting, and it should do a great deal to quicken public enthusiasm in aviation matters. Italian-built Farman, Blériot and Nieuport machines are included among the exhibits, as well as Gnome, Rhone and De Dion motors, while the Italian military authorities have arranged a comprehensive display. The exhibition was opened by the Mayor of Turin in the name of the King.

A Farman Waterplane in Australia.

A DESPATCH from Sydney, N.S.W., which has been received by MM. Farman Frères, states that some tests have been carried out successfully at Sydney with a Farman waterplane piloted by Guillaux. The tests were witnessed by representatives of the naval and military authorities.

Height Record by New Zeppelin.

DURING her trials at Friedrichshafen on the 16th inst. the new Zeppelin for the German Navy, "L 3," having 17 persons on board, ascended to a height of 3,125 metres (10,253 ft.), which is claimed as a world's airship record. Previously the record was held by the French airship "Conte" with 3,080 metres.

A Voyage by "Victoria Louise."

THE Zeppelin liner, "Victoria Louise," started from Frankfort on the 9th inst., at 5 a.m., and went to Oos, Baden, where she will be stationed for a week or two. The trip occupied 3 hrs. 35 mins.

Three-Hour Trip by "Eugene Montgolfier."

ON the 13th inst., the French military dirigible, "Eugene Montgolfier," made a voyage of over three hours' duration from Issy. She was commanded by Capt. Precheur, and carried a crew of eight. The following morning a 4½-hour voyage with 11 persons on board was made over Rambouillet, Mantes and Vernon.

THE FLYING MACHINE FROM AN ENGINEERING STANDPOINT.

By FREDERICK WILLIAM LANCHESTER, M.Inst.C.E.

(*Continued from page* 526.)

It would appear from recent experiment that my conclusions, as given in Tables III and IV, though in the main correct, require revision; at least in a quantitative sense. Thus plotting values of the pressure constant, as derived from Table IV, for different values of aspect ratio, and as determined for the condition of least resistance (max. lift/drift) by the N.P.L., Fig. 17, we find the two in perfect agreement for aspect ratio = 6; we also find that both graphs slope in the same direction, namely, they give a higher pressure constant as appropriate to higher aspect ratio; we do not, however, find justification for the extent of the difference as given in my Table: the N.P.L. curve gives the effect as very slight indeed, in fact, almost negligible, the pressure constant for the aerofoil tested might be assumed as 0·32 for all values of aspect ratio without serious error.*

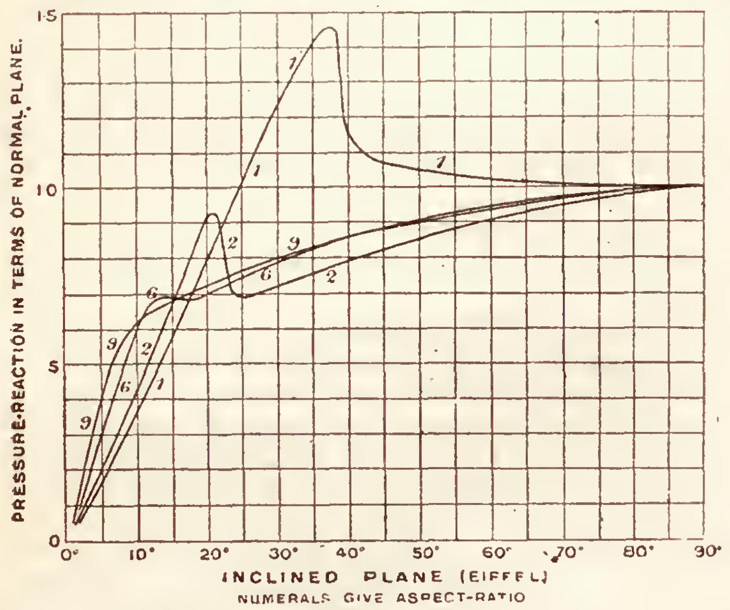


Fig. 14a.

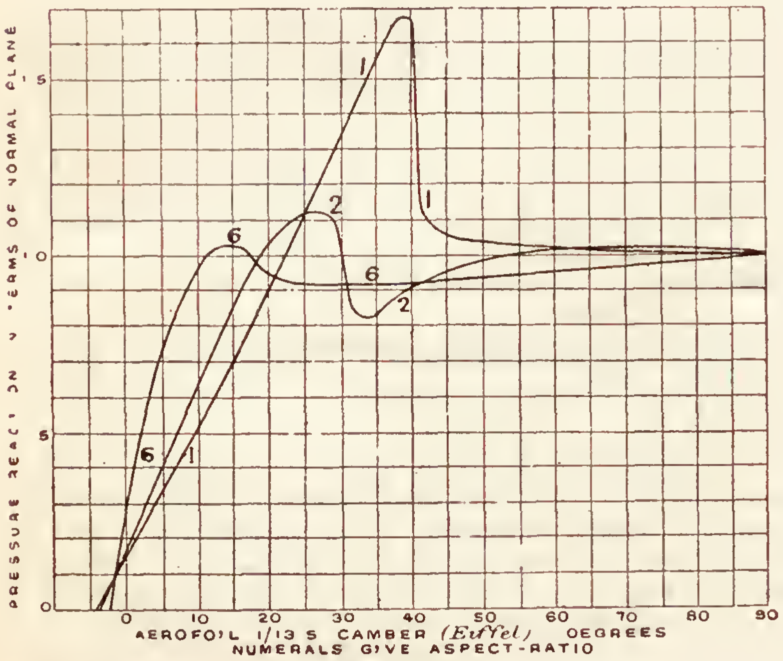


Fig. 14b.

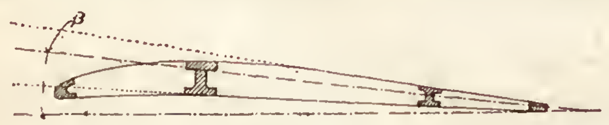


Fig. 15.

In Fig. 18, the N.P.L. curve from Fig. 17 has been plotted for comparison with the curve of the normal plane. It is well known that the pressure constant of the normal plane is greater for planes of elongate form; the normal plane curves given in Fig. 18 are based on the determinations of Langley and Dines, as given in *Aerial Flight* (the upper curve); and the more recent determinations of Mr. Eiffel, the values according to this authority being very much lower. On the left, on the line aspect ratio = 1, we have the value for the square plane as determined by the N.P.L., and a curve is shown (dotted) directed towards this point as being the nearest we can at present do towards a representation of the truth.

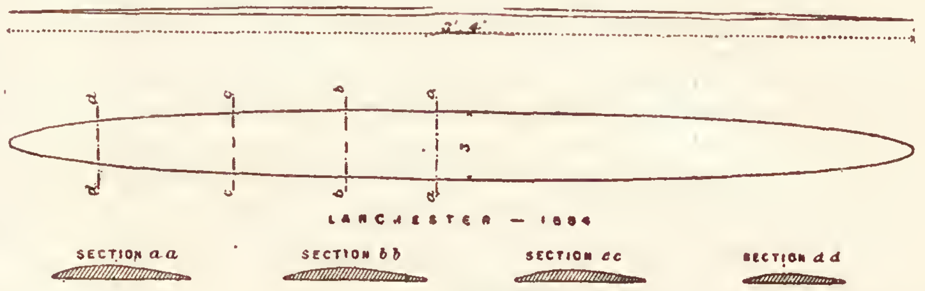


Fig 16.

The relation of the normal plane curve to the N.P.L. curve aforesaid is most suggestive; it happens that the values of the constants are almost exactly in the relation of two to one, this is probably a mere coincidence; a more important fact is that the increase of the pressure constant of least resistance (touching changes of aspect ratio) for the aerofoil is almost exactly proportional to the ordinary pressure-increase in the case of variations of proportion in the normal plane. This suggests that the increase in the two cases is due to the same primary cause; also that the coefficient of camber proper to least resistance is a quantity independent of the aspect ratio.

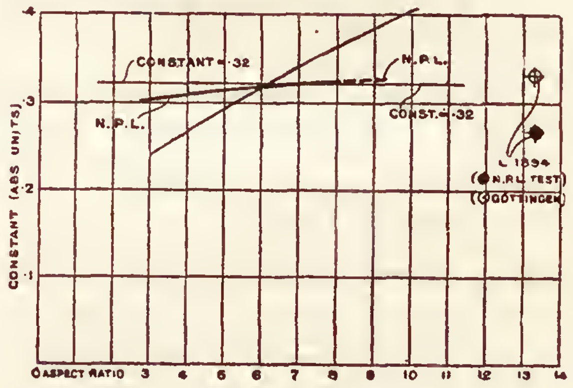


Fig. 17.

If this should turn out to be the case the reduction of the resistance for aerofoils of high aspect ratio may be regarded as due entirely to the fact that, where the cyclic component is stronger, the dip of the leading edge can be increased at the expense of that of the trail, that is to say, the chord angle may be diminished with higher aspect ratio, and with it the trail angle will be also diminished. This is contrary to the tabulated results of Table III; if true it must lead to the reconsideration of some of the assumptions on which I based my theory, or at least in the revision of some of the values of my constants.

It spite of the evidence, it is by no means certain that the matter is quite as simple as it appears. It is to be observed that any investigation to determine the effect of aspect ratio must of necessity involve a very complex experimental campaign, not merely a set of determinations with some half dozen or so models sawn off to length from a piece of Blériot or de Havilland "moulding"; this is exactly what was done in the experiments forming the basis of the plotting given in Fig. 17; any such method of investigation is liable to prove delusive.*

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* The series of observations from which the curve N.P.L. in Fig. 17 was plotted are those given in Advisory Committee Report 1911–1912, Memo. 60, § vi, Plate 3; the section of the form of aerofoil used is given in the Report, and is reproduced in silhouette in Fig. 18. The value of the pressure constant (at maximum lift/drift) evidently varies considerably for different forms of section. Rejecting forms that may be considered bad on account of their low maximum, we find:—In Report 72 (1912–1913) the fourth, fifth and sixth sections given in Fig. 1, constants 0·322, 0·334 and 0·334 respectively. In the same Report, section ii, figures are given of the tests of four aerofoils varied as to bluntness of leading edge. The three best of these each had a constant approximately 0·4. In the same Report an aerofoil corresponding in form to "R.A.F. 6" gave a value almost exactly 0·3.

* It is an old axiom that in conducting a scientific research only one condition (when possible) should be changed at a time. In trying to adhere to this rule too literally it is easy to mistake the shadow for the substance; in the present example, to vary the length of an aerofoil of constant section may appear superficially to be "changing one condition," but in reality it is nothing of the kind.

(*To be continued.*)

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Mr. J. L. Hall's Machines.

By an oversight, in our last issue, when referring to Mr. J. L. Hall, whose portrait appeared in our Men of Moment, no mention was made of his latest acquisition a 50 h.p. Avro, on which some of the best of his most recent flying has been carried out at Hendon.

Edited by V. E. JOHNSON, M.A.

Canard Type Models.

"As some misapprehension appears to exist amongst your readers," writes Mr. W. E. Evans, "respecting my remark that the canard type model had practically received its death-blow, and as you are uncertain as to what I intended to convey by my remark, I should like to give my reasons for making an apparently rather sweeping observation.

"The main point is that the type in question in full-sized work has been tried and found to be constructionally weak or dangerous to fly, or, perhaps, both. The machines I refer to are the Voisin canard hydro-aeroplane and the Blériot canard land machine.

"I do not know exactly what were the difficulties met with in these machines, but one of them was, I believe, the great risk to the pilot in the event of a rough landing, the weight of the engine, being at the extreme rear, throwing too great a strain on the *fuselage*, and in the event of a smash, it would mean certain death to the pilot. Another point is the engine being behind the pilot he cannot attend to it without landing, if it should not run properly. And, further, Mr. Handley Page's reply to Mr. H. H. Grove's query: 'What was the real cause of failure in full-sized canard type machines?' 'Too much surface in front of the centre of pressure led me to the conclusion that it was sheer waste of time and energy trying to prove scientifically that the canard type model was suitable for full-sized work.'

"Therefore research work with this type of model with a view to full-sized work should be abandoned. This is the idea I meant to convey. I do not say that nothing can be learnt from this type, because undoubtedly much can still be learnt from experiments made with such models. A point not mentioned above is the fact that, in full-sized work, front elevators are now practically discarded; evidently full-sized machines are better without them. If, in the face of the above facts, any of your readers have reasons to still believe in the utility of research work with canard-type models, either with covered-in *fuselage* or without, in relation to full-sized work, I shall be glad to know why."

Referring to Mr. Evans' communication, a point overlooked by him is the *indirect* value that model experiments made with canard models of untried or but little tried types would undoubtedly have on the problem of longitudinal stability in general. We cannot know too much about *every* type. Any one type is bound to have *some* advantage which another type has not. The problem is to find the type possessing the maximum of advantages with the minimum of disadvantages. This can only be discovered by a vast number of experiments made with every possible type. This means decades, it may be centuries of work. The steam engine, old as it is, is still being improved, to say nothing of the printing-press and even older inventions.

Efficiency Formulæ.

"I am sending you an efficiency formula," writes Mr. F. Whitworth, "with the hope that it will be subject to criticism in your columns. A correct efficiency formula is most needed for model aeroplanes, and a good 'bout of criticism' would no doubt soon bring one to light. My own suggestion is the following:—

$$\frac{\text{Weight of model}}{\text{weight of rubber}} \times \frac{\text{duration}}{\text{loading}}.$$

Loading in square inches per oz. [ozs. per sq. ft. is, we presume, meant]. This brings distance into the formula, because loading really means speed (leaving out the varying efficiencies of different planes), and speed × duration = distance, so that the formula boiled down becomes $\frac{\text{weight of model}}{\text{weight of rubber}} \times \text{distance}$. Of course the glide of the model is taken here, a bad point in some respects, but still it is the most efficient model which climbs highest and therefore glides best.

"This formula brings out the most efficient lifting surface, because it favours the model which flies slowest on the least surface, and, therefore, which flies fastest for the least power by reduced head resistance. I propose sending you at an early date some results I have obtained from my own models, subjected to this formula, and, perhaps, you could get some well-known model makers to submit their results."

We shall always be pleased to publish such results, whenever space permits, but there are two fatal objections to the above formula. In the first place you cannot measure the distance accurately, not even when using an anemometer and correcting the same accurately. The velocity of the wind where the model is and where the recording instrument is are not the same. It is true that the *mean* of a very large number of experiments might give you an approximately correct result. In the second place the rubber motor is not a scientific motor; the mere weight of rubber is not enough. We do not know the ft.-lbs. of energy the rubber gives out in unwinding. It does not give it out in any constant manner or at any even varying rate. Moreover, it varies probably with every wind, for it is wound up (*i.e.*, stretched) far beyond its elastic limit.

The last thing that we desire to do is to discourage any such experiments, but we cannot see how they can possibly come under the head of model research work. And unless a formula is (so far as we know) quite correct, *i.e.*, free from all conscious error, of what use is it? It has been decided not to make use of any such formula in this season's K. and M.A.A. competitions.

Model Aero Club for Hastings and St. Leonards.

An aero club has been formed in the districts of Hastings and St. Leonards for the building of models of every description. The Hon. Sec. (Mr. E. Taylor, 30, Perth Road, Silverhill, St. Leonards) will be glad to hear from anyone in the district interested in the subject.

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

Affiliation.—The Bath and Somerset Aero Club and the South-Western Aero Club are now affiliated. It is hoped that others will join up. Any club now affiliating will be eligible for the Inter-Club Competition.

Official Trials.—The following dates were fixed (by the Secretaries' Guild) for official trials:—June 20th, Wimbledon Common; July 18th, Wanstead Flats; Aug. 29th, Hackney Marshes; Sept. 26th, Sudbury; Oct. 24th, Mitcham Common; Nov. 14th, Sudbury. All secretaries will, prior to the dates, publish the best way to their respective grounds.

Programme.—The programme has now gone to press, and it is hoped to be able to get it out this month, as usual. Any readers or friends other than members will have a copy forwarded on publication if they enclose penny stamp for postage.

Competition.—The *Model Engineer* Competition will be the first contest of the season and will be held on Wimbledon Common on June 13th. Entries close June 6th. Models must not weigh less than 8 ozs. The distance between the rubber hooks not to exceed the span. Minimum loading—Monoplanes, 6 ozs. per sq. ft.; biplanes, 4 ozs. Aspect ratio to be not less than 5 and not more than 12. Competition will be decided on the average of flights. No special rising surface allowed. Entry fees—Registration fee to members, 3*d.*; affiliated members, 1*s.*; non-members, 2*s.* Entry forms can be obtained from the Gen. Hon. Secretary, *but must be returned to* H. A. Lyche, Model Secretary, 46, Templesheen Road, East Sheen, S.W.

Subscriptions and Badges.—All members will, on receipt of their subscription, receive the official badge for 1914–15, and all competitors must wear same in all contests, to show the judges that their subscription has been paid. These badges will be ready to send out by 30th. All members should send along their subscriptions at once, so that they may receive their badges as soon as ready. The colour of badges will alter yearly.

27, Victory Road, Wimbledon. W. H. AKEHURST, Gen. Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

MAY 24TH, at 6.30 a.m., flying Wanstead Flats; at 10.30 a.m., twin-screw r.o.g. duration competition, 8 oz. models, 4 oz. loading (models must rise off grass). May 31st, at 10.30 a.m., similar competition to above.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

MAY 23RD, flying at Sudbury. Reliability trials for silver and bronze medals.

Sheffield Ae.C. (41, CONISTON ROAD, ABBEYDALE, SHEFFIELD).

MAY 23RD (weather permitting), a demonstration will be given at 3 p.m. with a 4-ft. compressed-air flying monoplane, by Mr. Gumpert, at the Standhouse Aerodrome, Intake: also Novices' h.l. and record raising by members. May 30th, 4.30 p.m., hydro-aeroplane contest for "The President's Challenge Cup," at Tinsley Park Old Brick Yard.

UNAFFILIATED CLUBS.

Finsbury Park and District (66, ELFORT ROAD, HIGHBURY, N.).

MAY 30TH, practice flying, Finsbury Park, 3 p.m.; duration and distance contests for r.o.g. tractors, 4.30 p.m. The hon. secretary, Mr. R. Mullin, has resigned office. Mr. B. H. Barnard was elected in his place.

Ilford Model Ae.C. (83, ENDSLEIGH GARDENS, ILFORD).

MAY 24TH, flying at 9.30 a.m., at Aerodrome, Hog Hill, Hainault Forest, near Chigwell Row. Special competitions will be organised for Whit-Monday.

Liverpool Aero Research Club (62, CEDAR GROVE, LIVERPOOL).

MAY 23RD, exhibition flying contests, 4 p.m. No trials will be allowed after official starting time. May 26th, general meeting, Cedar Grove, 8 p.m.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

WEEK-END flying on Woolwich Common and Blackheath, as usual. The hon. secretary will be pleased to hear from members who intend entering the next "Trophy" competition.

CORRESPONDENCE.

The Wright Patents.

[1860] Great harm is being done the American aeroplane industry by the public press in its reiteration of statement and suggestion that the court decision in favour of the Wrights gives them practically a monopoly on the manufacture of aeroplanes, and that it places them in position to dictate to the makers and users of aeroplanes *ad libitum*. This, it seems to me, is a delusion due to a too easy acceptance of conclusions based on gossip and prejudiced claims rather than on the sense and wording of Judge Hazel's decision.

If every aeroplane manufacturer in America, and every prospective purchaser of an aeroplane, and every man now owning and using an aeroplane, will carefully read Judge Hazel's decision, and then, if necessary, read it through again, they will awake to the fact that it upholds a series of combinations. First, the means for *simultaneously* raising one *aileron* and depressing the other. Second, in combination with this simultaneous operation of the *ailerons* or marginal portions, the use of the rudder. Third, in combination with the foregoing, the use of the front elevator.

In other words, the basic element of the claim as sustained lies in the simultaneous operation of the *ailerons* or marginal portions. This one word, *simultaneous*, on analysis, makes reasonable and logical the broad support given to the Wright claims by the court. Once admit that the Wrights were the first to patent the idea of and to show means for the simultaneous operation of the *ailerons*, and it is evident that the rest of the combination follows as a matter of course. This also explains the position of the Court of Appeals in sustaining "the reasoning" by which Judges Hazel and Hand reached their decision.

Judge Hazel did not find that the Wrights invented or patented any of the individual elements covered by their patent. He says: "They (the Wrights) were not the first to conceive the idea of using monoplane or biplane surfaces for flying, nor the first to support the two planes at their margins one above the other, or to use the vertical tails or rudders for steering, or to place horizontal rudders forward of the machine to guide it upwards or downwards in its flight. The prior separate use of such elements is freely admitted by the patentees, but they assert, rightly I think, that the patented *combination* was a new combination . . . ."

Nor did the court by any means uphold all the claims of the Wright patent, but the decision flatly states: "There are eighteen claims in the patent, but Claims 3, 7, 14, and 15 only are infringed."

In support of this view of the decision a few paragraphs from it may be of interest. The infringed claims are quoted, and are of interest here in part: Claim 3. ". . . . means for simultaneously imparting such movement to said lateral marginal portions . . . ."

From Claim 7: ". . . . the *combination* with an aeroplane, and means for *simultaneously* moving the lateral portions thereof into different angular relations . . . , of a vertical rudder, and means whereby said rudder is caused to present to the wind that side thereof nearest the side of the aeroplane having the smaller angle of incidence and offering the least resistance to the atmosphere . . . ."

Claim 14 adds to the combination described in Claim 7 "a horizontal rudder provided with means for presenting its upper or under surface to the resistance of the atmosphere . . . ."

Claim 15 merely establishes the locations of the horizontal and vertical rudders.

Most important in this connection is the Court's quotation from the specifications of the Wright patent:—

"'. . . . any construction whereby the angular relations of the lateral margins of the aeroplanes *may be varied in opposite directions* with respect to the normal planes of said aeroplanes comes within the scope of our invention.'"

In discussing the *ailerons* illustrated by the Richard Harte patent of 1870, the Court says:—

"While the extensions may be movable above and below the normal of the main body, yet *there is no simultaneous manual control*, and THEREFORE, in my opinion, the described means do not correspond to the combination in Claim 3 of the Wright patent. . . ."

Discussing the Mouillard patent the decision repeats: "Nor does it show means *for simultaneously* increasing the lift of one *aileron* and depressing the other, . . . nor does it show the use of a rudder *in conjunction* with the *depressible* portions."

The Mattullath application is discarded for similar reasons: ". . . The structure is not provided with movable side *ailerons simultaneously* adjustable. . . ."

The problem was solved before the original filing of the decision. Professor A. A. Merrill more than two years ago exposed the apparent weakness of the Wright pretensions to monopoly. A very successful German machine has long used a system of lateral balance which in no way appears to conflict with the sustained claims, and there are still other machines which certainly seem not to infringe under the decision. I awaited the final decision of the courts before announcing any change, because I felt confident of ultimate success in the litigation, and had a system of control that was satisfactory, and had been widely advertised. But we have been experimenting for years with an alternate system which is equal to, if not better than the old one, and with which we now equip all Curtiss machines. These facts seem entitled to publicity as wide as that given the statements asserting the almost unlimited scope of the decision.

GLENN H. CURTISS.

Flying Corps Accident Fund.

[1861] The Women's Patriotic Aerial League have resolved to raise a fund for the purpose of offering financial assistance to the widows or nearest dependents of British naval and military officers, non-commissioned officers and mechanics who are killed or permanently disabled while on duty. The League feels that special help is needed because the science is still in its experimental stages, and the brave men who are conquering difficulties are exposed to grave dangers and risks in the service of their country.

The widows of those killed on flying duty receive the same pensions as the widows of men killed on active service; these pensions are very small indeed, and generally mean a life of great privation for those who have the misfortune to lose their husbands, especially if they have children and do not possess private means. Flying men are continually in danger, whereas men on active service are only in danger in time of war. Financial assistance from this fund will also be extended to the widows or families of civilian pilots.

We would ask all patriotic men and women to subscribe to this fund, which will be administered by the Executive Committee of the League. Every subscription will, unless otherwise marked, be acknowledged in the London or Local Press.

Kindly send all cheques and postal orders to Colonel H. S. Massy, C.B., Hon. Treasurer of the Fund, 25, Denison House, Victoria, S.W., and crossed Flying Corps Accident Fund.

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THOSE who are actively engaged in aviation and who wish to insure their life should make a point of getting particulars of the special policy which is issued by the Eagle Insurance Co., 79, Pall Mall, S. W. This old-established office, now under the management of Mr. F. Bertram Galer, F.I.A., is greatly extending the facilities offered, and is taking a much more reasonable view with regard to aviation risks than most other insurance companies. The policy referred to is an Endowment Insurance, with profits, for 20 years or less, not exceeding £2,000, and the chief points are that the applicant must pass a satisfactory medical examination and be between 20 and 40 years of age. Naturally an extra premium is charged over the ordinary rate, but it is quite moderate, and, moreover, the company is prepared to consider a proposal for increasing the policy the second year.

A Change of Address.

OWING to the increase in their business Messrs. Withers and Spooner, the well-known patent agents, have found it necessary to remove to more commodious premises. On and after June 1st their address will be Staple House, 51 and 52, Chancery Lane, London, W.C., one door from the Patent Office.

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CONTENTS.

Editorial Comment: PAGE
- Gustav Hamel ... 559
- Theory and Practice ... 559
- The Advisory Committee Report ... 560

The Wight Seaplane ... 564
Flying at Hendon ... 566
Royal Aero Club Official Notices ... 570
From the British Flying Grounds ... 571
Eddies. By "Æolus" ... 574
The Flying Machine from an Engineering Standpoint. By F. W. Lanchester 577
The Development of the Aeroplane. By Dr. R. T. Glazebrook ... 578
Foreign Aircraft News ... 581
Correspondence... ... 582
Models. Edited by V. E. Johnson, M.A. ... 583
Model Clubs Diary and Reports ... 584

EDITORIAL COMMENT.

Gustav Hamel. As we write, nearly a week has elapsed since Mr. Gustav Hamel vanished during his attempt to cross the Channel without any single clue to his fate being discovered. With the deepest regret, therefore, we are forced to the conclusion, in spite of the extraordinary report current on Wednesday evening of his having been rescued, that he has met the fate which overtook Mr. Cecil Grace and Mr. Allen when attempting overseas flights under rather similar conditions. Whether he was wise to tempt Providence by essaying the flight with weather conditions which were against him and with an engine which had admittedly been giving trouble is rather beside the point now. If he did indeed err, he has paid the penalty that has been exacted of brave men right down through the centuries. His loss—for loss we fear it is—is one that is well-nigh irreparable to British aviation, for without doubt he was one of our best aviators, and we have not so many good men that we can afford to lose them in this way. But apart altogether from these considerations, heavily though they weigh, we have to deplore the passing from amongst us of a man of singular charm of manner, modest in spite of his great achievements, and one who had made hosts of friends among those intimately, or even remotely, connected with the movement. The manner in which he was regarded by those with whom he came into contact is eloquently indicated by the tribute paid to his memory by the Admiralty, in announcing that it had been reluctantly decided to abandon the hopeless search in which a number of His Majesty's ships had been engaged for a full two days. The official communication reads:—

> "It has been decided to suspend the searching operations by flotillas and aircraft, which have been in operation for the last forty-eight hours, for Mr. Gustav Hamel.
>
> "In relinquishing this quest, the Admiralty desire to place on record their recognition of the services rendered to British aviation by the missing airman. He was without question the foremost exponent in these islands of an art whose military consequence is continually increasing.
>
> "His qualities of daring, skill, resource, and modesty merited the respect of those who pursue the profession of arms; and his loss, if this must be accepted, is received with deep regret by the officers and men of the Naval Wing of the Royal Flying Corps."

In all our experience we do not remember having seen an official tribute like this paid to a civilian. After this, there is no need for us to add more than our own tribute to his memory and the expression of our deep sympathy with his sorrowing relatives in their bereavement—the more sad since it was so unexpected.

* * *

Theory and Practice. At the last meeting of the Aeronautical Society, Dr. Glazebrook delivered the Wilbur Wright Memorial Lecture, entitled "The Development of the Aeroplane," in which he indicated the character of some of the work conducted at the National Physical Laboratory on the problem of Stability of Aeroplanes; and we feel confident that very few of those present failed to realise that the information he had imparted showed that a fresh stage of development in aeroplane construction had been reached—the possibilities of which it is extremely difficult to accurately estimate. The occasion was peculiarly appropriate. The Aeronautical Society is recognised as the leading body in this country concerned with the furtherance of the scientific side of aviation, and the results recorded were achieved by some of its members. The early successes of the Wright brothers were attained through the adoption of systematic methods of working, careful study, and an infinite capacity for taking pains; and although they were not the first to rise into the air in a heavier-than-air machine, their public appearance marked the conversion of mechanical flight from a dangerous undertaking into one of comparative safety.

R.E. 1, to which the lecturer referred, is not the first inherently stable aeroplane—to say that it is would be to disparage the work which has been carried out by constructors in this and other countries by such men as Dunne, Handley Page, D.F.W., &c.—but it *is* the result of long-continued and patient experiment with models at the National Physical Laboratory and with full-size machines at the Royal Aircraft Factory, that association of theory and practice—co-operation between engineers engaged in experimental work and those who design the machines—which has been repeatedly advocated in these columns. R.E. 1 is remarkable, and stands for what we believe it does—the commencement of a new era in aeronautical design—because it exhibits no radical departure from accepted lines of development, neither stabilising mechanism nor specialised construction being employed. In appearance, it resembles the later B.E's. excepting that the triangular fin in front of the rudder is of larger dimensions, the wing section has been improved, the body has somewhat finer lines, while there is only one pair of struts between the planes on each side. These are, however, details which are common to many machines, and have been introduced for the purpose of increasing the efficiency of the machine. The inherent stability of R.E. 1 is due *only* to the adoption of a dihedral between the planes of suitable magnitude, and correctly proportioning and locating the various surfaces—all of which have been calculated with infinite care—in accordance with experimentally determined values. Hence there is no reason why every manufacturer should not be able to build machines possessing an equal degree of stability, as the methods employed can be adapted to the design of any aeroplane. The beneficial effect upon the pilot of such machines, especially on long distance flights, need only be mentioned as the reduced physical and mental strain involved in their control is readily apparent.

It is not too much to say that the fact that an aeroplane of a standard type has been designed from data experimentally obtained in an aerodynamic laboratory has given to aerial transit a huge impetus; that the earnest desire of every serious student and believer in the future of aeronautics—the application of the aeroplane to commercial purposes, the carrying of passengers, mails, &c.—is within measurable distance of consummation; and the confidence which such an event inspires in the layman renders it *possible* that within a comparatively short time we may have services of aeroplanes in active operation in many parts of the world.

◆ ◆ ◆

The Advisory Committee Report.

The much-belated Annual Technical Report of the Advisory Committee has at length come to hand. We use the term "much-belated," not because it has been published eighteen months after its immediate predecessor, but because an examination of the dates attached to the memoranda reveals the fact that, with the exception of Dr. Rosenheim's Report on Light Alloys (September, 1913), all were presented not later than March of last year, fifteen months ago!—many were prepared in 1912, and one by December, 1911. We are fully aware that work of this character, which is accepted without question the world over, requires thoroughly checking; but if the dates count for anything, they should indicate the time at which the tests to which they refer were complete and had been verified, and if our assumption be correct we consider that this delay represents so much loss of time, which, at the present state of aeronautics, is much to be deplored. It is to be hoped that subsequent reports will be issued at a much earlier date or that means will be devised whereby manufacturers and others interested in the experimental work conducted at the N.P.L. and the R.A.F. may be made acquainted with the results obtained at these establishments.

The high standard of excellence obtained in the previous reports has been well maintained, and will prove equally, if not more, valuable to designers and others. Much new ground has been broken, notably in regard to aerofoils, wind forces and moments on parts of aeroplanes, stability, the calculation of stresses in wing spars and in the fabric, wind forces on hydroplane floats, and the properties of light alloys; while a considerable amount of other research has been carried to a further stage of completion. It will, therefore, be evident that the Report now under notice represents a most comprehensive examination of many of the more pressing problems that now await solution, and although some parts are highly technical in character, the greater part of the matter can be perused with profit and pleasure by the most casual reader. Much help in this respect is afforded by the large number of graphs presented, which form, as in previous volumes, an important portion of the work.

Space precludes any possibility of dealing adequately with the subject-matter of this volume, and we shall therefore confine our comment, principally, to the covering letter to the First Lord of the Treasury, which is signed by the President of the Committee, Lord Rayleigh.

With the exception of research on the determination of the lifting power of samples of hydrogen, the leakage of gas through, and the proofing of balloon fabrics, no experimental work in connection with airships is recorded; although it is stated that some tests have been made on the resistance of airship models in the William Froude National Tank, which more immediately pressing questions have prevented from continuance. These experiments form an extension of the work carried on last year, and refer especially to the determination of the conversion factor when passing from the model to full scale results.

The results obtained in the aerofoil experiments are of an extremely interesting character. Previous work, as is well known to readers of FLIGHT, has indicated that the efficiency of a wing is mainly determined by the camber of the top surface, the under surface being relatively unimportant. In the present report the effect of varying the position of the maximum ordinate while keeping the camber constant is recorded; and as the lift curves of many wing sections drop rapidly when a certain angle of attack is reached, it was considered desirable to reduce this decrease in lift as much as possible, and to increase the angle at which it occurred to as large a value as possible. This, it has been found, can be effected with an aerofoil having a camber of 1 in 20, by changing the position of the maximum ordinate, the best position being at a distance from the leading edge of about three-eighths of the chord. In this position, the lift maximum extends, with little diminution, over a considerable angular range, although a slightly higher value of lift to drift was obtained when the position of the maximum ordinate was moved to about one-third of the chord from the leading edge, but with the attendant disadvantage that there was some possibility of re-introducing the sudden drop in lift. Further experiments conducted in this direction, had as their object to ascertain to what extent the aerofoil could

Roderic Hill.

A MEMORY.—Mr. Gustav Hamel, whose disappearance since Saturday has caused such widespread sorrow, flying his Morane monoplane on which he has accomplished such daring feats during the past months. From an original drawing by Roderic Hill.

be thickened towards the trailing edge in the vicinity of the rear span without impairing its aerodynamic properties. This was considered to be of importance from the point of view of construction, and as a result the wing section known as the R.A.F. 6 was selected. This wing is abnormally thick, being almost flat on the underside, while the upper surface has very little camber between the wing spars, and resembles somewhat, so far as memory serves us, the wing section of the Bristol Scout exhibited at the last Olympia Show and described in detail in FLIGHT for April 26th last. It gave with an aspect ratio of 6 to 1 a lift coefficient (absolute) of 0·32 at 5°, with a maximum ratio of lift to drift of 14·3, the maximum lift coefficient being 0·6 at 15°.

In regard to the effect of wing warping, it is interesting to note that the observations made in the course of experiments on an aerofoil of the form R.A.F. 6 showed that there was no loss of lift and a negligible amount of movement of the centre of pressure, as the result of warping through a maximum angle of 6° (that is, the angle between the front and rear spars) at ordinary flight angles; but, as was expected, the drift was increased, thereby reducing the lift/drift ratio to 12·2. Research was also conducted to ascertain "the extent to which a reflex curvature towards the trailing edge could be made to neutralise the rapid change of centre of pressure which occurs when the angle of incidence is varied," and it was found that the centre of pressure is practically stationary when the trailing edge is elevated by about 0·037 of the chord, the point of inflexion from which the reversed curvature commences being "anywhere between 0·2 and 0·4 times the chord from the trailing edge," but the maximum lift/drift is reduced by 12 per cent., and the maximum possible lift by 25 per cent. This confirms the results of tests made by Eiffel on a different wing section, which were, however, not so extended.

The report on the experiments on the determination of the forces and moments on aeroplane bodies, as well as a model of a complete aeroplane; forces on struts, of varying fineness ratio, and wheels, when inclined to the relative wind; and the resistances of wires form a valuable contribution to our knowledge on the subject, especially in connection with the examination of stability problems. The work carried out, some of which is in the preliminary stage only, is of an extensive and varied character, which renders it impossible to do more than mention it here; but we hope to refer to some of the results obtained on a future occasion.

Messrs. Bairstow, Melville Jones and Thompson contribute a Memorandum relating to the stability of an aeroplane, and although it is invidious to make distinctions, they are to be congratulated upon the results obtained. This work is, naturally, of a more or less mathematical and complex character, but even so, there is much that can be learned without rigidly following the mathematical treatment accorded to the subject. The investigation applies the results of the theories developed by Lanchester and Bryan—supplemented by the latest information available as to the wind forces acting upon a machine in flight—to actual aeroplanes, and includes some original work, the object of much of which is directed to reducing the labour involved in calculations relating to stability and to a comparison of certain approximations with more accurate solutions. It will be readily conceded by everyone that the subject is extremely extensive, and the tests, so far, on the determination of the essential factors on which stability depends have been carried out on complete machines; but experiments have already been commenced which should provide data for the designer as to the effect of all the component parts and their mutual interference upon one another. The degree of stability which a machine should possess is also a question that calls for examination, but it is suggested by the Committee that its stability factor should not be too great.

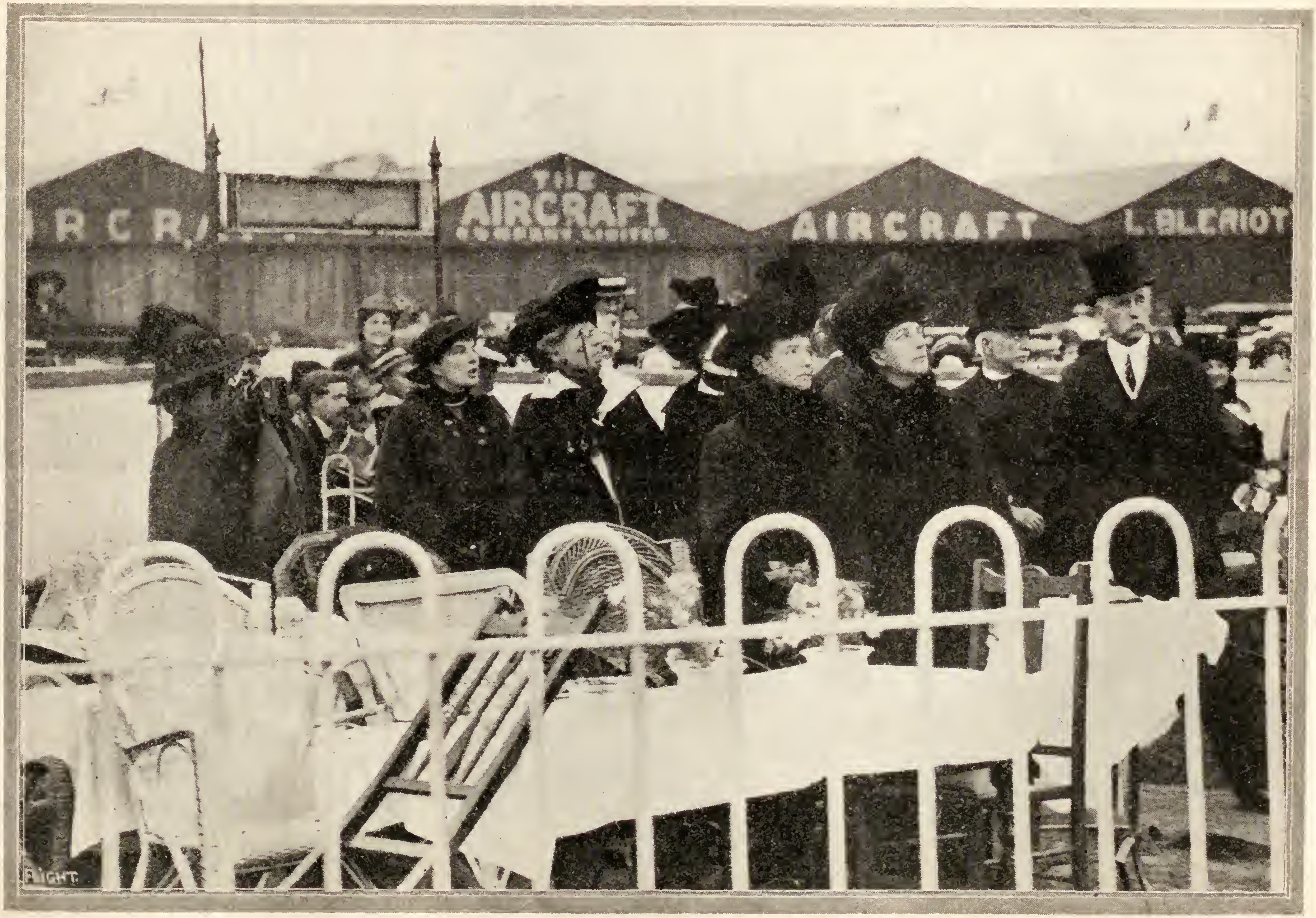
Another important memorandum bearing on the same subject relates to the effect of a side wind upon a propeller, and is an original contribution by Mr. T. W. K. Clarke, in the course of which he shows that a propeller, under some circumstances, may have a most marked fin effect, and conduce to directional instability, as, for example, when placed far forward in a tractor machine. The Superintendent of the R.A.F. presents a report which gives particulars of the measurements and calculations made to determine the amount of the effect due to gyroscopic action of rotating engines and propellers, and arrives at conclusions which are now generally accepted for the conditions assumed, namely, that the couple due to gyroscopic action is no more than can be readily taken up by the structure upon which the parts are mounted, and that the effect is well within the control of the pilot.

As stated in FLIGHT some weeks back, the Report gives a method of calculating the stresses in the wing spars of aeroplanes by the application of the theorem of three moments. This we regard with special interest, because the usual pin joint hypothesis may under some conditions be subjected to appreciable error in practice, and any attempt to arrive at a more exact knowledge of the actual stress is to be heartily welcomed. The method of working is fairly fully developed, and indicates the method of treatment that should be followed under certain conditions which may arise from various causes during flight.

The report on the year's work at the Royal Aircraft Factory will probably prove of more general interest, because it records, amongst other work, the results of experiments on full-size machines as distinct from tests on scale models. Particulars are given of the principal dimensions and performances of different types of aeroplanes—the R.E.1, S.E.2, F.E.2, and F.E.3; and it is worthy of notice relative to B.S.1—a high speed single-seater scout—that when fully loaded for 3 hours' flight the average speed was 91·7 miles per hour, the slow speed 51 miles per hour (which it is expected might be improved upon), and the rate of climbing 900 ft. per min. Much work, notably in the direction of stability and control, is indicated, of which the results are published; but at the time of presentation of the Report there were many problems still under, or requiring, further investigation.

In addition to many other matters, the Report continues the results of tests on aeroplane fabrics, which should prove of considerable value to constructors, as the effects of dopes and exposure upon their strength have been very severely examined. Light alloys have also received attention.

The whole work, which covers 400 pages, is, as can be readily seen from the brief outline we have given, of the highest possible value to all readers of FLIGHT; and the fact that the experiments upon which the reports are based were completed so far back and yet have lost little or nothing in value, reflects great credit upon all concerned.



Queen Alexandra with the Dowager Empress of Russia watching the flying at Hendon on Saturday last, when the Royal party motored to Hendon with the object of seeing the Aerial Derby, which, unfortunately, owing to the weather, had to be postponed.

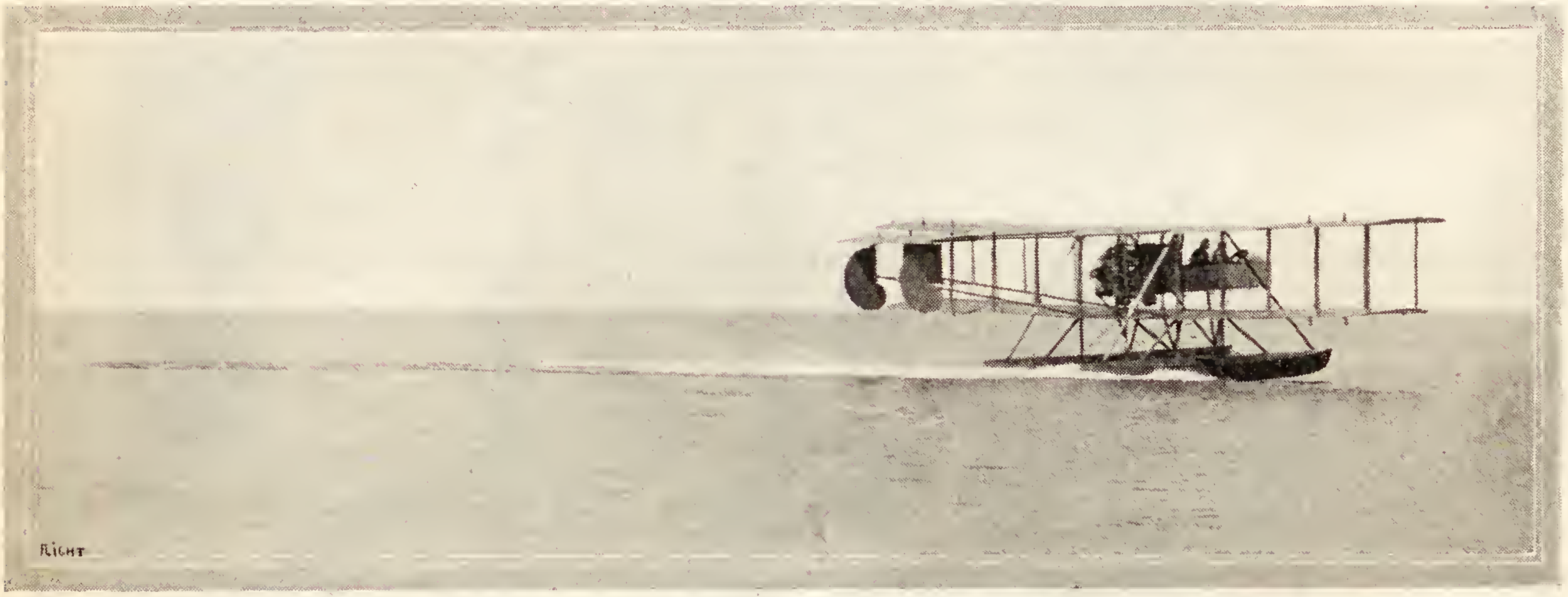
THE "WIGHT" SEAPLANE.

Among the ever-increasing number of British seaplanes, few have met with greater success than have Wight seaplanes designed by Mr. Howard T. Wright and built by Messrs. J. Samuel White and Co., Ltd., of Cowes. The excellent performances of these machines are somewhat apt to escape the notice that they certainly merit, since they are at present built for the British and foreign navies only and their flights in public have been limited to trial flights and delivery tests. There is no lack of recognition by our own and foreign governments, however, and several of these machines have already been delivered, whilst sufficient orders have been received to keep the firm very busy indeed for a long time to come.

One of these machines was, it will be remembered, exhibited at the last Olympia Aero Show when it caused considerable interest owing to its many original features. Most notable among these are the unusually long floats, and the peculiar double camber on the upper surface of the wings. It is undoubtedly chiefly due to this double camber that the machine possesses such a good speed range —from 78·9 miles per hour to about 35 m.p.h. with full load of fuel, wireless apparatus, pilot and passenger. The most marvellous point, however, does not so much lie in the speed range itself, although that is uncommonly good, but more in the attitude of the machine throughout the entire range of speeds. The main planes and the tail plane are so designed that as the speed of the machine increases, the lift of the tail plane increases at a different ratio from that of the main planes, in such a manner that, as the speed goes up, the angle of incidence of the main planes in relation to the horizontal decreases without necessitating use of the elevator. When the maximum speed has been reached, the main planes are flying at a negative angle of incidence of 1°, whilst the tail plane has a negative angle of incidence of 4°. Any attempt to increase the speed beyond this point causes a top pressure on the tail plane and the machine begins to climb. It will therefore be seen that it is possible to fly the machine simply by closing or opening the throttle without using the elevator, as longitudinal stability is perfect under all speeds.

The lateral stability is more difficult to explain, but is none the less pronounced. We had occasion recently to observe the machine in flight, and she appears to bank up to the right degree in making a turn without any use of the *ailerons*, and when flying in a straight line, even on a windy day, the *ailerons* are rarely called into play.

Excellent as is the behaviour of the machine in the air, her performances when on the sea are almost even more so. The long three-stepped floats leave the water in a perfectly clean manner, without the huge spray of water usually set up while a machine is gathering speed. The nose of the floats leaves the water first, then the first step, and so on, until gradually the whole of the floats leave the water without any jerk whatever. When starting for a flight in a rough sea, the long narrow floats plough their way through the waves without causing the machine to rise and sink with the swell. Alighting on the water is effected by throttling down the engine until a sufficiently low flying speed has been obtained to allow of settling down on the surface of the sea gently and without shock. One of the accompanying photographs shows in a most striking manner the clean wake of the floats under these conditions. When taxying on the surface of the sea the machine answers her rudder beautifully, and it is possible to make a complete circle of only about 30 ft. diameter. With a full load including fuel, wireless apparatus, pilot and passenger, the machine reaches an altitude of 3,000 ft. in 7½ mins., and recently experiments were made with an additional load of 400 lbs., with which the machine reached 3,000 ft. in 13¼ mins. By sacrificing the low starting and alighting speed, a much greater load could be carried, but Mr. Howard Wright is—rightly we think—in favour of a machine possessing a wide speed range.



The "Wight" seaplane alighting. This photograph gives a good idea of the small wake set up by the long narrow floats.

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The Progress of the Montrose Squadron.

Up to the end of last week the officers of the Montrose Squadron of the R.F.C. who are flying south had reached Lincoln. Another stage was completed on Tuesday, when eight of the machines reached Chapel Brampton, near Northampton. The weather was very cold, and a snowstorm was encountered. The officers who made the trip were Major Burke, Capt. Todd, Capt. Dawes, Capt. Waldron, Lieut. Harvey-Kelly, Lieut. Dawes, Lieut. Corballis and Lieut. Martyn. Last week Capt. Waldron and Lieut. Harvey-Kelly returned to Montrose, and started on the afternoon of the 19th inst. to fly south on two fresh machines to replace those damaged at York.

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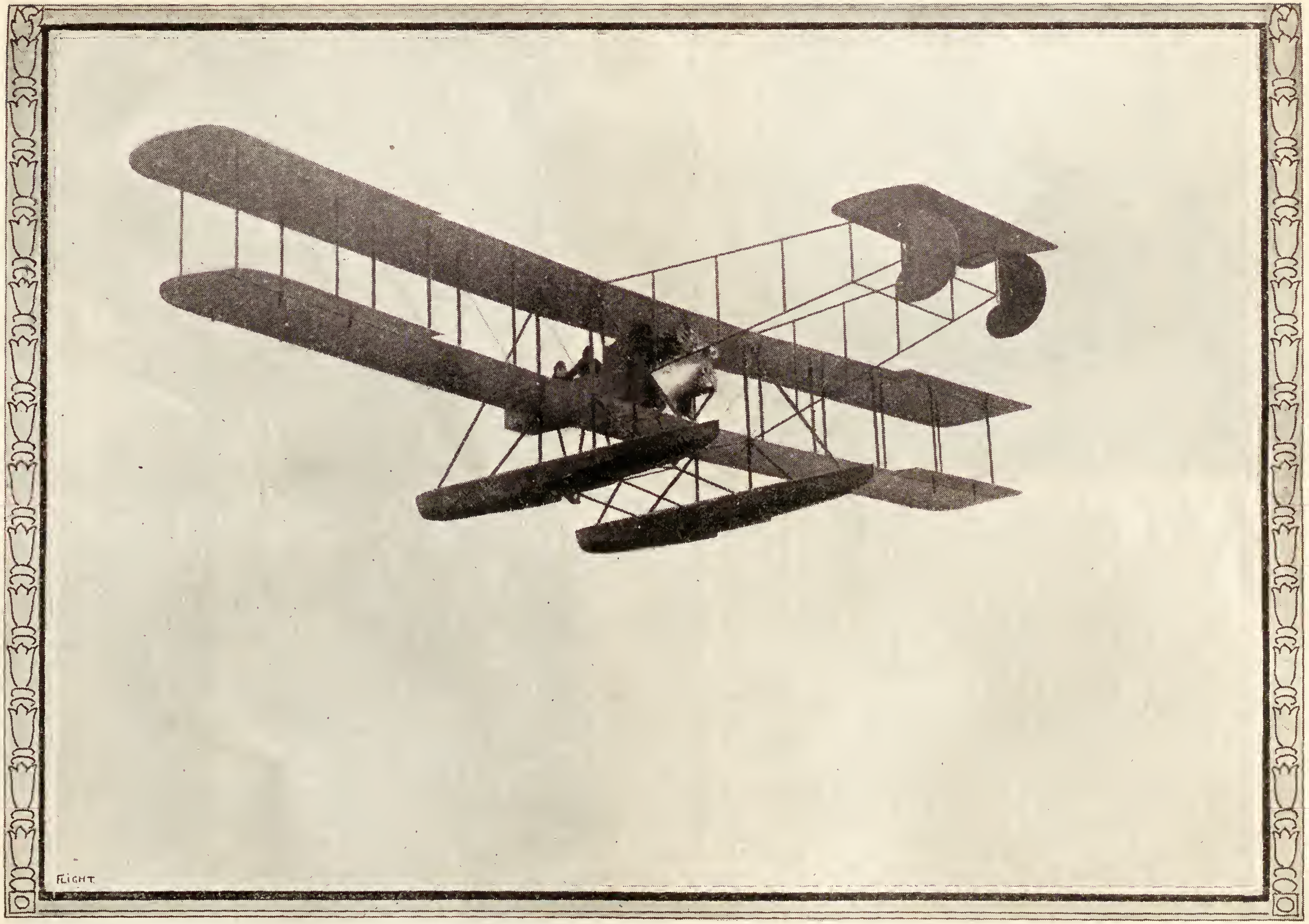


The "Wight" seaplane in flight

FLYING AT HENDON.

THURSDAY of last week was fine and breezy and a good afternoon's flying was put up by the Hendon pilots. In the morning, W. R. Ding, accompanied by Princess Ludwig of Lowenstein-Wertheim, left for France on the 100 h.p. Handley Page biplane, arriving at Eastbourne at noon, after which he flew on to Calais *via* Dover, taking about 15 mins. to cross the Channel, his total flying time for the journey being 1 hr. 50 mins. Just as R. H. Carr was opening the proceedings shortly before 3.30 p.m. with a flight on the G.-W. tractor biplane "Lizzie," Lieut. Horden of the R.F.C. started for Farnborough, whence he had flown earlier in the day, on Henry Farman No. 244. Whilst Carr was executing numerous spirals on "Lizzie," W. Birchenough ascended on the G.-W. bi-rudder 'bus, and after completing several circuits of the aerodrome he stopped his engine and glided to earth with the propeller stationary. This method of descending is very popular just now, and it is certainly both spectacular to look at and extremely pleasant to experience. R. J. Lillywhite next took over the bi-rudder 'bus, and climbing high, descended with a spiral *vol sans force*. Carr then took up two passengers on the 100 h.p. five-seater aerobus, and Louis Noel brought out the resurrected Maurice Farman, which, although low in the tail, is still flying, like Charley's Aunt. Two passenger flights were then made by Lillywhite on the bi-rudder 'bus, whilst F. W. Goodden put up a fine 25 mins. flight on the 80 h.p. Morane-Saulnier. Carr also ascended and gave a looping display on "Lizzie," making two complete loops at heights of about 1,000 and 800 ft., after which Noel and Goodden each took up a passenger on the Maurice Farman and the Morane-Saulnier respectively. Goodden then took a 'busman's holiday and went for a flight as passenger on the Maurice Farman with Noel, who executed various evolutions and finished up with a *vol sans force*. Birchenough made the next flight on the bi-rudder 'bus, Carr following shortly after with four passengers on the aerobus, Claude Grahame-White ascending the meanwhile on "Lizzie." At 6.25 p.m. Gustav Hamel arrived from

Mr. C. F. Lan-Davis in the Avro at Hendon.

The crowd at Hendon on Aerial Derby Day, as seen looking left from the Judges' box.

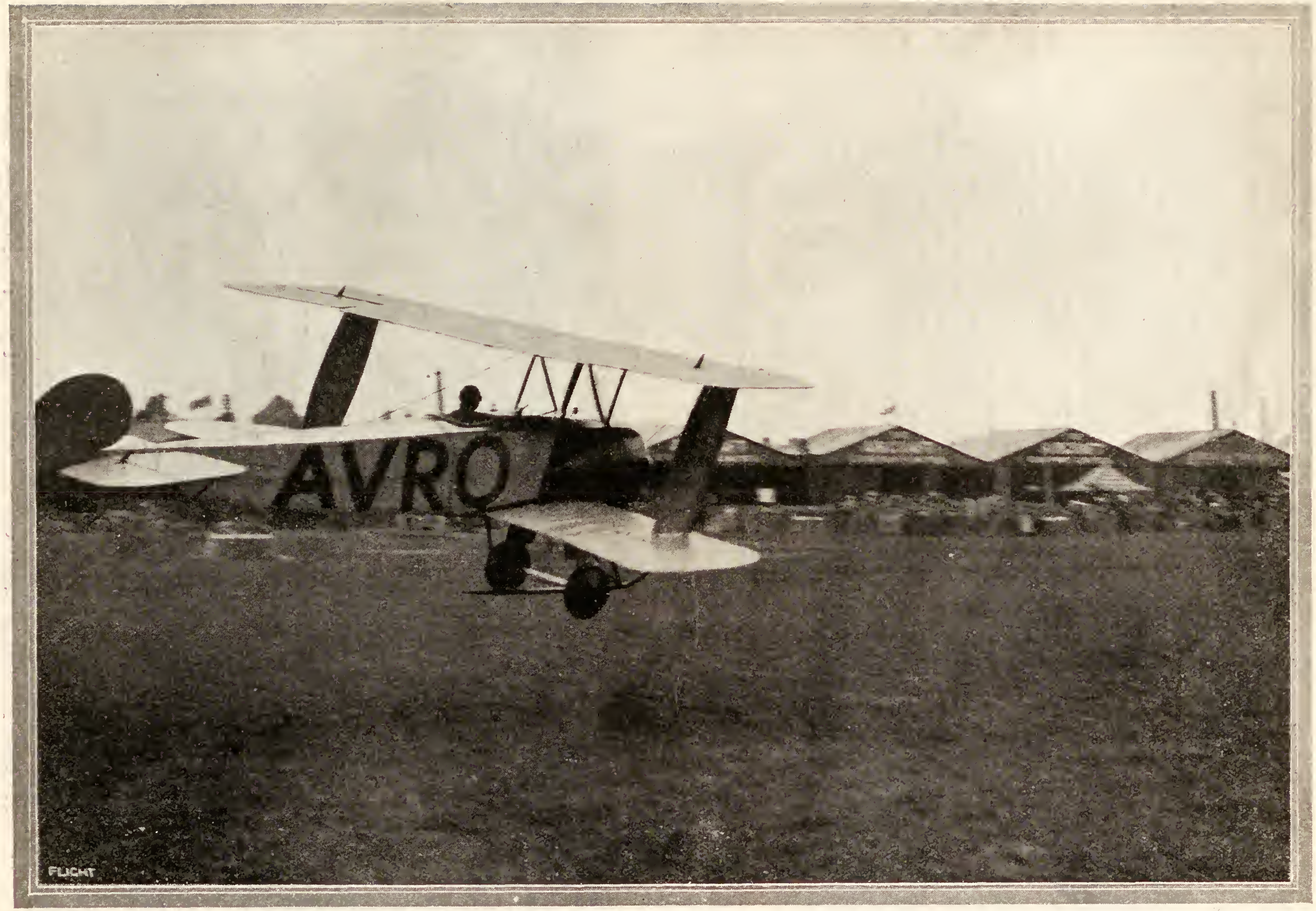
Cambridge on the 80 h.p. Morane-Saulnier with Baron de Gunsberg as passenger, having taken 45 minutes to complete the journey.

Mr. R. Skene in the pilot's seat of Lord Edward Grosvenor's Blériot.

Immediately after he made two passenger flights, a lady accompanying him on his second trip, during which he chased the aerobus which Carr was piloting the meanwhile with three passengers. After this the proceedings were brought to a close and school work started, but later in the evening Goodden took up a lady passenger on the Morane.

After several weeks of fine summer weather, that gave promise of ideal conditions for the Aerial Derby, it was bitterly disappointing to get such a sudden change to bad weather, causing this interesting event to be postponed, for everything looked as if it was going to be an exceptional race this year. The storm that broke over London on Friday night of last week, however, completely broke up the weather, and the day of the event, Saturday, turned out to be very unsettled and misty, altogether unfavourable for a cross-country race such as the Aerial Derby. The postponement of this event, however, was not the only cause for general resentment against the weather, for it was also undoubtedly responsible for the loss of the favourite competitor—Gustav Hamel. He had gone over to Paris on Friday at the last moment to fetch a new 160 h.p. Morane-Saulnier type monocoque specially for the race. The last that was heard of him was, all now know, that he left the French coast shortly after noon on Saturday, and as the day wore on and no news of him came, many feared the worst. On Saturday morning nine of the competing machines were on the ground, Howard Pixton arriving from Brooklands shortly before 11 a.m., having taken about 12 mins. to complete the journey. He reported the weather as being very bad, and the ground was so misty that he could not locate Kempton Park when he flew over, although he was not more than 600 ft. high. At noon Louis Noel made a test flight on his 80 h.p. Morane-Saulnier, after which a terrific rain storm prevented any further flights from being made until nearly 3 o'clock, when Noel again went up, this time on the Maurice Farman with a passenger. Carr on "Lizzie" and J. L. Hall on his 50 h.p. Avro came out immediately after, and F. P. Raynham followed with a test flight on the 80 h.p. Avro Arrowplane which showed a clean pair

The crowd at Hendon on Aerial Derby Day, as seen looking right from the Judges' box.



Mr. Raynham, in the Avro scout, just getting off at Hendon Aerodrome.

of elevators, although it must be admitted that it was not so speedy as was expected. After flights by Birchenough on the bi-rudder 'bus, and Claude Grahame-White on the Maurice Farman, Pixton came out on the Sopwith. He put up several circuits at a remarkable speed which caused no small amount of excitement amongst the spectators, but on landing the chassis collapsed just as the machine was about to come to rest, causing it to swerve towards the enclosure. Fortunately the machine came to a standstill some 20 or 30 yards from the latter, and as far as could be seen all the damage done was a broken skid. It was a bit of hard luck which might have put Pixton out of the race, for it was still undecided as to whether the race would be flown or not, and Pixton had many sympathisers. However, mechanics were soon at work effecting a repair. Two more competitors came out and made trial flights, P. Verrier on the 70 h.p. Maurice Farman, which he was to fly instead of the Henry Farman, and W. R. Ding, who had returned to Hendon from France on Friday, on the 100 h.p. Handley Page biplane; R. J. Lillywhite also made a flight at the same time on the bi-rudder 'bus. By this time it was nearly 4 o'clock, and, whilst Noel was executing startling banks on the Maurice Farman, Queen Alexandra, with the Dowager - Empress of Russia, arrived in her motor car, having entered the aerodrome at the far end near the railway. Her Majesty, who was received by Mr. Grahame-White, stayed for nearly an hour, and witnessed several excellent exhibitions of flying. Goodden ascended on the 60 h.p. Caudron, and, climbing to a height of about 800 ft., executed a perfect loop, then making a circuit to regain his former altitude, he made a second one, and then a third at about 1,000 ft., after which he descended with a series of spirals. Lord Carbery next gave an exhibition of looping on his 80 h.p. Morane-Saulnier, making three loops amongst the clouds. Verrier then ascended on the Maurice Farman, and put up some switchbacks and wiggle-woggles, after which Grahame-White on the other Maurice Farman, Raynham on the Avro Arrowplane, and Noel on the 80 h.p. Morane-Saulnier all went up together, Goodden following shortly after on his 80 h.p. Morane, and climbing above the clouds where he was lost to view several times. An announcement was then made that it had been decided to postpone the Aerial Derby owing to the unfavourable state of the weather until Saturday, June 6th. Some further flights were made by Carr on "Lizzie," Noel with a passenger on the Maurice Farman, J. L. Hall on his 50 h.p. Avro, Lord Carbery and Goodden on the Moranes, Goodden taking as passenger Mr. V. W. Eyre, who took his pilot's certificate some two years ago at Buc.

Queen Alexandra and the Dowager Empress of Russia were particularly interested in Mr. Goodden's looping the loop at Hendon on Saturday last.

The day's proceedings were wound up with a four-lap speed handicap, which resulted in a very close finish, so that the 35,000 spectators at the aerodrome itself had an excellent show if they did not see the start and finish of the Aerial Derby. Grahame-White who started first maintained his lead until the end of the last lap, where he was overhauled by Noel, who had made a fine effort from scratch. The result was as follows :—

Speed Handicap. (4 laps).

		Handicap.	Handicap Time.
		m. s.	m. s.
1.	Louis Noel (80 h.p. Morane-Saulnier) ...	scratch	7 59
2.	C. Grahame-White (70 h.p. M. Farman) ...	1 57	8 4
3.	P. Verrier (70 h.p. Maurice Farman) ...	1 25	8 16
4.	R. H. Carr (50 h.p. G.-W. tractor biplane)	1 10	8 25
5.	F. W. Goodden (60 h.p. Caudron)	1 48	8 31

Amongst the visitors on Saturday were Lady Juliet Duff, Lady Diana Manners, Lady Vita Perry, Lord and Lady Curzon, Lord Herbert Vane Tempest, the Duke Villa Rosa, Prince Potenziani, Prince Lichknoysky, the Bishop of Glasgow, Sig. Marconi, &c. Capt. Thomas S. Baldwin, who made several parachute displays in England some twenty years ago, and who afterwards started an aeroplane and dirigible factory in the U.S.A., was also an interested spectator of the flying at Hendon during the week-end.

Some thirty exhibition flights were made at the aerodrome on Sunday in dull and windy weather. About fifteen of these flights were with passengers, one of whom was Signor Caruso, who made his first flight with Claude Grahame-White on the Maurice Farman. The pilots who contributed to the afternoon's flying were :—W. Birchenough on the bi-rudder 'bus, Lord Carbery on his 80 h.p. Morane-Saulnier, R. H. Carr on "Lizzie" (on which he made two loops at a height of 1,000 ft.), and the 80 h.p. Blériot, F. W. Goodden on the 80 h.p. Morane-Saulnier, C. Grahame-White on the Maurice Farman and "Lizzie," N. Howarth on the bi-rudder 'bus, J. L. Hall on his 50 h.p. Avro, R. J. Lillywhite on the bi-rudder 'bus and Louis Noel on the Maurice Farman.

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The London-Manchester-London Race.

ARRANGEMENTS are now well forward in connection with the one-day race from London to Manchester and back, which is to be held on Saturday, June 20th. The competitors will leave the Aerodrome at Hendon at intervals between the hours of 9 a.m. and 12 noon, and after a stop of one hour at Manchester will return to Hendon in time for the winner to arrive shortly after 5 o'clock. It is probable that a control will be established at Birmingham.

The prizes are the *Daily Mail* Gold Trophy, which will be a model in gold of the winner's machine; and the "Pratt's" Trophy and £750 offered by the Anglo-American Oil Co—the distributors of "Pratt's" Motor Spirit—in celebration of the Anglo-American Peace Centenary. Full details of the rules and route will shortly be announced.

The Aerial Derby.

As we have recorded elsewhere, owing to the state of the weather the Stewards at Hendon on Saturday last decided that the Aerial Derby should be postponed, and it has now been decided that the race shall be held on Saturday, June 6th, over the same course as originally proposed, starting at 4.15 p.m. The entry list has been reopened and entries will be accepted up to midday on Monday next. Numbers allotted for last Saturday may be altered.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Diary of Events.

May 30 ... June 1 ...	Whitsun Flying Meeting. Hendon Aerodrome.
June 6 ...	Aerial Derby. Hendon Aerodrome.
June 10 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
June 27 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
July 11 ...	International Correspondence Schools Race, London–Paris–London. Hendon Aerodrome.
July 11 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
Aug. 1–15	*Daily Mail* £5,000 Circuit of Britain Race. Starting from Southampton Water.
Aug. 22–29	Gordon-Bennett Eliminating Trials. Salisbury Plain.
Sept. 20–29	Gordon-Bennett Aviation Race. Buc, France.

HENDON AERODROME.

Members of the Royal Aero Club are admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards. The Membership Card admits the Member only, motor cars must be paid for.

Balloon Contests at Hurlingham.

The Club has arranged the following Balloon Contests from Hurlingham Club, Fulham, for this year:—

June 10th...	Hare and Hounds Race for Cup presented by Mr. John Dunville.
June 27th...	Long Distance Balloon Race for Cup presented by Mr. A. Mortimer Singer.
July 11th...	Hedges Butler Challenge Cup.

Members are admitted free to Hurlingham on the above dates, on production of their Club Membership Cards.

Daily Mail Circuit of Britain Race, £5,000.

Date of Contest	August 1st to 15th.
Starting Place	Southampton.

Entries.—The Entrance Fee is £100 per aircraft, and entries will be received up to 12 o'clock noon, May 30th, 1914. The Entrance Fee of £100 is payable either in one sum or as follows:—

£50 by noon on May 30th, 1914.
£50 by noon on June 20th, 1914.

Late entries will be received up to 12 noon, June 30th, 1914, in which case the Entry Fee will be £150.

The Entry Form, which must be accompanied by the Entrance Fee, must be sent in to the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

Full particulars can be obtained from the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

Mr. Gustav Hamel.

No news having been received of Mr. Hamel since he left Hardelot on Saturday last to fly across the Channel, it is greatly to be feared he is drowned.

Mr. Hamel had been a member of the Club for many years, during which time he had endeared himself to all with whom he came in contact. His well-known skill as a pilot did much to further the science of flying in this country, and he will be greatly missed by all interested in aviation.

The sincerest sympathy of all members is extended to his relatives in their sad bereavement.

COMMITTEE MEETING.

A Meeting of the Committee was held on Tuesday, May 26th, 1914, when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Prof. A. K. Huntington, Major F. Lindsay Lloyd, Mr. F. K. McClean, Mr. J. T. C. Moore-Brabazon, Mr. Alec Ogilvie, Mr. Mervyn O'Gorman, C.B., Mr. C. F. Pollock, Com. C. R. Samson, R.N., Mr. T. O. M. Sopwith, and the Secretary.

New Members.—The following new Members were elected:—Harold Blackburn, Jens Tryggve Herman Gran, Eng.-Lieut. Hubert John Napier-Hemy, R.N., and Hubert Walter.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

780 Frazier Curtis (Caudron Biplane, Caudron School, Hendon). May 11th, 1914.
(Subject to permission of Aero Club of America.)
781 2nd Lieut. John Aidan Liddell (Vickers Biplane, Vickers School, Brooklands). May 14th, 1914.
782 Reginald Max Maximilian Murray (Vickers Biplane, Vicker School, Brooklands). May 14th, 1914.
783 Michael Geoffrey Smiles (Grahame-White Biplane, Grahame-White School, Hendon). May 14th, 1914.
784 Victor Mahl (Sopwith Biplane, Sopwith School, Brooklands). May 14th, 1914.
785 Benjamin Herbert Piercy (Grahame-White Biplane, Grahame-White School, Hendon). May 18th, 1914.
786 Bernard Francis Hale (Farman type Biplane, Shoreham.) May 18th, 1914.
787 Major Edward H. Phillips (Vickers Biplane, Vickers School, Brooklands). May 19th, 1914.
788 Capt. Alfred Garnet Moore (Grahame-White Biplane, Grahame-White School, Hendon). May 19th, 1914.
789 Lieut. Norman Wood-Smith (Vickers Biplane, Vickers School, Brooklands). May 20th, 1914.
790 Lieut. John Burgh Talbot Leighton (Vickers Biplane, Vickers School, Brooklands). May 20th, 1914.
791 Lieut. Gerald Desmond Mills (Sherwood Foresters) (Bristol Biplane, Bristol School, Brooklands). May 22nd, 1914.
792 Robert Eugene Lagrange (Bristol Biplane, Bristol School, Brooklands). May 22nd, 1914.
(Subject to permission of Aero-Club de Belgique.)

Accidents Investigation Committee.—On the motion of Col. H. C. L. Holden, the report on the fatal accident to Lieut. Hugh Frederic Treeby was unanimously adopted and ordered to be published in extenso.

(Full report will be found following these notices).

COMPETITIONS COMMITTEE.

A Meeting of the Competitions Committee was held on Tuesday, May 26th, 1914, when there were present: Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Major F. Lindsay Lloyd, Mr. F. K. McClean, Mr. N. C. Neill, Mr. Alec Ogilvie, Mr. Mervyn O'Gorman, C.B., and the Secretary.

British Empire Michelin Trophy No. 2, £800. Duration Contest.—The draft regulations were considered and approved, and ordered to be issued.

***Daily Mail* Circuit of Britain Race, £5,000.**—The following Officials were appointed to take charge of the arrangements for the starting and finishing of the Race at Southampton:—Mr. F. P. Armstrong, Col. H. C. L. Holden, Mr. Robert Loraine, Mr. N. C. Neill, and Mr. H. E. Perrin (Secretary).

The question of the Controls and Control Officials was left to the Secretary.

Gordon-Bennett Eliminating Trials.—The following officials were appointed for the Gordon-Bennett Eliminating Trials which take place on Salisbury Plain during the last week in August:—Major W. S. Brancker, Col. H. C. L. Holden, Major F. Lindsay Lloyd, Mr. N. C. Neill, Mr. Alec Ogilvie, and Mr. Mervyn O'Gorman. Timekeepers, Mr. A. V. Ebblewhite and Mr. A. G. Reynolds.

The selection of the course was left to Major W. S Brancker and Mr. H. E. Perrin.

PUBLIC SAFETY AND ACCIDENTS INVESTIGATION COMMITTEE.

A Meeting of the Public Safety and Accidents Investigation Committee was held at the Royal Automobile Club (by kind permission) on Tuesday, May 26th, 1914, when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Eng.-Lieut. E. F. Briggs, R.N., Mr. F. K. McClean, Mr. Alec Ogilvie, Mr. Mervyn O'Gorman, C.B., Major-Gen. R. M. Ruck, C.B., R.E., Com. C. R. Samson, R.N., and the Secretary.

Fatal Accident to Mr. Philippe Marty.—The draft report was considered and approved, and ordered to be submitted to the Committee.

Fatal Accident to Capt. C. P. Downer.—Lieut. W. W. A. Burn and Mr. S. Heckstall Smith attended at the invitation of the Committee and gave evidence.

The reports of the National Physical Laboratory on the various tests carried out by them were gone into, as also the reports of tests carried out by the Royal Aircraft Factory.

The report of the Accidents Investigation Committee was then drafted.

International Correspondence Schools Race.
London–Paris–London.

(*Under the Competition Rules of the Royal Aero Club.*)
Organised by the Royal Aero Club and the Aero-Club de France.
Starting and finishing at the Hendon Aerodrome,
Hendon, N.W.
Saturday, July 11th, 1914.
Prizes.

Fastest Time... 1st Prize: £500. Presented by the International Correspondence Schools.
Handicap .. 1st Prize: £300. Presented by the Royal Aero Club.
2nd Prize: £150. Presented by the International Correspondence Schools.
3rd Prize: £50. Presented by the International Correspondence Schools.

Full particulars can be obtained from the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

HAROLD E. PERRIN, Secretary.

166, Piccadilly, W.

ACCIDENTS INVESTIGATION COMMITTEE OF THE ROYAL AERO CLUB.

REPORT No. 22.

Report on the Fatal Accident to Lieut. Hugh Frederic Treeby, when Flying at the Central Flying School, Upavon, Wilts., on Thursday, March 19th, 1914, at about 10.20 a.m.

Brief Description of the Accident.—Lieut. Hugh Frederic Treeby was flying a Maurice Farman Biplane fitted with a 70 h.p. Renault engine, at the Central Flying School, Upavon, on Thursday, March 19th, 1914, at about 10.20 a.m. He had been flying about twenty minutes and was approaching the alighting-ground at a height of about 350 ft. A left-hand turn had been completed in a normal manner, apparently with the idea of landing into the wind. The engine was throttled down and the aircraft in a position for a straight glide to the ground. Suddenly, the aircraft nose-dived, fell into some trees, and was completely wrecked. The pilot, who was found underneath the engine, was killed.

Lieut. Hugh Frederic Treeby was granted his Aviator's Certificate, No. 687, on November 16th, 1913, by the Royal Aero Club.

Report.—The Committee sat on Monday, March 30th, 1914, and received the report of the Club's representative, who visited the scene of the accident within a short time of its occurrence, together with the evidence of eye-witnesses.

From the consideration of the evidence, the Committee regards the following facts as clearly established:—

1. The aircraft was built by Messrs. Farman in Paris, and was delivered new to the Central Flying School in July, 1913.
2. The wind at the time of the accident was 10 to 15 m.p.h., and somewhat gusty.
3. The pilot had previous experience on other types of aircraft and had flown the Maurice Farman Biplane several times, including one flight the same morning.
4. This particular aircraft had been flown previously the same morning by another officer and had been found to be in perfect order.
5. The aircraft was fitted with an engine revolution indicator and air speed indicator.
6. The controls were found to be in working order after the accident.

Opinion.—The Committee is of opinion that the accident was due to the aircraft having lost flying speed owing to an error on the part of the pilot.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—Monday, a fine day for flying. No. 43 Bristol tractor, 49 and 50 B.E.'s and 104 Sopwith to Isle of Grain returning as escort to Mr. Winston Churchill. 24 Bristol, 150 Avro, 16 Avro, 153 Bristol tractor, 31 Henry Farman were also up.

Tuesday, fine. No. 2 Short instruction, 150 Avro, 16 Avro, Lieut. Marx cross-country, 10 Short, 70 Maurice Farman, 49 B.E., 43 Bristol tractor, 153 Bristol tractor.

Wednesday, fine. No. 2 and 64 Shorts, 7 Deperdussin, 70 Maurice Farman, 150 Avro, 50 B.E., 31 Henry Farman.

Thursday, fine. Very little flying was done on account of the heat; the following only were up:—No. 2 and 10 Shorts, 70 Maurice Farman.

Friday, fine. Again very hot. Nos. 2 and 64 Short, 150 Avro, 70 Maurice Farman cross country, "P. O. Hooper and passenger."

Saturday, windy and rain. No. 2 Short, instruction 70 Maurice Farman, P. O. Hooper to Chatham.

Sunday, very windy towards midday. Com. Samson left about 10 a.m. on Maurice Farman No. 70 for Isle of Grain, on arrival he transferred to a waterplane, and left to try to get tidings of Mr. Hamel, but had to return to Grain owing to the stormy wind.

Civilian Flying.—Monday morning, Mr. Hamel, from Isle of Grain, in company with Mr. Winston Churchill and naval machines (escort). Shortly after arrival he looped the loop about six times on his Morane monoplane, 80 h.p. Gnome, afterwards leaving in the direction of Grain for Hendon.

Monday evening, the Hon. M. Egerton made a fine flight of about an hour on his 50 h.p. Short.

Tuesday, Wednesday and Thursday evenings, the Hon. M. Egerton was flying for about an hour.

Friday, Mr. Alec Ogilvie flew to Hastings and back on his 50 h.p. Wright.

Saturday and Sunday no flying.

Brooklands Aerodrome.

On Monday morning last week, the Bristol and Vickers pupils were out. In the afternoon, Mr. Barnwell on the Vickers biplane, Mr. Busteed on the Bristol "scout," Mr. Mahl on the 80 Sopwith two-seater. Vickers and Bristol pupils at work. Mr. Roland Ding arrived with passenger from Hendon on a Handley Page machine, and returned to Hendon. Wind variation 0-20 m.p.h.

Major Phillips, D.S.O., passed his *brevet* tests (altitude 400 ft.), on Tuesday morning, in good style on a Vickers biplane. Vickers and Bristol Schools busy. Lieut. Collet came in on D.F.W. biplane (154). Vickers "scout" arrived. In the afternoon, Mr. Mahl made several flights with and without passengers on the 80 Sopwith. School work by Bristol and Vickers pupils. Blériot pupils out on Blériot "penguin," and Mr. Waterfall on the Martinsyde monoplane. Wind variation 0-24 m.p.h.

On Wednesday morning Blériot, Bristol, and Vickers pupils busy. Mr. Waterfall out on Martinsyde monoplane with Miss Cyril Orr Paterson as a passenger. Arrival of No. 5 Sopwith "scout." Mr. Mahl on Sopwith 80. In the afternoon, Mr. Merriam giving exhibition flights on Bristol biplane for cinematograph. Arrival of Sopwith Schneider Cup machine. Mr. Barnwell testing 100 h.p. gun 'bus, and afterwards with passenger. Mr. Mahl with two passengers on Sopwith 80. Vickers, Blériot, and Bristol school work. Excellent *brevet* tests were passed by Mr. Norman Wood Smith, Vickers biplane (altitude 1,250 ft.), and Mr. J. B. T. Leighton, Vickers biplane (altitude 2,800 ft.). Messrs. H. Racine Jacques and G. Desmond Mills passed the first portion of their *brevet* tests on Bristol biplanes. Major Raleigh, of No. 4 Squadron, R.F.C., with Lieut. Mitchell as passenger, came in from Netheravon on B.E. 299. Wind variation, 0-14 m.p.h.

Mr. Geoffrey Charles Gold, who has taken his ticket recently at the Blériot School.

Bristol and Vickers schools at work, Thursday morning, Mr. Alcock for an hour's flight on the Sunbeam-engined Maurice Farman. Mr. Mahl with passenger on the Sopwith 80. In the afternoon, Lieut. Collet on the D.F.W., Mr. Pixton on Sopwith Schneider Cup machine, Mr. Jullerot solo on Bristol biplane, Mr. Merriam solo on Bristol biplane, and Blériot, Vickers and Bristol school work. Wind variation, 0–18 m.p.h.

Friday morning, Bristol, Blériot and Vickers pupils out. Mr. Dukinfield Jones for several flights up to 2,000 ft. on the D.F.W. biplane, the engine of which he has succeeded in tuning up to produce another 100 revs. Mr. Barnwell testing Vickers "scout." Lieut. P. B. Joubert de la Ferte in from Netheravon on Blériot. In the afternoon, Mr. Pixton for several flights on the 100 Sopwith, Mr. Knight on the 70 Vickers, Mr. Mahl for several flights on the 80 Sopwith, Mr. Waterfall on the Martinsyde, Mr. Alcock on the Maurice Farman, and a pilot "taxying" on a Perry Beadle biplane. Bristol, Vickers and Blériot pupils out. *Brevet* tests on Bristol biplanes by Lieut. Mills, H. Racine Jacques, Robert Lagrange (altitude 700). Wind, 0-14.

Blériot, Vickers, and Bristol pupils out on Saturday morning. Mr. Sippe on Bristol "scout" (Clerget engine), Mr. Pixton on Sopwith "scout," Mr. Barnwell on Vickers Blériot, Mr. Elsdon on Vickers Blériot, Mr. Alcock for an hour's flight on 100 Sunbeam, Lieut. P. B. Joubert de la Ferte testing two-seater Blériot, Mr. Waterfall on Martinsyde, Mr. Pixton left for Hendon at 10.30 a.m. on Sopwith Schneider Cup machine, and in the afternoon Mr. Sippe on Bristol "scout" and Mr. Alcock on 100 Sunbeam.

On Sunday, in dull weather and a fresh wind, Mr. Mahl made a number of flights with and without passengers, as also Mr. Waterfall on the Martinsyde (on which machine the winner of the ballot for the free passenger flight, Mr. A. C. V. Prior, of King's Bench Walk, Temple, had a trip across country), and Mr. Pixton on the Sopwith "scout."

Next Sunday afternoon, at 3.30 p.m., an interesting altitude handicap will be started, in which there will be competing three up-to-date biplanes of the "scout" type, namely Sopwith (Pixton), Vickers (Barnwell), and Bristol (Sippe), the 100 h.p. Vickers gun 'bus (Knight), the 120 h.p. Martinsyde monoplane (Waterfall), the 100 h.p. Sunbeam-engined Maurice Farman (Alcock), the 80 h.p. two-seater Sopwith biplane (Mahl).

On Whit-Monday there will be ten starters in the Cross-country Aeroplane Handicap, and a great struggle is expected between the pilots of the Bristol, Sopwith and Vickers biplanes of the "scout" type. Amongst the other starters will be Waterfall (Martinsyde), Alcock (100 Sunbeam), Knight (100 gun-'bus), Mahl (Sopwith two-seater), and Elsdon (70 Vickers).

Bristol School.—Full advantage was taken of the splendid weather during last week, over 220 flights being made at this school. Mr. Lagrange and Lieut. Mills both obtained their certificates on Friday evening, flying splendidly throughout, and Mr. Racine Jacques completed two-thirds of the tests for his *brevet*.

On Monday, pupils taken as passengers: Mr. Parker, Lieut. Richard (8), Mr. Chambers (12), Mr. Eastwood (5), Mr. Gresley (3). Pupils having control with pilots as passengers: Mr. Lagrange, Mr. Jacques, Mr. Chambers (2), Mr. Gresley (2). Solos by: Lieut. Mills (9), Mr. Lagrange (5), Capt. Walcot (5), Mr. Jacques (2), and Mr. Parker (5).

Tuesday, Jullerot and Stutt with Mr. Gresley (5), Mr. Eastwood (4), Lieut. Richard, and Mr. Chambers as passengers. Pupils controlling—Mr. Chambers, Lieut. Richard, Mr. Eastwood (2), Mr. Gresley and Mr. Lucas. Solos:—Capt. Walcot (6), Lieut. Mills (8), Mr. Parker (8), Mr. Lagrange (7), and Mr. Jacques.

Passenger tuition, Wednesday, to:—Mr. Lucas (4), Mr. Eastwood, Mr. Chambers (7), Mr. Gresley (3), Lieut. Richard (5). Solo flights by Lieut. Mills (3), Mr. Parker (3), Mr. Eastwood (3), Mr. Lagrange (3), Mr. Gresley and Mr. Lucas.

Mr. J. A. Liddell, who last week obtained his *brevet* on a Vickers biplane at the Vickers Flying School, Brooklands.

Thursday, Jullerot, Merriam, and Stutt, taking as passengers: Mr. Gresley (2), Mr. Chambers (3), Capt. Walcot, Lieut. Richard (4); afterwards sitting behind Mr. Chambers (5), Lieut. Richards (2), and Mr. Gresley (2). Solo flights by Lieut. Mills, Mr. Jacques, Mr. Eastwood (2), Mr. Lagrange, and Capt. Walcot..

Passenger tuition, Friday, to Mr. Chambers (3), Lieut. Richard (4), Mr. Eastwood, Mr. Gresley (2). Solo flights were made by Mr. Parker (2), Mr. Eastwood (4), Lieut. Mills (2), and Mr. Lagrange.

Saturday, solos by Capt. Walcot, Mr. Parker (2), Mr. Gresley (2), and Mr. Eastwood.

Vickers School.—Instructors for last week, Barnwell, Elsdon, Knight, Webb. Monday, with pilot, Major Phillips and Messrs. Parker, Wilson. Lieut. Wood-Smith and Major Phillips solos. Lieuts. Eberli and Tennant and Mr. Steinbach with pilot.

Tuesday, with pilot, Lieuts. Eberli and Tennant and Messrs. Parker, Collins, Wilson and Steinbach. Lieuts. Wood-Smith, Tennant, and Messrs. Collins and Wilson solos. Major Phillips for *brevet* in excellent style.

Wednesday, Lieut. Leighton solo. Lieuts. Wood-Smith and Leighton for *brevets*, both in splendid style. Lieut. Tennant with pilot.

Thursday, Lieut. Eberli with pilot. Messrs. Wilson, Collins and Steinbach solos. Lieut. Gillman and Mr. Parker with pilot.

Friday, Mr. Wilson and Lieut. Eberli with pilot. Messrs. Parker, Collins and Wilson solos.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Messrs. Robinson, Shepherd, Weber, Wyles, Boyesen, Carpenter, Howitt, Liu and Lowe, straights with Instructors Howarth, Lillywhite and Barrs. Major Piercy solo straights, circuits, &c., afterwards going in for and passing

18
GERMAN AIRCRAFT WORKS LTD LEIPZIG
FLIGHT

Lieut. Collet, of the Naval Wing of the R.F.C., in the pilot's seat of the 100 h.p. D.F.W. Arrow biplane, prior to his testing the machine on a long flight at Brooklands.

brevet tests. Cowley solo straights, Mr. Moore, figures of eight, &c., afterwards passing first and second part of *brevet* tests.

Tuesday, Messrs. Peck, Robinson, Shepherd, Palmer, straights with Instructor Howarth. Messrs. Carpenter, Lowe and Liu, straights with Instructor Birchenough. Messrs. Boyesen, Winter and Weber straights with Instructor Lillywhite. Mr. Howitt straights with Instructor Barrs. Mr. Moore going in for third part of *brevet* tests and gaining certificate.

Wednesday, Messrs. Wyles, Peck, Robinson, Shepherd, Weber, Winter, Boyesen, Carpenter, Cowley, Howitt, Liu, Palmer and Lowe straights with Instructors Howarth, Lillywhite and Barrs. Mr. Carpenter solo circuits. Mr. Howitt solo straights.

Thursday, Mr. Howitt solo straights and circuits. Messrs. Winter and Weber solo straights. Messrs. Boyesen, Liu, Peck, Tapps, Wyles, and Lowe straights with Instructors Lillywhite, Howarth and Barrs in passenger seat.

Friday, Messrs. Robinson, Shepherd, Tapps, Wyles, and Peck straights with Instructor Howarth. Messrs. Weber and Winter solo straights. Messrs. Lowe, Liu, Gruning, and Palmer straights with Instructor Barrs. Mr. Howitt solo circuits. Mr. Boyesen straights with Instructor Birchenough.

Saturday, Messrs. Peck, Robinson, Shepherd, Boyesen, and Liu straights with Instructor Howarth in passenger seat. Mr. Weber solo straights.

British Caudron School.—Monday, last week, the Caudron school was out at 5 a.m., under the instruction of W. T. Warren and R. Desoutter. Mrs. Buller doing straights. Rene Desoutter flight.

Tuesday, school at 5 a.m., under the instruction of W. T. Warren and R. Desoutter. W. T. Warren trial flight. Mrs. Buller doing straights with good landings. Mr. Macgregor doing straights and circuits in good style. Rene Desoutter flight.

At 5 a.m. Wednesday, school out under the instruction of W. T. Warren and R. Desoutter. Mrs. Buller doing straights and first circuits in good style. Mr. Macgregor doing circuits. W. T. Warren and R. Desoutter flight.

Thursday, school out at 5 a.m. under the instruction of W. T. Warren and R. Desoutter. W. T. Warren test flight. Mrs. Buller doing circuits. Mr. Macgregor doing circuits in good style. Rene Desoutter flight. Friday and Saturday windy.

Hall School.—Monday, last week, Miss Sophie d'Elsa and A. Charig straights on Penguin.

Tuesday, Miss Sophie d'Elsa, A. Charig, and Haines straights on Penguin. Rose taxying machine, tried to damage some palings.

Wednesday, J. Clappen instructing. Messrs. A. L. Brookes, A. F. Arcier, and H. Gearing eighteen straights each on No. 1 Caudron 10 to 50 ft. high; landings much improved. In afternoon, A. Charig on 25 Anzani-Penguin. In evening, A. F. Arcier after two good straights made two pretty circuits at 200 ft., landing gracefully. A. L. Brookes and H. Gearing four straights each.

Thursday, 5 p.m., J. Clappen and Virgilio instructing. A. F. Arcier one good straight and perfect landing, but had to give up owing to engine trouble.

During the week, every morning H. C. G. Allen has been making steady progress on his 35 h.p. Anzani-Blériot with neat landings. Mr. Clappen was out testing the school Deperdussin but a cyclinder blew off and alighted on one of the wings.

Some fine specimens of banking on the 100 h.p. D.F.W. all-steel Arrow biplane, when being flown recently by Lieut. C. H. Collet, of the Naval Wing of the R.F.C. at Brooklands.

EDDIES.

It was a great pity that the weather should have got a fit of sulkiness on Saturday last and thereby prevent the flying of the Aerial Derby round London, but in this case as in so many others the truth of the old proverb: It is an ill wind, &c., holds good, for the postponement of the race may enable some of the entrants who had scratched on account of not being able to get their machines finished in time, to be ready for the race on June 6th.

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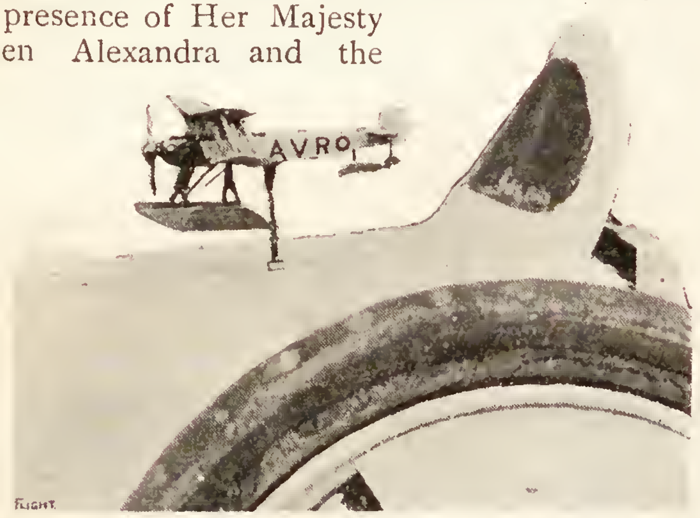
Congratulations to Frank Goodden for the masterful loops which he executed at Hendon on Saturday last, in the presence of Her Majesty Queen Alexandra and the Dowager Empress of Russia. In spite of the strong wind which was blowing at the time, the loops were some of the cleanest it has ever been my good fortune to see. The little Caudron showed no uncertainty as to whether it should pass the top of the curve or do a tail slide, or simply flap out of the top of the circle, it calmly completed the circle without any undue deceleration on the upward path, and with no feverish haste to reach its normal position on the downward portion of the curve.



An Avro mascot on a car at Hendon on Aerial Derby Day.

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Sydney Pickles, in accordance with his intention to continue his flying more as an amateur, is sending his Blériot monoplane up to Leeds where he proposes to establish his headquarters. I should very much like to see other sportsmen follow his example, for aviation as a sport can now, I think, compare not unfavourably with other branches of sport both as regards safety and expense, and certainly as regards the amount of enjoyment to be got out of flying a machine for the sport of the thing.

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It was a revelation to me on a recent visit to Cowes to see the way in which Mr. Gordon England handled the Wight seaplane, both on the water and in the air. He repeatedly made complete circles on the sea of certainly not more than 30 feet in diameter and took the machine off with less fuss than many a car driver exhibits when changing gears and letting in his clutch. Of course, Mr. Gordon England, with typical modesty, disclaimed any credit for the extraordinary performances of the 'bus, which he puts down to excellence of design. At the same time Mr. Howard Wright, its designer, I think has been fortunate in securing Mr. England to demonstrate the excellent Wight machines.

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The method employed in getting the Wight seaplane out of and into the harbour is one of the neatest I have seen. The very strong tide makes it somewhat risky to navigate the machine under her own power among the numerous craft anchored or passing, and so as an extra precaution she is towed or rather guided behind a motor boat into open water. A rope is taken from the lower end of each front float strut to the motor boat and the engine of the machine is kept running just sufficiently fast to give the machine the same speed as that of the boat, and in this manner the great seaplane is manœuvred with surprising ease in and out of the harbour. On reaching open water the tow ropes are cast off, Mr. England opens out the throttle and in less time than it takes to describe it the machine is off. Once in the air there is very little to do, for she is so perfectly balanced that she practically takes care of herself. Mr. England nonchalantly leans back in his seat resting his elbows on the gunwales of the *nacelle* while he has a look at the exceptionally fine view spread out below him. Practically all he has to do is to steer in the direction in which he wishes to go. The speed is regulated as in a motor car by closing or opening the throttle without any attention to the elevator whatever. Whether going at 35 or at 79 m.p.h. the Wight remains on an even keel without any necessity for keeping her nose down when going all out and without flying cabre when doing her lowest speed.

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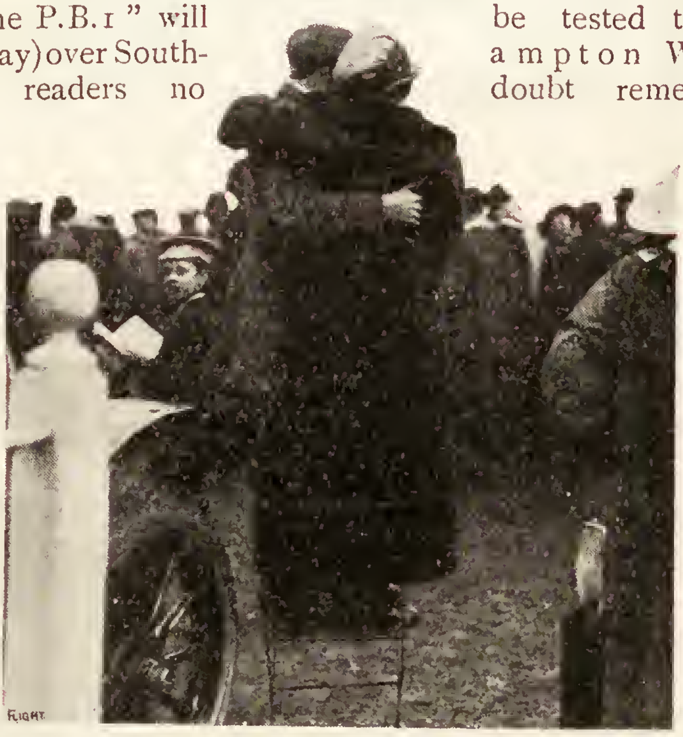
Mr. Pemberton Billing, whom I hurriedly interviewed at Hendon on Saturday last, informs me that "Supermarine P.B.1" will be tested to-day (Friday) over Southampton Water. Our readers no doubt remember P.B.1, which was exhibited at last Olympia Aero Show. At that time it had the engine placed in a casing above the boat and in front of the main planes. This arrangement, I learn, has been altered, and the engine is now arranged inside the boat, just behind the pilot's seat, and drives, by means of chains, the two propellers which are placed behind the main planes.



Aerial Derby Day at Hendon.—Making the best of being unable to get a front seat.

Mr. Pemberton Billing hopes to obtain with P.B.1 some very valuable data for a newer type he has designed, and which is, he assures me, absolutely *le dernier cri* in seaplane construction. At present he does not wish any of the details to be made public, but I will take the chance of incurring his wrath by whispering that the boat, engine and propeller, and pilot's seat form a unit which can be instantaneously detached from the main planes, and used as a high speed motor boat.

Mr. E. R. Whitehouse, who has lately been flying the Curtiss flying boat, informs me that Messrs. White and Thompson of Middleton, Bognor, are now busily engaged on the construction of a new flying boat for this year's *Daily Mail* waterplane flight round Britain. This machine, I understand, will be fitted with two Curtiss engines (British built, of course), each of which will drive a separate propeller. In other respects the new machine will follow fairly closely standard Curtiss practice.

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It appears that Mr. Fowler's establishment at Eastbourne is in a fair way to become "the road to success," for not long ago one of Mr. Fowler's pupils, Mr. Thornely, secured an engagement to give exhibition flights in Germany, and now I learn that Mr. E. L. Gassler, who has been acting as designer and pilot for the Eastbourne Aviation Co., is leaving shortly, and that we may expect to hear of him in connection with a large, well-known English firm. Good luck to him!

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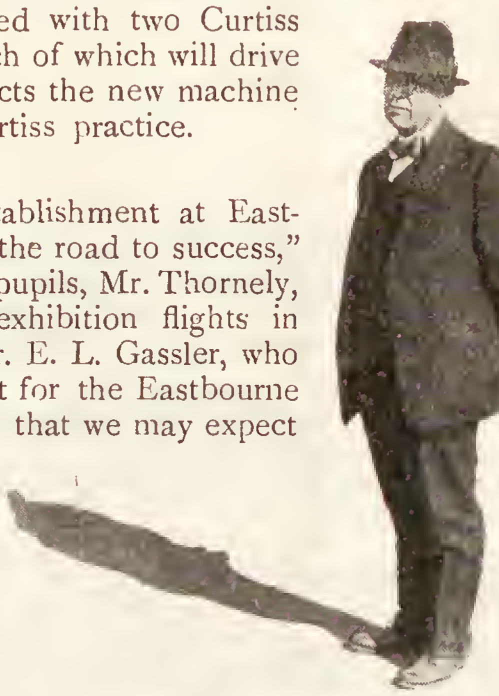

Professor Baldwin in the sun.

No doubt there are some of our readers who remember the time—long before the days of aeroplanes—when Capt. Thomas S. Baldwin made those exciting parachute descents at the Alexandra Palace. I cannot say off-hand how long ago it was, somewhere about the early 'eighties I think, but anyway, Hendon received a visit from the self-same Baldwin—who is, by the way, the designer of the Baldwin "Red Devil" biplanes and other machines that have been flying with success in America—on Thursday and Saturday of last week, where he saw an aerial show vastly different from the one he himself took part in afar back. As he said, "Gee, but things have changed some." Yes, and they have changed in the parachute line as well, according to his account of the shows they give "over there" now. What they do is this: The parachutist ascends in a hot air balloon with eight parachutes packed one on the top of the other, and as the descent is made these are cut free one after the other until he is ultimately supported by the last of the series. It is intended to increase the number of parachutes to ten in future displays. I should have thought the risk of one parachute not opening was bad enough, but ten! Well, I should call it "some nightmare."

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I understand that Capt. Baldwin is not over here entirely on pleasure bent, but has some business in hand in connection with an aviation concern that is to be started on a large scale in America under the name of the Connecticut Aviation Co. The trouble with the Wright patents will not affect this concern, as Baldwin informs me that he holds the Wright license and intends to "sub-let." Beyond this I could not get any further information, so we must "wait and see." I hope Capt. Baldwin was impressed with our attempts at aviation over here, and that he will not take too many of our pilots away with him, for he says he has his eye on several of our crack flyers and hopes to send them across the Atlantic to be made a fuss of.

"ÆOLUS."

GUSTAV HAMEL.

It is with profound regret that we have been forced to the conclusion, as we state elsewhere, that Mr. Gustav Hamel came to an untimely end during his Channel trip which he started on Saturday morning last. Briefly the record of his movements shows that Hamel left Villacoublay at 4 40 a.m. on the new Morane monoplane with 80 h.p. Gnome monosoupape engine with which he proposed to compete in the Aerial Derby last Saturday afternoon. At 5.22 he reached Le Crotoy, and having breakfasted, he left at 8.30 for Hardelot, where he landed half an hour later. There he rested for a couple of hours, then had a light lunch, filled up the fuel and oil tanks of his machine, and left Hardelot at a quarter past 12. From that time nothing is known of the airman's movements, although the Cross-Channel steamer "Riviera" reported seeing an aeroplane flying in mid-Channel on Saturday afternoon.

Hamel was one who had done very much for the cause of aviation in this country. The son of a well-known English surgeon and a clever motor driver, it was not surprising that aviation should attract him. Having studied the question in France, he set to work and qualified for a French certificate on a Morane monoplane on February 3rd, 1911. Returning to England he repeated the necessary tests on a Blériot monoplane, and obtained a British certificate on February 14th, 1911. He quickly showed that he was master of the Blériot type of machine, and he was selected to pilot a Blériot racing monoplane in the Gordon-Bennet race at Eastchurch, in July, 1911. It will be recalled that on the morning of the event, a trial flight showed that the machine was slightly slower than some of his rivals' mounts. With the object of augmenting the speed, M. Blériot decided to shorten the already very small wings, but, in the race, when rounding the first pylon, Hamel's machine side-slipped to the ground, no doubt owing to his taking too sharp a turn. The pilot was fortunately thrown clear and escaped with very severe concussion.

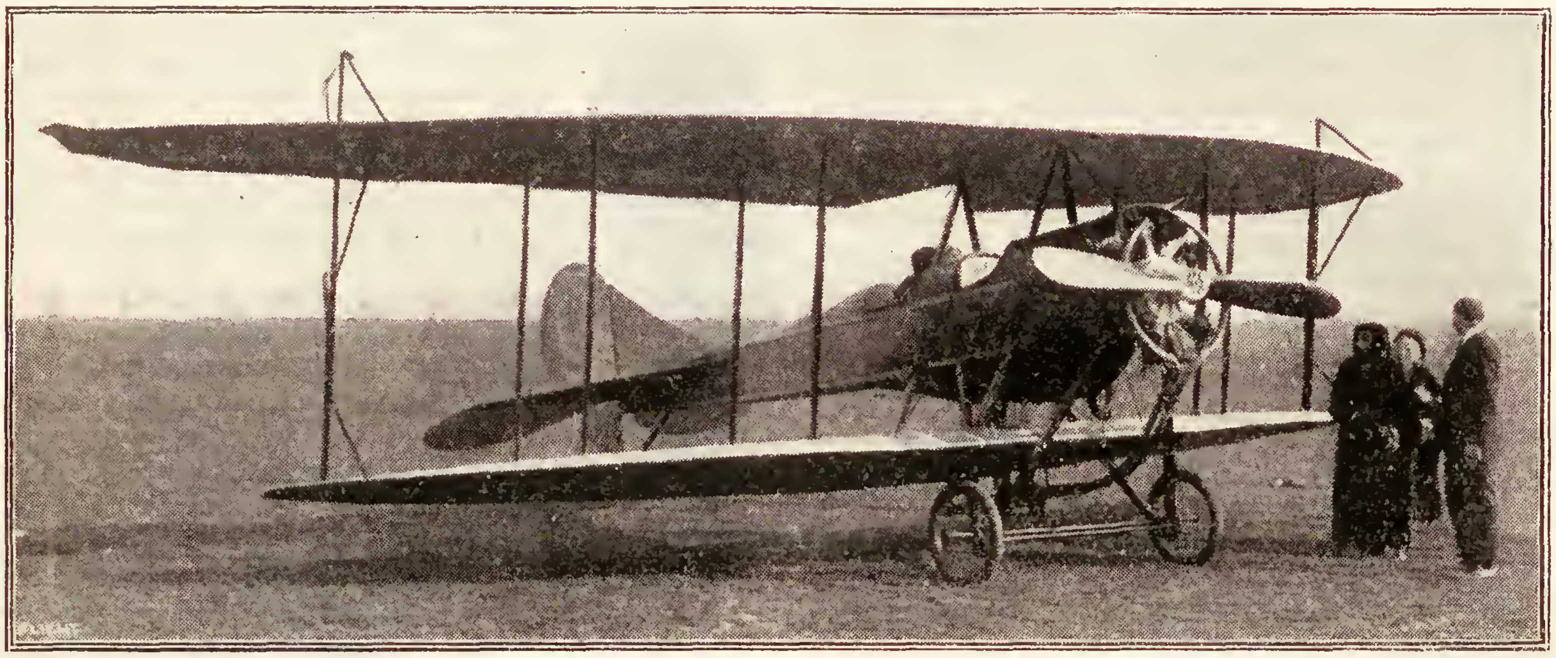
In July he took part in the Circuit of Britain, and after a good deal of engine trouble he was forced to retire at Dumfries. In the following September he took the principal part in the aerial post between Hendon and Windsor, flying in spite of the high winds. In the Aerial Derby of 1912 he secured the second place, last year seeing him a very popular winner of the event, whilst he was the favourite for the race which was to have been held last Saturday, the day of his disappearance. Of his many Cross-Channel trips, one of the most outstanding was that made in the course of his flight from Dover to Cologne on the Blériot machine which was subsequently presented to the New Zealand Government.

In a match against Hucks over a course round Birmingham last August, Hamel secured a victory by a narrow margin. He won several races at Hendon, and his flying there and at Brooklands was always highly popular, especially since last November, when he added looping the loop on the Morane to his accomplishments, and he had the honour of twice being commanded to "loop" before the King at Windsor.

CROSS-CHANNEL ON THE HANDLEY PAGE BIPLANE.

THE merits of the Handley Page biplane, with 100 h.p. Anzani motor, were strikingly brought out in the flight which was made on Thursday last by Mr. W. Rowland Ding, with Princess Ludwig of Lowenstein-Wertheim, from Hendon to Calais. He left Hendon Aerodrome at 7.40 a.m., and reached Eastbourne at 8.45 a.m. After waiting for the fog to clear in the Channel, he left Eastbourne at 3.30 p.m., and flying to Dover flew across the Channel in the record time of 15 mins., and landed at Calais at 4.20 p.m. There the Princess joined the train and went on to Paris. The next day Mr. Ding left Calais at 8 a.m. and flew across to Staplehurst, in Kent, after having a rather nasty moment in the channel, as for a few moments the engine hesitated and the machine began to glide down. However, the engine picked up all right and flew safely through to Staplehurst. Here he had breakfast and filled up the aeroplane's tanks with petrol. He arrived safely at Hendon at 11.30 a.m.

It will be recalled that Mr. Ding only obtained his pilot's certificate on April 28th, and these were his first long cross-country flights.



Mr. Rowland Ding in the Handley Page biplane, with Princess Ludwig of Lowenstein-Wertheim in front, just before their departure from Hendon to fly across the Channel, *en route* for Paris.

On Tuesday, Mr. Ding set off from Hendon for Bath about 5 a.m., but owing to his compass going wrong he found himself over Southampton Water. Turning to the north-west he got to Salisbury Plain, where he made a landing. Later he flew over to Bath in 22 mins.

* * * *

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending May 23rd, 1914 :—

No. 2 Squadron.—This Squadron remained at York till Friday, 22nd, on which day it moved to Lincoln, where all the machines, mechanical transport and personnel arrived by the scheduled time. The Squadron has been delayed at Lincoln to-day owing to continuous heavy rain. It will move to Northampton on Monday, and thence to Netheravon *via* Oxford.

All ranks are gaining very valuable experience from this progress by stages under service conditions, from Montrose to Salisbury Plain.

No. 3 Squadron.—Over 2,000 miles were covered during the week in reconnaissance flights. Observation and direction or artillery fire was successfully carried out.

No. 4 Squadron.—The pilots of all three "Flights" were out daily engaged in reconnaissance work over Salisbury Plain and the surrounding district.

No. 5 Squadron.—Several long cross-country reconnaissances were made, including flights to and from Bath and Brighton.

No. 6 Squadron.—All the pilots of this Squadron were out every day on B.E., R.E. and M. Farman machines practising reconnaissance work.

Nos. 1 and 7 Squadrons.—Steady progress was made with the foundation of these new Squadrons at Farnborough. A certain amount of flying was carried out, and also instructional work on aircraft and engines.

Headquarter Flight.—Experimental work with aeroplanes and kites was continued.

Aircraft Park.—The Flying Depôt will in future be known as the Aircraft Park. This unit has been occupied with repair work to aircraft and M.T., with special courses of instruction, and with the technical training of recruits.

General News.—1. On Tuesday, the 19th inst., Their Majesties the King and Queen, accompanied by Princess Mary, the Chief of the Imperial General Staff, Sir Douglas Haig, General Officer Commanding-in-Chief Aldershot Command, and their suite, visited the Royal Flying Corps (Military Wing). His Majesty inspected the recruits, the workshops, and M.T. sheds and the aircraft. 25 machines were paraded for inspection; they ascended in turn from Jersey Brow and landed on Farnborough Common, after making a circuit of the aerodrome.

Photographs of the inspection were taken from a Henry Farman at 2,000 ft., and the prints were handed to Their Majesties at the conclusion of the inspection. His Majesty was in wireless communication with a B.E. At the conclusion of their visit to the Military Wing, Their Majesties visited the Naval Airship Detachment, and later the Royal Aircraft Factory.

2. The funeral of the late Lieut. J. Empson took place at Blacktoft Church, Yorkshire, on Wednesday last, and that of Air-Mechanic R. G. Cudmore at Manchester on the following day. Strong detachments from No. 2 Squadron attended both funerals. Lieut.-Colonel F. H. Sykes, Commanding the Royal Flying Corps, Military Wing, and representatives from the War Office and other squadrons of the Military Wing were also present.

Col. Seely's Flights.

REPLYING to a question put in the House of Commons by the Marquis of Tullibardine, as to whether Col. Seely recently took charge of an Army aeroplane, on which he was passenger, when in the air, and for which he claimed automatic stability, or whether the pilot still exercised foot control.

Mr. H. Baker, of the War Office, said that the reply to the first part of the question was in the affirmative, and to the second in the negative.

The Aerial Picnic.

IN spite of the wretched weather the picnic arranged by the Association Amicale des Aviateurs for Sunday last was a great success, thirteen machines being flown over to the rendezvous, Chartres. Those taking part were Fourny (M. Farman) with Derome as passenger from Etampes, Leblanc (Blériot) with A. Guymon, Giraud (Blériot) with Max Bruyere, Comte de Larienty Tholozan (Blériot), Senator Reymond (Blériot), M. Farman (M. Farman) with Barbaroux, Bille (H. Farman), Auger (M. Farman) with Senoucques, Molla (R.E.P.), Marquis de Larienty Tholozan (M. Farman), all from Buc, Mahieu (Voisin) with two passengers from Chateaufort, Bonnier (Nieuport) with Mme. Bonnier from Villacoublay, and Lenoir (Blériot) from Juvisy. After the picnic several of those taking part indulged in some fancy flying before one and all returned to their starting points.

THE FLYING MACHINE FROM AN ENGINEERING STANDPOINT.

By FREDERICK WILLIAM LANCHESTER, M.Inst.C.E.

(*Continued from page* 556.)

In the first place, each aspect ratio should be explored by a number of determinations using aerofoils of varying camber; secondly, the aerofoil section must not be uniform from end to end, the section must be "graded," or, as it is sometimes expressed, the camber must "wash out" at the extremities. Beyond this, not one series must be tried but some dozen or more. The final "winner" for each aspect ratio is the aerofoil of greatest lift/drift.

In my opinion, in the present unsatisfactory state of things, it is best (so far as the pressure constant is concerned) to assume a uniform value for all values of aspect ratio, say that given as appropriate to aspect ratio = 6 in the Table IV. Whether we consider the N.P.L. result as valid or not, the salient fact is that we have at present no sufficient evidence that there is any change in the pressure constant worth taking into account. Alternatively we are not going far astray if we assume aerofoil pressures equal to half the pressure on the normal plane, as shown in Fig. 18.

The most important fact with which we are immediately concerned in connection with the theory of least resistance is that the total aerofoil resistance for least value is almost constant in respect of velocity; in other words, provided that we design for least resistance, we know our traction coefficient in advance; it is virtually a constant, just as though the problem were that of an automobile required to ascend a hill of known gradient—an analogy which comprehends the fact that there is the direct wind resistance or body resistance additional in both cases. This constant is only within control, inasmuch as by careful design the effective value of the coefficient of skin friction, ξ, can be kept down, and a high aspect ratio adopted. Theoretical values of least gliding angle (that is to say, resistance coefficient), tabulated for values of ξ and aspect ratio, are given in Table V. (From *Aerial Flight*, vol. i, p. 262.) It is of some interest to enquire to what extent these results are in agreement with modern experiment.

TABLE V.—*Least Gliding Angle* ($=\gamma_1$) (*Theoretical*).

n.	ξ=0·025.		ξ=0·02.		ξ=0·015.		ξ=0·010.	
3	6·25°	1 : 9·2	5·6°	1 : 10·2	4·8°	1 : 12	3·95°	1 : 14·5
4	5·75°	1 : 10	5·15°	1 : 11·1	4·4°	1 : 13	3·65°	1 : 15·7
5	5·3°	1 : 10·8	4·75°	1 : 12	4·1°	1 : 14	3·4°	1 : 16·8
6	5·0°	1 : 11·5	4·5°	1 : 12·8	3·9°	1 : 14·7	3·2°	1 : 17·9
7	4·7°	1 : 12·2	4·25°	1 : 13·5	3·6°	1 : 15·9	3·0°	1 : 19·1
8	4·5°	1 : 12·8	4·0°	1 : 14·4	3·4°	1 : 16·8	2·8°	1 : 20·5
...	...	...	...	...	...	...	...	...
10	4·1°	1 : 14	3·65°	1 : 15·8	3·2°	1 : 17·9	2·6°	1 : 22
...	...	...	...	...	...	...	..	...
12	3·8°	1 : 15	3·42°	1 : 16·8	3·0°	1 : 19	2·4°	1 : 23·9

I have collected experimental data from various sources; a series of aerofoils of Blériot section—(Report of the Advisory Committee, 1911–12, p. 75),—aspect ratios vary from 3 to 8. Determinations of Voisin wing by Mr. Eiffel, aspect ratio 6·3. Aerofoil "R.A.F. 6," aspect ratio 6. Aerofoils from my 1894 model, aspect ratio 13·3, Fig. 16, independent determinations by N.P.L. and Göttingen Laboratories. The above are given in Table VI; columns 1, 2, and 3 give the aspect ratio, type and authority respectively; column 4 gives the experimental determination, and my theoretical values are given in columns 5 and 6 for values of $\xi = 0·02$ and $\xi = 0·015$. Table VI is shown plotted in Fig. 19, the relation of aspect ratio to lift/drift being represented by curves drawn through the observed and calculated values.

TABLE VI.

1. Aspect Ratio.	2. Type.	3. Determination by	4. Experimental.	5. Calculated ξ=0·02.	6. Calculated ξ=0·015.
3·0	Blériot section	N.P.L. ...	10·1	10·2	12·0
4·0	,,	,, ...	11·5	11·1	13·0
5·0	,,	,, ...	12·9	12·0	14·0
6·0	,,	,, ...	14 0	12·8	14·8
6·0	R.A.F. 6 ...	,, ...	14·5	—	—
6 3	Voisin... ...	Eiffel ...	14·0	—	—
7·0	Blériot section	N.P.L. ..	15·1	13·5	15·9
8·0	,,	,, ...	15·5	14·4	16·8
10·0	—	—	—	15·8	17·9
12·0	—	—	—	16·8	19·0
13·3	Author, 1894	N.P.L. *...	17·1	—	—
		,, *...	17·6	—	—
		,, †...	20·0	—	—
		Gottingen‡	16·4	—	—
		,, ‡	17·3	—	—

* Velocity 30 ft. per sec. † Value at 50 ft. per sec. (computed by N.P.L.).
‡ Velocity not stated.

It will be noted on referring to Table VI and Fig. 19 that the agreement is almost complete. The two cases of the Eiffel determination of the Voisin aerofoil and the R.A.F. 6 aerofoil are shown as outlying points, not being fully in agreement with the main run of the remaining experimental determinations; it will be noted, however, that the whole of the experimental values lie between the two adjacent theoretical curves given, and the general form of the experimental curve corresponds to the curves given by my equations. It is true that there is something in the nature of the hump on the experimental curve, the extremities of which correspond to a double surface coefficient of skin friction of 0·02, whereas the central part of the curve round about aspect ratio = 6 rises nearly to the upper curve. This peculiarity of angular character of the curve may be a real feature, but I am disposed to think that is more probably due to the fact that a great deal more experimental work has been done in the region of the hump of the curve and so more highly perfected forms have been available than for aspect ratios of greater or less value. It would appear probable that if equal diligence were displayed in designing and testing forms of other aspect ratios the upper theoretical curve ($\xi = 0·015$) would be found to be very close to the truth; some confirmation of this is found in the fact that the best value for the R.A.F. 6 aerofoil, a form that had been subject to considerable study both by the R.A.F. and the N.P.L., lies considerably above the curve representing the run of other observations.

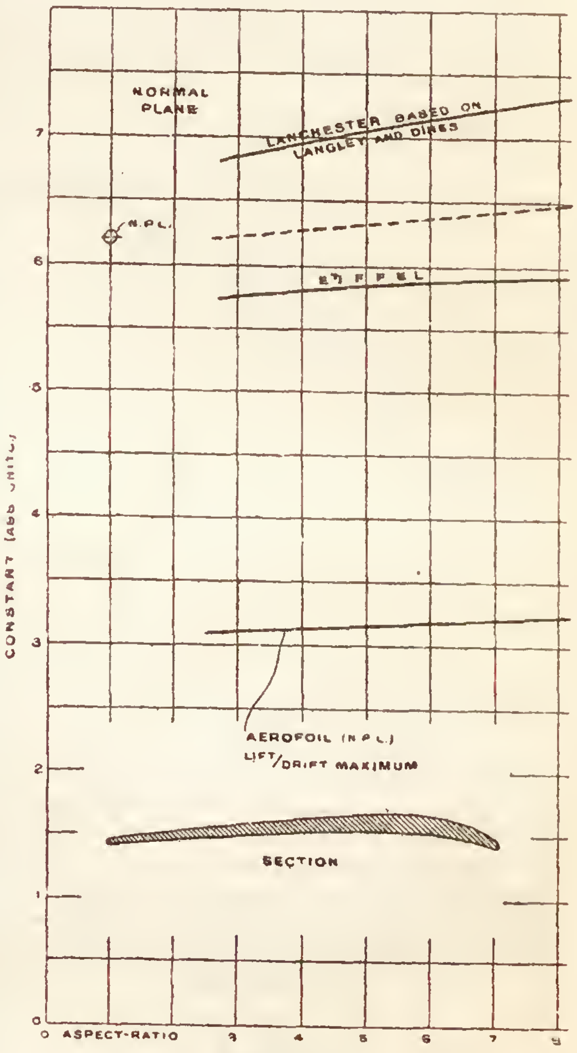


Fig. 18.

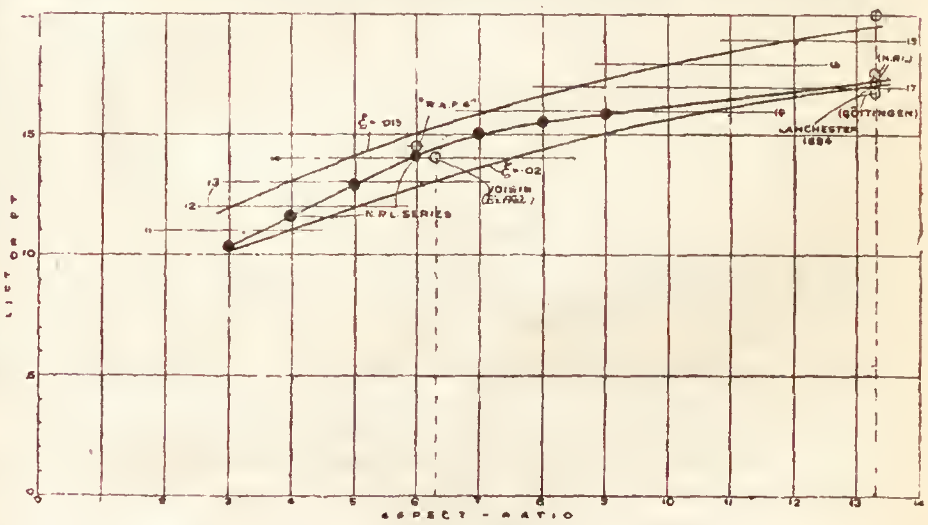


Fig. 19.

In the N.P.L. report to me on the tests of my 1894 model, it is stated that if it had been found possible to employ a velocity of 50 feet-seconds instead of 30 feet-seconds, the figure obtained would probably have reached the neighbourhood of 20. This value is also plotted as an outstanding point in Fig. 19.

(*To be continued.*)

THE DEVELOPMENT OF THE AEROPLANE.*

By DR. R. T. GLAZEBROOK, F.R.S., F.Ae.S.

In the first part of his lecture, the author, with the assistance of lantern slides, gave a brief account of the development of the aeroplane, from Henson's machine, which was designed in 1842 and never constructed, to the Santos Dumont aeroplane of 1906; and then proceeded to deal with the work of experiment and scientific research conducted at the N.P.L., demonstrating that an extraordinarily high order of accuracy is attained, and that the results obtained correspond with almost mathematical exactness when the observations are made in either of the two existing wind-channels by different observers.

The second section of the lecture was devoted to the consideration of laws connecting the forces on the model with those upon the model itself—the laws of similarity. The lecturer observed that experiment had proved that the force on a surface due to the wind was not proportional to the square of the speed, but that the lift/drift and the lift coefficient increased with increase in speed (*see* Figs. 1 and 2). Lord Rayleigh, however, had called attention to the fact that if K in the expression for wind pressure—KSV^2—be not constant, it must depend upon the quantity $(LV \div v)$ where V is the velocity of the current, L some linear dimension of the surface, and v is the kinematic viscosity of the air. Hence, if the values of K as found for an aerofoil in a given position but for different values of the velocities are plotted against LV, the points ought to lie upon a smooth curve, and the form of this curve will determine K as a function of LV. This was illustrated in Fig. 3 where the values of the lift/drift ratio are plotted against LV (or rather, for convenience, against log LV) for the series of experiments shown in the preceding curves—the points on the line marked "Full Size Aerofoil" being taken from the results of experiments at the Aerodynamical Laboratory of the University of Paris on full-sized aerofoils of the same design as the models used in the preceding experiments, which were made to a $\frac{1}{18}$ scale. It will be seen that the values for the coefficients found from the 50 feet per sec. observations in the channel do not differ greatly from those belonging to the actual machine.

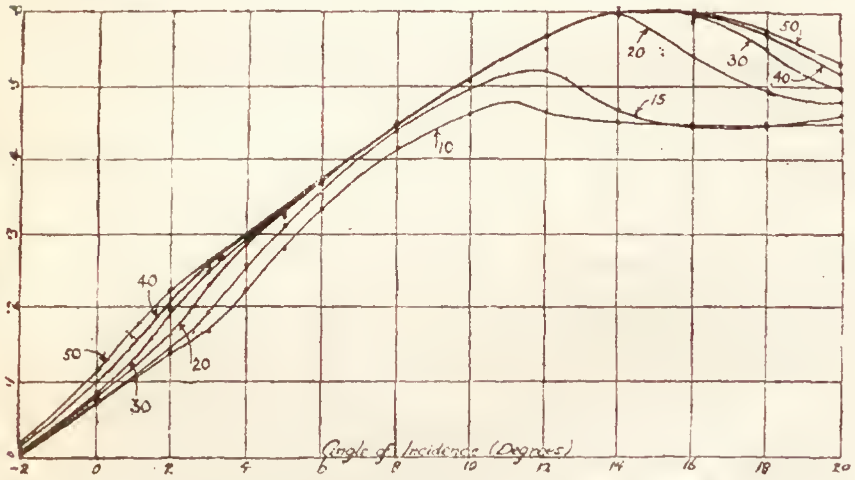


Fig. 1.—Variation of lift coefficient of a model aerofoil with changes of speed.

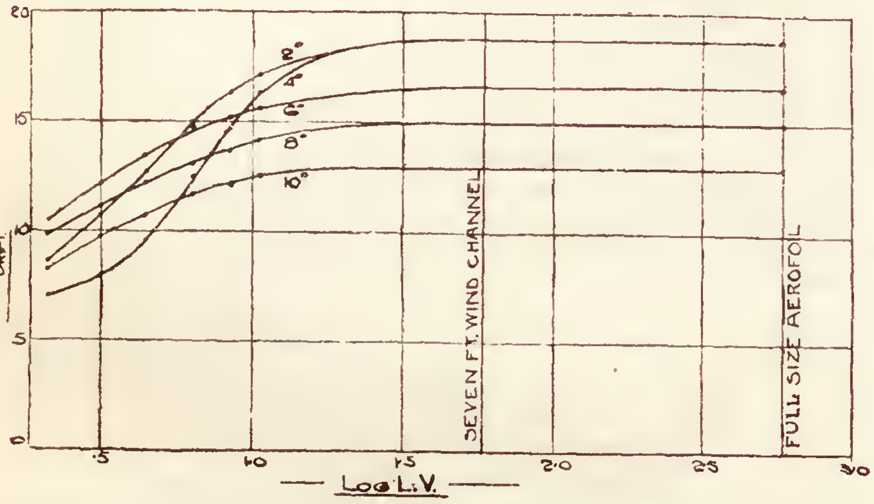


Fig. 3.—Variation of lift/drift with LV, where L is the length of chord in feet and V is the velocity in feet per second.

Dr. Glazebrook next considered the problem of the *Stability of Aeroplanes*, remarking that it was most complex, and depended on finding an expression for the energy of the machine in any position, in terms of the velocity of its centre of gravity along the axes of reference and of the angular velocities of its centres of the machine about these axes. This expression involved a number of constants, quantities which depend on the shape and dimensions of the machine, not on its motion. If we know the energy, values can be found for the forces and moments on the machine—these involve the same constants—and the equations of motion can then be formed. Their solutions can be obtained at any rate in certain cases of importance, but to utilise the results we require to know the numerical values of the constants just referred to and to determine these we must have recourse to the model experiments. By means of the balance the forces on the model can be measured; these forces can also be expressed in terms of the constants, and the wind velocity, and hence we can find certain of the constants applicable to the aeroplane considered. Further experiments of a somewhat different character are required to determine the values of the rest of the constants or coefficients in the energy expression—the rotary derivatives, as they are called; but by means of the model experiments all these can be found, and on substituting the values in the equations of motion, the nature of the motion can in many cases be determined by the solution of the equations.

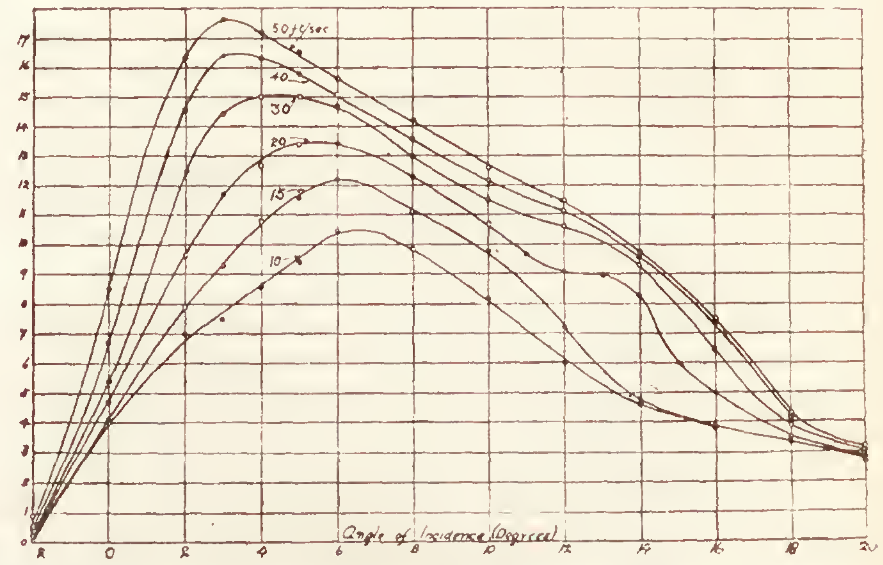


Fig. 2.—Variations of lift/drift of a model aerofoil with changes of speed.

In determining the stability coefficients a model is supported in the channel in various positions relative to the direction of the air current and the forces measured; the axes or direction of reference are taken as shown in Fig. 4. The angle of pitch is positive when the nose of the machine rises, the angle of yaw is positive when the machine turns to the right, and the angle of banking which properly accompanies this turn to the right will also be positive.

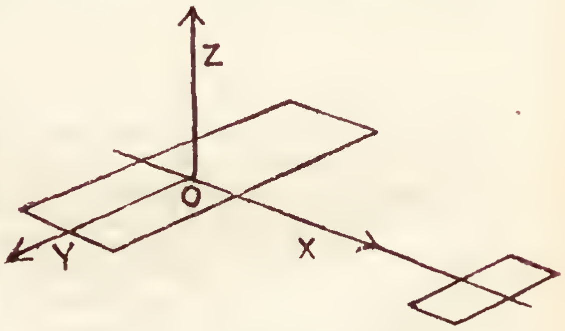


Fig. 4.—Axes of reference.

Fig. 5 gives the forces and moments which are produced in the plane of symmetry when the attitude of the machine to the wind changes, but without yawing, while in Fig. 6 are shown the forces and moments produced by yawing without altering the angle of pitch, so that the flight is horizontal. The wind speed for which the forces are given is 30 ft./sec. Starting from zero pitch angle the longitudinal force falls as the angle of attack is increased, reaches a minimum at about 8°, and then rises again rapidly. The normal force increases regularly as the angle of attack increases, while the pitching moment increases in amount but is negative, that is to say, it tends to reduce the angle of attack. The machine is stable longitudinally, so far as pitching moment on it is concerned, but further investigation is required before the motion can be completely determined. Turning now to Fig. 6 we see that as the angle of yaw increases the longitudinal and normal forces are somewhat reduced though the changes are not at first large, but a considerable negative lateral force is brought into action, if the machine turns to the right the side force is from left to right, the machine side-slips in the direction in which it is turning. There is a yawing couple N which is negative, *i.e.*, tends to reduce the angle of yaw and turn the nose of the machine into the wind, at the same time a positive rolling moment L is produced, the machine tends to bank as required for the turn, and also at first we have a positive pitching moment M, the angle of attack is increased, and the nose of the machine rises.

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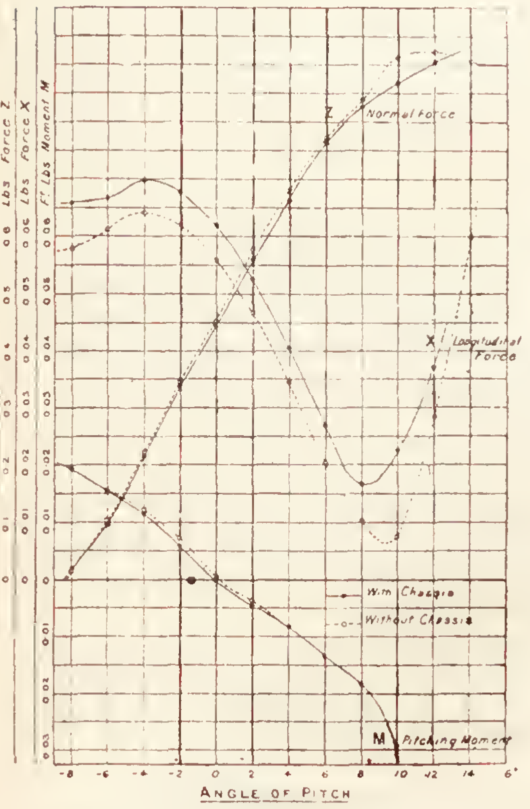
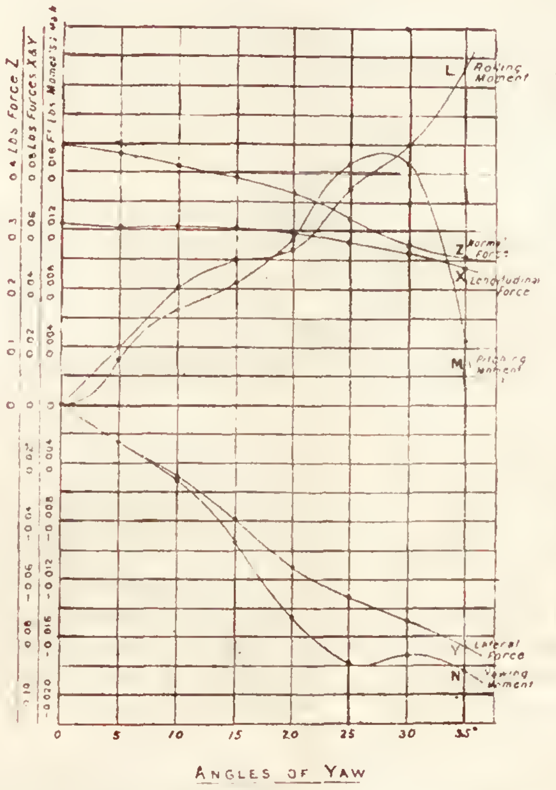
* Digest of the Wilbur Wright Memorial Lecture, delivered before the Aeronautical Society on 20th inst.

Fig. 7 gives the curves of pitching moment of a biplane model for various settings of the elevator in the tail, the wind speed in this case being 40 ft./sec. Without the tail plane the angle of attack for horizontal flight would be slightly negative, but the machine in this state would be unstable, any increase or decrease in the angle of attack causes a moment tending still further to increase or decrease the angle respectively and so to disturb the machine. With the tail plane the machine flies though with no great longitudinal stability when the elevator is not raised. The effect of raising or lowering the elevator is shown in the curves. Positive angles correspond to an elevation of the elevator tending to raise the nose of the machine.

Curves were then given in which the longitudinal moment about the c.g. was plotted against the inclination of the machine to the wind. These indicated that the effect of the tail on the longitudinal balance is much less than would be anticipated if it were supposed that the air current is not deflected by the main planes and is free to act on the tail as though the main planes were absent—the moment as measured being only one-half of that calculated on the latter assumption. This required further investigation.





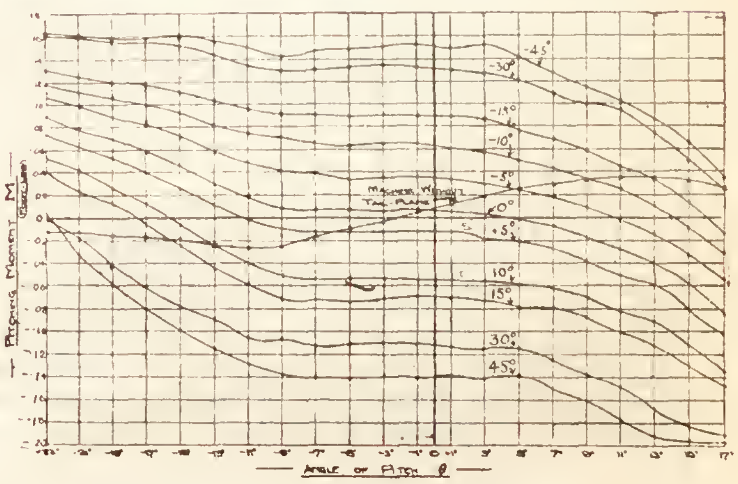


Fig. 5.—Variation of forces and moments on model Blériot type monoplane with angle of pitch. Fig. 6—Ditto with angle of yaw. Fig. 7.—Pitching moment for complete machine.—Wind speed 40 ft. per second.

So far it had been supposed that the aeroplane is in steady flight in a uniform wind. The author next dealt with some aspects of disturbed flight in a non-uniform wind. He said in the first place we may deal separately with the motion of the machine in the vertical plane of symmetry, the longitudinal motion, as it is called, and its lateral motion or motion perpendicular to that plane. If the longitudinal motion be slightly disturbed and the machine be stable, two kinds of oscillations are set up; one kind consists of rapid oscillations, both of the machine about its centre of gravity and of the centre of gravity itself. Ordinarily, in a stable machine, these are quickly damped down and give no trouble. But besides these the centre of gravity of the machine itself describes an undulating path; the period of these undulations is much longer than in the first series, though for a stable machine the amplitude of the oscillation is gradually reduced and the machine, if no other changes have been made, gradually recovers its normal flight path. Mr. Lanchester has called these slower oscillations the phugoid oscillations. If the machine is not stable, when disturbed from its normal path, its motion will diverge more and more from the condition of steady flight, and this divergence may take place continuously or it may happen that a series of oscillations of increasing amplitude is set up which ultimately become so large as to cause disaster. It is not possible to predict exactly what will happen in a given case without a knowledge of the relative values of the constants or coefficients already referred to, but if these be known the equations can be solved numerically and the details of the flight can be predicted.

We can go further than this, as Mr. Bairstow has shown in the beautiful model experiments he carried out recently before the Society, and determine the alterations which must be made in the machine to produce modifications in the conditions of its flight.

Now we have already seen in Figs. 5 and 6 the curves of forces and moments from which the constants can be determined for the model monoplane which has been exhibited. Mr. Bairstow and Mr. Nayler have recently determined the coefficients for this machine and used it to determine its motion under a variety of circumstances, and I propose to give some account of their results.

Let us suppose that the machine is flying horizontally against a uniform wind, and at a certain moment the horizontal velocity of the wind changes by a known amount, u_0 say, and remains permanently at its new value. Fig. 8 gives the solution of our problem; the longitudinal motion only is affected and the results on the components of this motion are shown in the curves. The quantities we have to deal with are u, the change in the horizontal velocity relative to the surrounding air; w the normal velocity, θ the pitch angle or angle of attack, and q the angular velocity of the machine in the plane of symmetry.

At a certain moment the velocity of the wind changes by an amount u_0. At that moment, therefore, the velocity of the aeroplane relative to the air is increased by an amount u_0, but this increase rapidly dies away, and after five seconds has become zero; the velocity goes on decreasing for five seconds more, and at the end of some ten seconds has reached its minimum value, which is less than the original steady value by about $\frac{1}{2}u_0$. The velocity then increases again for some ten or eleven seconds and the changes follow a regular periodic curve of rapidly decreasing amplitude, and after some 40 or 50 seconds are completely damped out. Dealing next with w, the normal velocity, we find it starts from zero, but rises rapidly in a fraction of a second to its maximum amount, about 0·2 of u, and then dies away rapidly in the same manner as u.

The angular velocity q is small, so small that the curve is drawn to give 100 times q, and this follows practically the same law as w, while θ, the pitch angle, increases for five seconds and then decreases to pass through periodic changes of decreasing amplitude and of about 22 seconds period.

The motion is stable; the complete calculations show that the rapid oscillations in this case only affect w and q, and that they die out in less than a second, while the other disturbances are those arising from the phugoid motion of the machine. Thus, in this case the machine when struck by the horizontal gust loses longitudinal speed at first, and after passing through a series of changes of velocity, settles down after a few oscillations in less than a minute to its original speed relative to the wind. This loss of speed is accompanied by an initial increase of normal velocity; the machine rises for a fraction of a second, acquiring a rapid positive angular velocity, but these motions soon change sign and die away like the horizontal velocity. The nose of the machine rises for five seconds, at first rapidly, then more slowly, and this oscillation dies down in the same manner as the others.

The next figure, Fig. 9, gives the changes due to a downward gust, w. Relatively to the air the machine acquires an upward velocity, w_0, which dies down in about one second and is followed by the slow phugoid changes as before. The changes in the other quantities are shown in the curves, and the motion of the machine can be traced as before. By combining the results of these two diagrams we can find the effect of a steady gust striking the machine in any direction in the plane of symmetry. In a similar way we can find the effect of a change in the direction of the wind or of an alteration in the propeller thrust or of the position of the elevators. The last is shown in Fig. 10, in which it is supposed that the elevator is turned so as to cause the machine to dive.

The next two figures indicate what the motion will be in two cases of lateral disturbance. This motion, in the particular machine dealt with, is unstable. Its expression involves three terms. One of these corresponds to a periodic oscillation rather heavily damped, having for one machine a period of about six seconds; the second to a considerable disturbance in certain of the co-ordinates, which however subsides or dies out very rapidly; and the third to a gradually increasing disturbance which gets larger with the time, according to an exponential law.

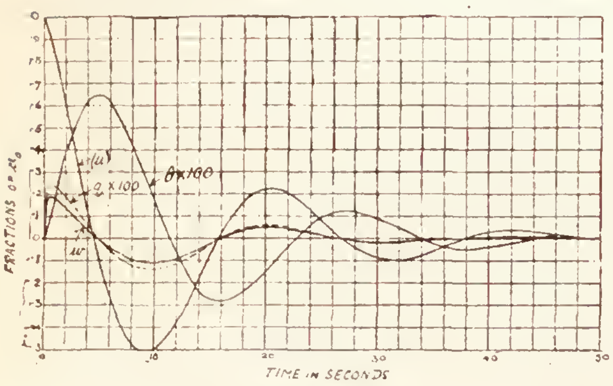


Fig. 8.

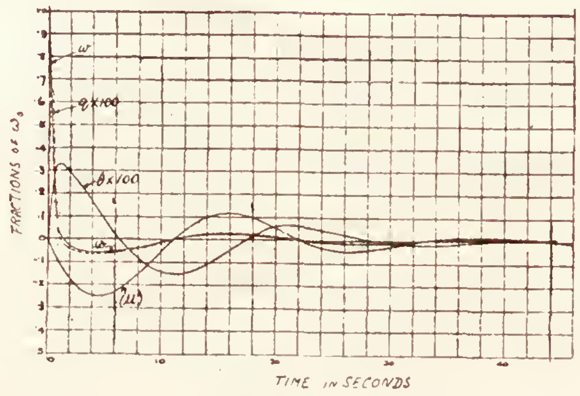


Fig. 9.

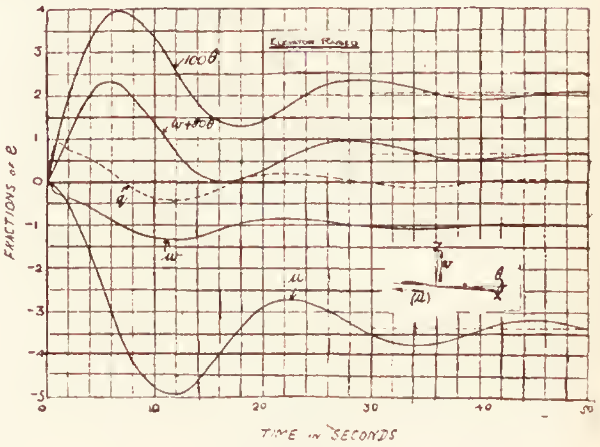


Fig. 10.

Fig. 8.—Disturbed longitudinal motion of an aeroplane $(u) = u_0$, $w = 0$, $q = 0$, $\theta = 0$ when $t = 0$.

Fig. 9.—Disturbed longitudinal motion of an aeroplane $(u) = 0$, $w = w_0$, $q = 0$, $\theta = 0$ when $t = 0$.

Fig. 10.—Disturbed longitudinal motion of an aeroplane with elevator raised—w = increase in upward velocity of aeroplane and $= w$ of mathematics. (u) = increase in velocity of relative wind and $= -u$ of mathematics. θ = inclination of propeller axis to horizontal. q = angular velocity of turning machine from Z to X. When positive it increases the inclination of propeller axis to the horizontal. $(u) = -3{\cdot}40e$, $w = -e$, $q = 0$, $\theta = 0{\cdot}0206e$ when $t = \infty$

In Fig. 11 is shown the effect of a side wind, v_0, striking the machine on the left-hand side. The curves show chiefly the effect of the slow oscillation, though the rapid increase in the value of p, the velocity of rolling, is due to the subsidence term. The machine quickly picks up the velocity of the wind; after some seven seconds v, the relative sideways motion, is very small, but it gradually increases, and after about 40 seconds has reached some 9 per cent. of the original disturbance. Unless the controls are altered the side-slip will continue to increase. A large angular velocity of roll, p, is started almost immediately, and at first this gradually dies down, but after six seconds or so the divergence term begins to tell and the rolling continues to increase unless checked by the pilot. Again, r, the velocity of yaw is at first negative, the machine yaws to the left, a motion opposite to that which corresponds to the bank; after a time this is reversed, and yaw and bank increase together.

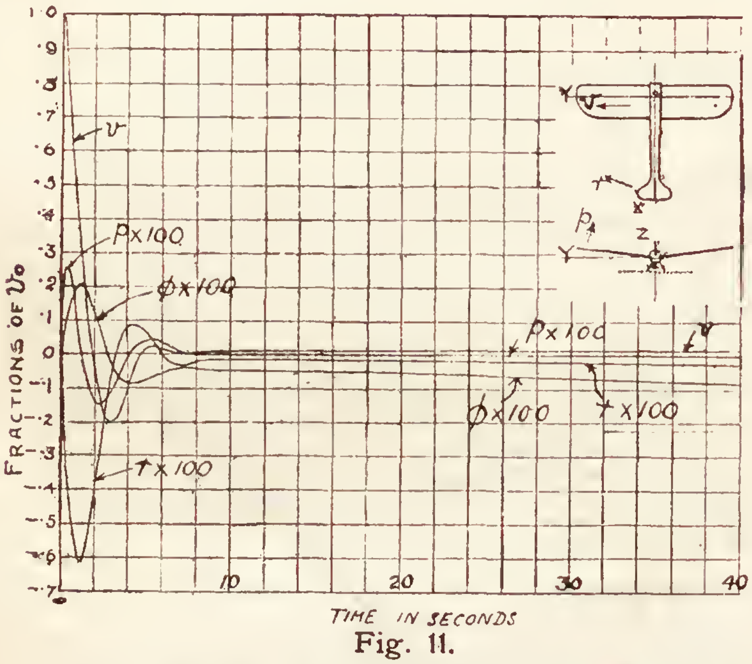


Fig. 11.

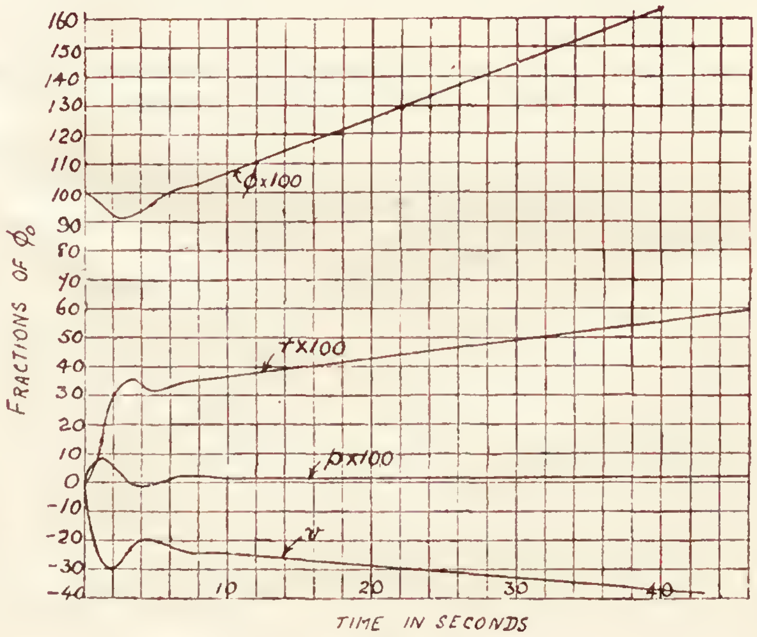


Fig. 12.

Fig. 11.—Disturbed lateral motion of an aeroplane $v = v_0$, $p = 0$, $r = 0$, $\phi = 0$ when $t = 0$.

Fig. 12.—Disturbed lateral motion of an aeroplane $v = 0$, $p = 0$, $r = 0$, $\phi = \phi_0$, when $t = 0$.

In Fig. 12 we have recorded the effect of sudden banking through an angle ϕ_0. The effects of the subsidence and oscillation terms are not large, but those of the divergence terms are very great; after 40 seconds the angle of banking exceeds its original value by 63 per cent., while r, the velocity of yaw, also increases rapidly, as does v, the side-slip velocity, which takes place in the negative direction. Thus, the machine turns to the right, increasing the angle of banking and side-slipping outwards and downwards at the same time. In all the descriptions above it has been assumed that the controls are not touched, but a comparison of Fig. 12 with the curve obtained when the effect of warping or of turning the rudder are considered show that the control of such a machine is not easy.

Thus, Messrs. Bairstow and Nayler have solved the following problems:—An aeroplane is in flight in the air—(1) At a given instant the wind changes either in speed or direction or both, and the new conditions remain for a time steady. The motion of the aeroplane is determined by the curves given in the paper; (2) at a given instant the controls of the aeroplane are altered. The ensuing motion is defined by other curves; and (3) by a suitable combination of the curves the effect of change of wind and change of control occurring simultaneously can be determined.

They have however gone much further than this. The wind does not change instantaneously and remain steady. Let us investigate the effect of supposing that at the end of each consecutive second there is a change, but that during each second the wind is steady. Clearly this is a closer representation of the facts, and if we go further and take as our divisions of time, not seconds, but small fractions of a second, we get a proper representation. We start with a knowledge of the motion of the aeroplane and the air at the commencement. Certain changes occur suddenly, and then for one second the atmospheric conditions remain steady. We can determine the motion of the aeroplane at the end of that second; then further atmospheric changes occur, treating the commencement of the second second as our origin of time, we know the motion of the aeroplane at that instant and our curves applied again will give it at the end of the second second, and we can proceed thus for each

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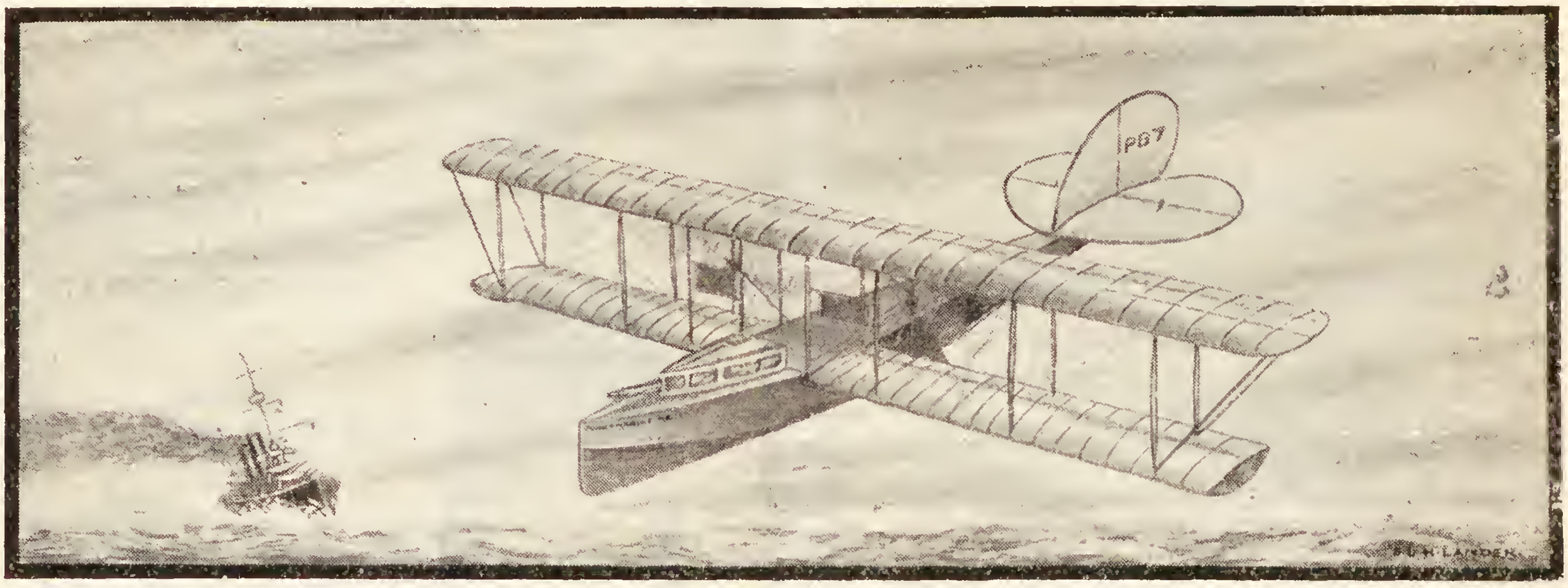

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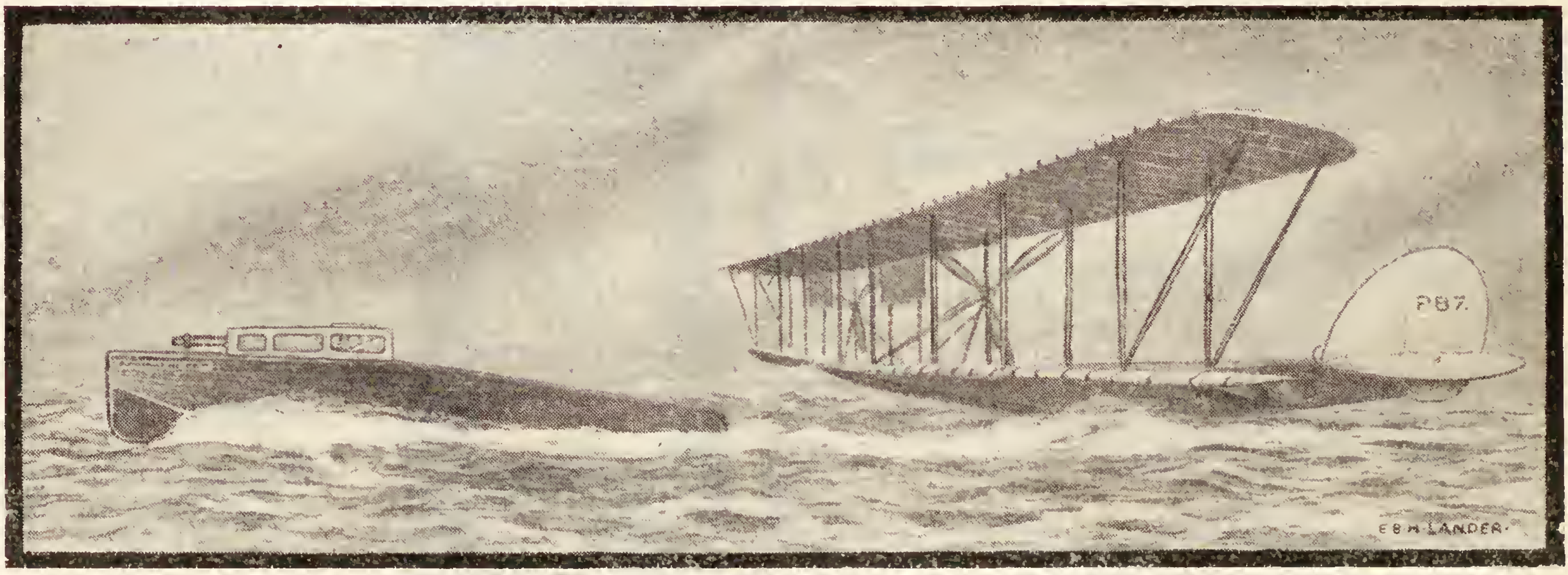

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consecutive second and so find the resulting motion. The operation is, of course, a very tedious one if the motion has to be investigated over any long period of time; its value consists in the fact that we can thus predict what will be the motion of an aeroplane having a definite amount of stability when moving in gusty air, if we analyse it thus for a few minutes, and we can thus determine whether either the safety of the machine or the comfort of the passenger require a modification of the stability.

Dr. Glazebrook then referred to some experiments carried out by Dr. Stanton, to ascertain the variation in the velocity of the wind at short intervals of time. The curves obtained had been analysed by Messrs. Bairstow and Nayler, and the effects of the varying wind velocity upon the motion of an aeroplane were indicated with the aid of diagrams, showing that the elevator can, without difficulty, be so manipulated as to cancel the effect of the gusts.

The author concluded by briefly indicating some of the more important conclusions of the Advisory Committee for Aeronautics in regard to the influences that affect the stresses induced in various parts of an aeroplane, and call for a higher factor of safety, and suggested that although there were at present great difficulties in the way, a factor of safety of 12 (based upon flight in still air) should be aimed at.

FOREIGN AIRCRAFT NEWS.

Another Record for Garaix.

HAVING to demonstrate the Paul Schmitt biplane at Juvisy in connection with the Security competition on Saturday, Garaix decided to fly it over from Chartres and incidentally attempt a new world's record. He therefore took up three passengers, MM. Paul Schmitt, Frangeois and Galibourg, and with a total useful load of 544·9 kilogs. the aeroplane covered the 70 kiloms. from Chartres to Juvisy in 42 mins., so that the speed was 100 k.p.h.

The Next Paris Aero Show.

IT has now been decided that the next Paris Aero Show shall open on Saturday, November 21st, and close on Sunday, December 6th. Mr. Andre Granet has been elected Commissaire General to take charge of all arrangements in connection with the Salon.

Another Projected Trans-Atlantic Flight.

IT is reported from Nice that Van den Born, who will be remembered as one of the first H. Farman pilots, is making arrangements for an attempt to secure the *Daily Mail* £10,000 prize. Van den Born proposes to cross the Atlantic from Konakry in French Guinea to Pernambuco in Brazil, which is a little shorter than the more northerly route. A special machine is being built for Van den Born near Nice.

Quick Climbing on a F.B.A.

WHILE testing a 100 h.p. Gnome-F.B.A. flying boat over the Seine at Bezons on the 23rd inst., Burri, who was accompanied by a passenger, climbed 2,100 metres in 24 mins.

French M.P. Flies.

ON an R.E.P. 80 h.p. monoplane, Molla, on the 22nd inst., took M. Girod, a member of the Chamber of Deputies, from Vincennes to Soissons, the distance of 120 kiloms. being covered in 1 h. 5 m. After giving a lecture to the students at the college, M. Girod returned by the aerial way to Vincennes.

Another French Aviatress.

LAST week at Buc, Mdlle. Picard, who has been at the Blériot School for some time, successfully qualified for a pilot's certificate.

Chevilliard has a Mishap.

WHILE making a cross-country flight from Gelsenkirchen to Dusseldorf on the 23rd inst., Chevilliard had a fall when near the Krupp mansion at Essen. The pilot escaped with a dislocated arm, but the passenger, Herr Wulfen, sustained severe injuries.

Aerial Touring by Farman Brothers.

ON Friday last, Maurice Farman, accompanied by his brother Diok, made a flight from Buc to Tillieres-sur-Avre in the Eure district and back.

A Nieuport Superior Pilot.

SAPPER BAUMONT, on the 21st inst., completed his qualifying flights for the French superior certificate by a trip from Villacoublay to Mailly Camp and back, on a Nieuport monoplane.

Additional Loopers.

AT Chateaufort, on the 20th inst., the Chilian aviator, Page, looped the loop on a Bathiat-Rhone monoplane; while at Moscow, on the same day, Wasilieff looped alone and with passengers on a Morane.

On the 22nd inst., Le Bourhis, who recently made some parachute descents from an aeroplane, and is now one of the Blériot instructors at Buc, looped the loop for the first time.

An M. Farman for Amundsen Expedition.

THE Norwegian explorer, who has been making a serious study of aviation with a view to utilising aeroplanes on his next Polar trip, has purchased a Maurice Farman biplane. Capt. Amundsen has asked Capt. Sem Jacobsen to fly the machine from Paris to Norway, and on Saturday last the first stage from Rheims to Liege was completed, stops being made at Rocquigny and Namur.

Verrier Returns to Paris.

ON the 20th inst., Verrier, on his H. Farman, completed his return trip from Berlin by flying from Dusseldorf to Buc in exactly three hours, the average speed working out to about 150 k.p.h.

Looping on a Vendome.

GIBERT, on a Rhone-engined Vendome monoplane, looped the loop at Gravanches, near Clermont-Ferrand, on the 24th inst. He made similar flights at Montlucon on the 21st inst.

M. Maeterlinck's Impressions.

"IT is a morning prayer in an azure cathedral," M. Maurice Maeterlinck's epigrammatic summing up of his impressions of his first flight on an aeroplane, is in the poetical language which one would expect from the great writer. The flight was made at Eze near Nice on the 21st inst. on a machine piloted by Maicon, who was recently appointed by Mr. Paris Singer as his family pilot.

Arrest of M. Clement-Bayard.

THE arrest of M. Clement-Bayard at Cologne, on Friday of last week, on a charge of espionage, would appear to have been due to a regrettable blunder on the part of someone, but it is to be hoped that the enquiries which are now being made by the French and German Governments will clear up the affair satisfactorily.

Aeroplanes at Belgian Review.

AT the review held at Brussels in honour of the King of Denmark on the 23rd inst., six H. Farman biplanes, piloted by Army officers, carried out a series of evolutions above the parade ground.

German Pilots in 1913.

FIGURES which have been issued by the German Aerial League show that during last year 293 pilot certificates were issued. Of these, 113 were gained on biplanes and 180 on monoplanes. In the classification according to the machines on which they were gained, Grade heads the list with 39, Rumpler second with 30, Albatros third with 26, and Bristol fourth with 22. Eighty-two certificates were granted to military officers. Johannisthal was the most favoured aerodrome, 142 certificates being gained there, while Bork was second with 30.

Flying Over the Baltic.

ON the 19th inst., an aeroplane, carrying two German officers, started from Heligoland and flew to the island of Norderney off the Dutch coast, the distance between the two places being about 100 kiloms.

Double Fatality in Germany.

WHILE flying through a thunderstorm an aeroplane, piloted by Lieut. Böder, with Lieut. Dernhardt as passenger, fell from a height of 1,500 metres near Wellendorf, and both officers were instantly killed.

Chanteloup in Norway.

DURING last week Chanteloup gave a series of exhibitions of looping the loop, &c., at various places in Norway on his Caudron-Rhone. His flights at Trondhjem, on the 22nd inst., were witnessed by the King of Norway. On Sunday last Chanteloup was flying at Stavanger.

Long Flight in Russia.

A RUSSIAN military pilot, Nesteroff by name, started from Kieff at 3.30 a.m. on Sunday and finished at Gatchina at 9.30 p.m., having landed twice on the way. His flying time for the 1,400 kil. (870 miles) was 8½ hours.

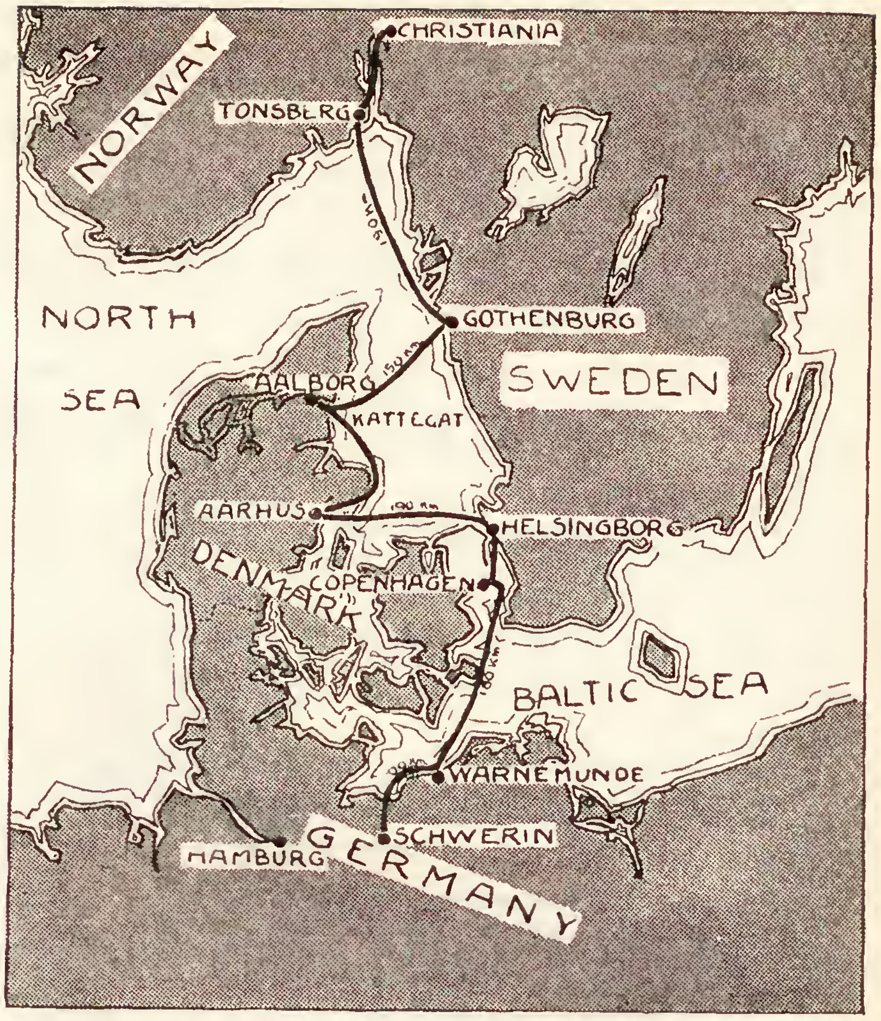
Fatal Accidents in America.

WHEN making a test flight with a new biplane at Utica, N.Y., on the 8th inst., Precival Van Ness apparently tried to make the machine climb too steeply, with the result that it turned turtle and fell 50 ft. The pilot was pinned beneath the wreck and died from his injuries later in the day.

On Saturday last Mr. Robert Cowan fell with his balloon into the river at Alton, Illinois, and was drowned.

The Scandinavian Waterplane Circuit.

DETAILS are now to hand regarding the competition for waterplanes, which is to be held next August, over a course from Schwerin, in Germany, to Christiania, in Norway. Starting from Schwerin, the daily stopping places are: August 21st, Warnemunde, 100 kiloms.; August 22nd, Copenhagen, 180 kiloms.; August 23rd, Aarhus, with a stop at Helsingborg, 190 kiloms.; August 25th, Aalborg, 140 kiloms.; August 27th, Gothenburg, 150 kiloms.; August 28th, Tonsburg, 190 kiloms.; August 30th, Christiania, 80 kiloms. August 24th, 26th, and 29th will be spent at Aarhus, Aalborg, and Tonsburg respectively. The prizes total to £3,200, of which £280 will be distributed equally among those who get to Warnemunde, £320 among those who reach Copenhagen, £600 at Aarhus, £400 at Aalborg, £400 at Gothenburg, £400 at Tonsburg, and £800 at Christiania.



Map of the Scandinavian Waterplane Contest.

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35-Hour Voyage by the "L3."

THE new Zeppelin airship "L3," built for the German Navy, left Friedrichshafen at 7.16 a.m. on the 22nd inst. for a trial trip, which it was intended should occupy 36 hours. After cruising over the neighbourhood of Lake Constance for some hours, the airship passed over Basle at 10 a.m., at 6 p.m. she passed Frankfort, at 9.30 p.m. Metz, at 10.30 p.m. Bingen, at 2 a.m. the next morning Bremen, at 4 a.m. Heligoland, then back to Hamburg, and reached Potsdam at 9.30 a.m. After cruising over Berlin for some time a visit was made to Stettin, while the vessel landed at Johannisthal at 6.15 p.m., having been in the air for 34 hours 59 mins. Between Metz and Bingen the airship is said to have covered 150 kiloms. in the hour.

New French Airships.

DURING the next few months the French Army hope to have several new dirigibles in service. At Toul a new Lebaudy airship, which will be equipped with three groups of 150 h.p. Salmson motors, is being inflated, while next month at Epinal a new Astra-Torres will be inflated. She will be of 23,000 cubic metres capacity, and will have four 250 h.p. Chenu engines.

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CORRESPONDENCE.

Brakes on Aeroplanes.

[1862] It seem to me a surprising thing that up to the present so little has been done in the way of controlling the speed of an aeroplane after landing by means of a brake. With the exception of the Bristol, Albatros, and Sanchez-Besa machines, no real endeavour appears to have been made in this direction.

It is obvious that, in many cases, machines and even lives may be saved by the use of a brake acting on the chassis wheels to curtail the length of "roll" following upon landing. For military and cross-country machines I consider brakes a necessity. Within certain limits, a pilot never knows how small a field he may have to land in, and having landed, how quickly he may require to pull up. As an instance, let us take the recent accident at Northallerton. According to evidence, the machine touched ground well inside the field, and I am convinced that a prompt application of a brake to the wheels of the machine would have greatly reduced its speed, and would very probably have prevented its overturning.

In case of a landing being made where no help could be obtained to hold back the machine or start the engine, the brakes could be put hard on. The pilot could then start his engine, get into his seat, release his brakes, and get away.

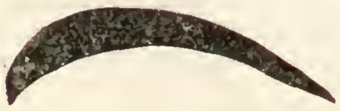
I have designed a brake, which can be fitted to any wheels, and used on any chassis. I intend to offer the designs to the Royal Aircraft Factory, and I shall also be pleased to give particulars and sketches to any constructor who cares to apply, for I feel that the universal provision of a brake to the chassis wheels would be another step onward towards the ultimately perfect aeroplane.

St. Mary's Mount, Leyburn,
Wensleydale, Yorks.

FRANK BROOK.

Turbine Blade Camber.

[1863] The enclosed cambered section (full size) will perhaps interest your readers as it represents the blade of a modern Parsons steam turbine. I re-visited these works, where I was once a pupil, a few days ago, and was naturally much impressed with the great increase in the size of the engines now being constructed compared with those that were built whilst I was working in the shops. Incidental to this increase in engine size is an increase in the size of the blade and those now used at the low pressure end of a 20,000 K.W. Set are sufficiently large to indicate the profile of the camber with great distinctness. I took away with me a section of one of these blades and had Sir Chas. Parsons' permission to use it as an illustration in a lecture that I gave in Newcastle that evening. Under the circumstances, I am sure he would have no objection to its publication in FLIGHT.



Coventry, May 11th.

A. E. BERRIMAN.

Climbing Speeds of Machines.

[1864] As Mr. S. C. Shepley-Part has "challenged" the accuracy of the conclusions I drew with regard to the climbing speeds of aeroplanes in letter 1854, I should like space in your columns in which to vindicate the same. Your correspondent in letter 1857 accuses me of making the absurd mistake of neglecting the fact that the speed of the machine must be measured relative to the air. I beg to state that I did not fall into this "trap," as Mr. Shepley-Part terms it; but I stated that a propellor working efficiently on a machine whose air speed is 60 m.p.h., would not work efficiently with a following wind of 40 m.p.h., and so the machine would not attain 60 m.p.h. air speed; or, as I expressed it in my last letter, 100 m.p.h. land speed. So the reduction of propeller efficiency would cause a reduction in climbing speed. It would also be of interest to know on what grounds your correspondent bases his theory as to a machine being virtually heavier when climbing than in horizontal flight.

Ely.

ALFRED M. COATE.

Flying Accident Fund.

[1865] Having accepted the Honorary Treasurership of the Flying Accident Fund, inaugurated by the Women's Patriotic Aerial League for the assistance of the widows or dependents of pilots killed or permanently disabled, and of which Field Marshal Lord Roberts and the Marquess of Tullibardine, Chairman of the Royal Aero Club, are patrons, I venture to make an appeal on behalf of an undertaking the necessity for which has been so painfully brought home to us during the past few weeks.

I have already had to thank you, sir, and your readers for assisting me in the collection of £330 for the widow and orphans of Lindsay Campbell, the Australian aviator, and £1,420 for the family of the late Col. S. F. Cody, to which Her Majesty Queen Alexandra was graciously pleased to contribute £50.

All contributions received by me at 25, Denison House, Victoria, S.W., will be thankfully acknowledged in the Press.

H. S. MASSY, Colonel,
May 26th. Hon. Treasurer.

Models

Edited by V. E. JOHNSON, M.A.

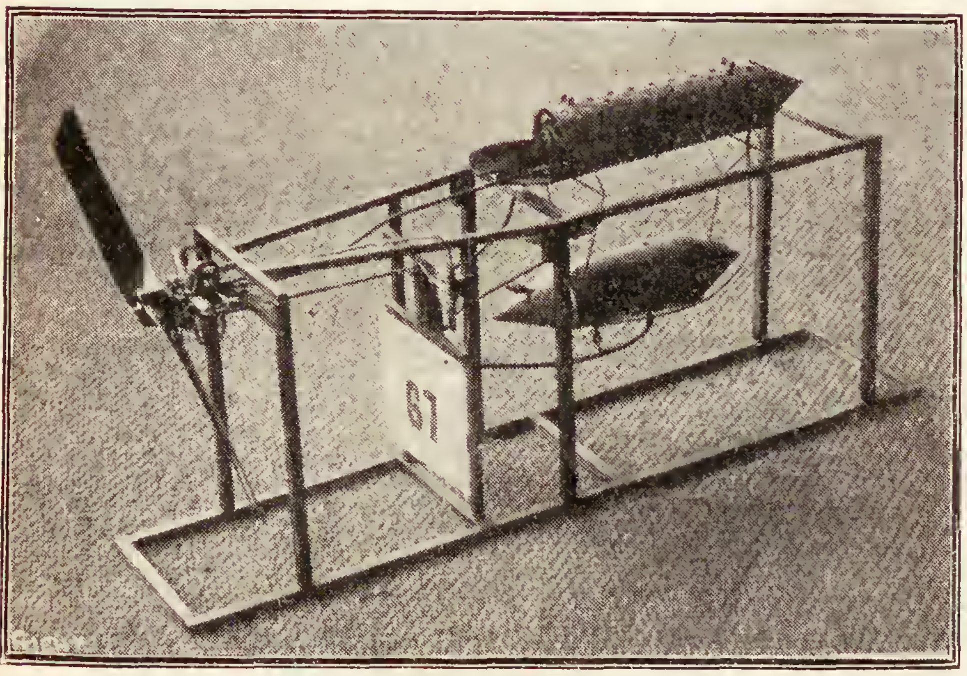
Some Experiments with Steam Plants for Models.

THE writer has recently been making some experiments with aerial propellers driven by steam in which the boiler (of the ordinary type) is fitted with a steam gauge in order to acquire some really reliable knowledge of the steam or air pressure necessary to drive a propeller at some given speed. The boiler used was of copper, brazed, vertical with one central tube; some 3 to 4 ozs. of water were used. The boiler was heated by a gas ring containing 16 holes, fed by a half-inch gas pipe, connected in turn with a larger one direct off the main. The engine used was a double acting single cylinder one of the toy locomotive type, fitted with a slide valve of the cylinder type. Its weight, 2½ ozs. The propeller used was a 12 in. one, central type. In one case in a ½-min. run, in which the pressure fell from 60 to 40 lbs., the mean being 50 lbs., the number of revolutions of the propeller was at the rate of 1,200 per min. In another test in which the mean steam pressure was 52 lbs., and the length of run the same, the r.p.m. were 1,360. In another trial in which the initial pressure was 100 lbs., falling to 50 lbs. at a mean pressure of 70 lbs., the r.p.m. were also 1,360. At first sight this seems curious, but can be accounted for, I think, on the score of leakage on the part of the engine, which was not, of course, of the really high-pressure type.

In another case in which a pressure of approximately 60 lbs. was maintained throughout the run, the r.p.m. were about 1,560. The speed indicator used, so far as its moving parts were concerned, was of almost no weight or friction, and could not have appreciably delayed the number of revolutions per minute. The thrust of the propeller at the above speeds has not yet been taken, but this will be done later on.

The employment of a pressure gauge is most interesting and instructive, and we hope others will carry out similar experiments with the same. The greatest difficulty was experienced in keeping up the pressure. The cubical contents of the boiler was 6 ozs. of water.

The gas stove gave a run of 3 minutes and a half at a mean pressure of 40 to 45 lbs., using 3 ozs. of water. The r.p.m. of the propeller in such a case was between 1,200 and 1,300. The little engine worked well and showed no signs of giving out even at 100 lbs. pressure. In some earlier experiments an engine 0·75 of an ounce in weight, single acting oscillating, was used, and without difficulty drove the same propeller up to 1,000 r.p.m. The steam pressure was not taken. The heating agent was a vapour lamp, methylated spirits being the fuel. This engine was soft soldered, and although I have not as yet taken the other to pieces it is, I presume, the same.



Mr. C. L. Pratt's Olympia steam-driven model.

Some Deductions from the Above.

Let us assume for a moment that a centrale propeller 12 ins. in diameter at 1,360 r.p.m. gives a thrust of 2 ozs. [perhaps some reader who knows from experiment just what it is will kindly send it along]. This is sufficient to fly an 8-oz. model. Now, taking a model of the worst type of flying-stick. Let us put the plant at 4½ ozs. and the fuel at 1½ ozs. This leaves 2 ozs. for the rest; not much certainly, but still possible. Now for the power plant. The engine presents no difficulty, and can be put down at ½ oz. The lamp ditto at 1 oz. We have then 3 ozs. left for the boiler, and in this we appear to have but little choice other than a very small pressure-fed one of the flash boiler type and one of a very light tubular type. In the latter case it is extremely difficult to keep down the weight. The tube must be seamless and brazed. The water fuel carried would only be 1 oz. and the heating fuel ½ oz. Length of flight 30 to 40 secs. I am perfectly prepared for this idea to be ridiculed, but as a matter of fact I have progressed much nearer its solution than in the experiments related above.

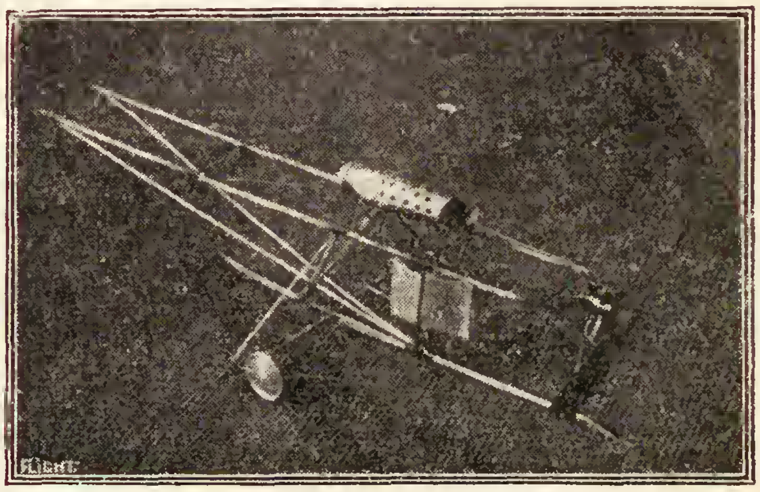
The ordinary type of flash boiler and lamp is constructed on altogether wrong principles so far as obtaining anything like *maximum uniform heating effect*. The manner in which the coils are arranged greatly interfere and shield one another, with the result that whilst parts of the tubing are at red or almost white heat, parts are comparatively speaking cool. Heating by means of *flame* is one which is extremely wasteful of energy. Some remarkable results have been obtained during recent years with what is known as surface combustion or heating, in which the burning gases are caught in suitable substances and rendered white hot (like an incandescent mantle), which latter in turn heat the desired body—round which they are packed—in a far more economical method than when bare flames are employed, in which enormous losses are entailed by radiation only.

Some Further Experiments.

Some further experiments were carried out on the losses entailed by friction in the case of very *small* steam engines. These were found in several cases to amount to more than *fifty per cent.*, which I think goes far to explain how it is that good results (*at high speeds*) can be obtained from engines whose pistons rattle in their cylinders.

Of course I do not maintain that such do not waste steam. But which is the worst evil—loss of efficiency due to wasted steam, or to friction owing to tight packings, &c.? So far as my experiments go (always, of course, in the case of small motors), the former is the lesser evil. In high-speed engines the actual rush or momentum of the steam or gas is all-important. Its mass may be very small, but it moves at a high velocity. A really loose-fitting piston for a low-pressure engine would of course be useless.

I have referred to the difficulty of keeping up a high steam pressure, and the manner in which, in boilers of small capacity, the pressure falls; a 20 lb. drop in 10 secs. was quite common. This shows (in the case of compressed air motors) how rapidly the pressure must fall, for in this case nothing is being done, as in the case of the water boiler, to keep it up.

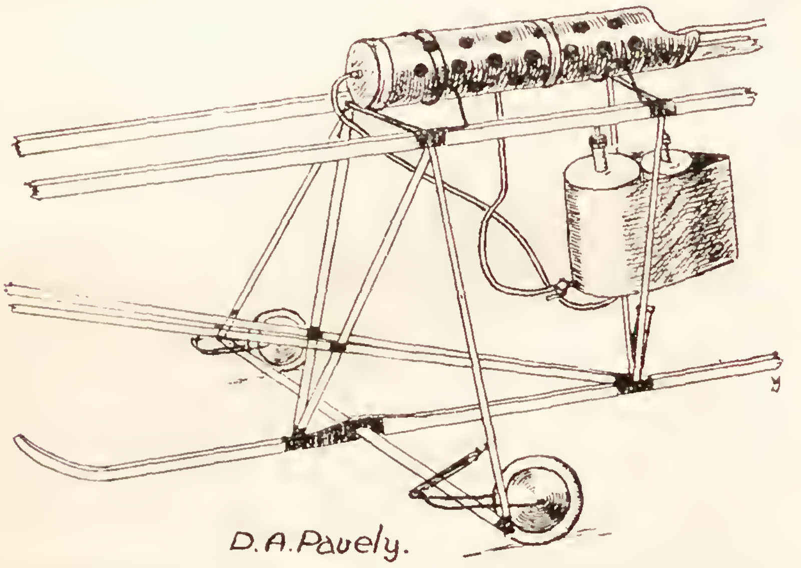


Mr. D. A. Pavely's Olympia steam-driven model.

Olympia Steam-driven Models.

Quite a number of steam-driven model aeroplanes and plants were exhibited at Olympia, although these were unfortunately unable to give a good account of themselves at the official tests, such, that is, as were submitted; we take their advent at Olympia as an extremely healthy sign. It clearly shows that there are a number of aeromodellists who have grown tired of rubber as a motor power and desire to attempt a higher and more engineering class of work. The difficulties are very great, only those who have tried them practically know how great they are, but they, like others, will be overcome in time and we shall have at our disposal a small and cheap power plant, cheap that is I mean to construct, and its construction will not be too difficult for an amateur to undertake who has had some experience with tools. It will also be possible to buy its parts in the rough and finish and fit them together just as in the case of other models.

Mr. H. H. Groves was the first to obtain any real success with such a type of plant, consequently it is only natural that others should have followed it more or less closely. Although it has been shown in the hands of an expert to give good results, it is not by any means an ideal plant, and is capable of great improvement. The earlier type was fitted with a pressure-fed flash boiler, and the later with a pump-fed one. A pressure-fed boiler, save for short runs of some 30 to 40 secs. soon results in a serious drop in propeller thrust, unless the boiler tap be opened more.



Sketch showing the power plant of the Pavely steam-driven model.

With a pump-fed one, the valves appear to be a constant worry and nuisance, owing mainly to water deposit. If this really be the cause, surely the use of distilled water would overcome this. Another source of difficulty is a single flame lamp, *i.e.*, a blow lamp with but one orifice. The tiniest difference in this makes all the difference to the one resultant flame, on which everything depends. The shielding effect of the coils of steel piping on one another has already been referred to. Quite remarkable results can be obtained with such a type of plant so far as propeller speed and thrust are concerned, when the plant is working at its best. But even in the most successful type of this plant yet evolved, we believe we are correct in saying that the boiler floods after a two minutes' run.

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver	85 secs.
Twin screw, do.	Distance	R. Lucas	590 yards.
	Duration	G. Hayden	137 secs.
Single screw, rise off ground	Distance	W. E. Evans	290 yards.
	Duration	W. E. Evans	64 secs.
Twin screw, do.	Distance	L. H. Slatter	365 yards.
	Duration	J. E. Louch	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance	C. C. Dutton	266 yards
	Duration	J. E. Louch	91 secs.
Do., off-ground	Distance	C. C. Dutton	190 yards.
	Duration	J. E. Louch	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter	60 secs.
Engine driven off grass	Duration	D. Stanger	51 secs.

Exhibition at the Anglo-American Exhibition.—The Aviation Section of this exhibition has stall room for a few more models, especially hydro-aeroplanes, but these should if possible have suitable floats for display in tanks. Full details will shortly be published of the competitions to be held in connection with this section. Any member or reader wishing to loan a model should apply to Col. H. S. Massy, Administration Office, Anglo-American Exhibition, Shepherd's Bush.

Channel Crossing.—An attempt to cross the Channel will be made by two members of the kite section during the summer in a small boat towed by kites. This will be done to demonstrate the seaworthiness of the new folding "Bapo" boat which Major B. Baden-Powell has specially designed for hydro-aeroplanes.

International Meeting.—Will all endeavour to do their best to obtain support for this meeting. The French clubs have stated that they will send representatives from at least 6 associations to compete and it is hoped that other countries will do likewise. The trophies promised to date are the *Car Illustrated* trophy and the Shell trophy.

27, Victory Road, Wimbledon. W. H. AKEHURST, Gen. Hon. Sec.

Mr. C. L. Pratt's Olympia Steam Plant.

This plant is substantially the same as that of Mr. Groves. The tanks are the same, with the exception of dimensions, partitioned in the centre, one side benzolene and the other water. The water pump is geared down to 5 to 1, and the oil feed to 50 to 1. The oil feed gear is obtained by a 10 to 1 worm off the water pump shaft. The amount of steel tubing used is about 12 ft. of tubing in the boiler, and it weighs 11 ozs. The engine cylinders have $\frac{1}{2}$ in. bore by $\frac{1}{2}$ in. stroke, and are constructed of german silver and the crank-case of steel. Each piston has two rings made of gun metal. The ends of the cylinders and the steam feed pipes are all silver soldered, as well as the cylinders, into the crank-case. The engine, complete with valve chest and propeller nut, weighs just $6\frac{1}{2}$ ozs., and the whole plant together 2 lbs. $4\frac{1}{2}$ ozs. without fuel. At the flying trials at Hendon the plant apparently was working well, but the model made no actual flight owing to reasons already referred to in these colnmns. At the Aero Motor Trials at the East London Technical College the plant was not, we believe, subjected to an actual test owing to pump trouble.

Mr. D. A. Pavely's Olympia Steam Plant.

This plant, unlike that of Mr. Pratt, is pressure fed; the engine is a 3-cylinder one of the rotary type, $\frac{7}{16}$-in. bore, $\frac{9}{16}$-in. stroke. The boiler contains 6 ft. of $\frac{3}{16}$-in. steel tubing. The propeller is 16-in. diameter and 20-in. pitch. The weight of the machine, minus the planes, with fuel is 2 lbs. 6 ozs. The wheels are 3·5-in. Clarke's disc. Each longitudinal consists of two pieces of birch, laminated $\frac{1}{8}$ in. by $\frac{1}{4}$ in. The skid is laminated bamboo. The covering round the reservoir tanks is aluminium. The valves are needle ones. The wheels are rubber sprung. We do not so far know any of the results obtained with this plant.

A New Model Association for Nottingham.

A new Model Association has recently been formed in Nottingham under the title of the "Nottingham Scientific Model and Experimental Association." The Association embraces practically all kinds of models, and the following sections, amongst others, are represented:—Model aeroplanes, sailing yachts, power boats, steam, gas, and petrol engines, scale locomotives and electrical appliances and apparatus. Although the Association has only been in existence a few weeks, the membership at the time of writing is between 40 and 50, including a number of the members of the late Nottingham Society of Model Engineers.

Lord Henry Bentinck, M.P., has kindly consented to become the first President of the Association, and a number of influential gentlemen in the city and district have signified their willingness to accept office as Vice-Presidents. Lectures on a variety of scientific subjects have already been arranged, and it is hoped in due course to secure a workshop in a convenient part of the city for the use of the members. It is also proposed to offer awards for meritorious work turned out by the members. The annual subscription has been fixed at a particularly low figure, namely, 4*s.*, and 2*s.* for juniors under 21. The Hon. Secretary, Mr. P. M. MacColl, of 2, Park Street, Beeston, Notts, will be pleased to answer enquiries from any of our readers who may be desirous of joining the Association.

AFFILIATED MODEL CLUBS DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Bath and Somerset Aero Club (199, WELLSWAY, BATH).

MEMBERS of this club will visit Bristol on July 18th, to compete in a great competition held in connection with the International Exhibition and under the auspices of the Bristol and West of England Aero Club.

Monthly Report.—At the last meeting of the club, held on the 15th inst., it was decided to affiliate to the K. and M.A.A. Mr. R. C. Cross' club record of 85 secs., has been raised by him to 95 secs. The same member has also had flights of over a minute on several occasions with r.o.g. model, the machine climbing to a great height and showing great stability in strong wind. Mr. C. Jenning's twin-screw mono. flew right out of sight and was lost. Messrs. Knight, Lewis, Tolman, Brampton and Pickett all making rapid strides both in construction and flying. It is hoped to shortly start the construction of a new glider based on the results of the last one, which was attacked and destroyed by a cow.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

MAY 31ST, flying on Wanstead Flats at 6.30 a.m. R.o.g. duration competition at 10.30 a.m.; 8-oz. models, 4-oz. loading. June 7th, similar competition to above. Models must rise off grass.

Monthly Report.—May 3rd, on Wanstead Flats, Messrs. F. Wood and W. Hersom were flying, at 6.30 a.m., r.o.gs. with good durations. Messrs. Wharnsby and Wood h.l. models. H. Bedford and H. Green were obtaining good flights with tractor models, and F. E. Grattan averaging 50 secs. with a single-propeller model. Flying this model at Nazing the previous week Mr. Grattan averaged about 80 secs, and obtained one flight of 100 secs. May 3rd, at 10.30 a.m., four r.o.gs. were in evidence, Mr. C. Hersom averaging 60 secs., F. Wood 65, W. Hersom 66, and T. Kimpton 65. H l models were flown by F. Wood and Osborne. Mr. Bedford was again flying his tractor and Mr. F. Grattan his single-propeller. May 10th, there was a good meet of members, and two hydros. were flown; one a tractor by W. Hersom, the other the usual twin-screw by F. Wood. Both flew well. Mr. H. Bedford was getting an average of 63 with an r.o.g. off rough grass. Messrs. Wharnsby and Osborne flew h.l. models. May 17th, Messrs. Bedford and Bond brought out 8-oz. r.o.gs. with 6-oz. loading. Mr. Bedford's average for nine flights was 83 secs., Mr. Bond 74. Four 8-oz. r.o.gs. with 4-oz. loading were flown; the averages for three or more flights being: F. Wood, 85 secs.; T. Kimpton, 87 secs.; S. C. Hersom, 66 secs.; and H. Bedford, 65 secs. Mr. Wharnsby also flew a r.o.g. Tractors were flown during the morning by C. Hersom, W. Hersom and H. Bond. Mr. Osborne flew a biplane. May 24th, Mr. H. Bond was again flying his 8-oz. r.o.g. with 6-oz. loading and averaging 54 secs. F. Wood could only get 40 secs. with his r o.g. 4-oz. loading. Wharnsby, with r.o.g., 35 secs. H.l. models were flown by T. Kimpton and F. Wood. After flying, Mr. W. Hersom's compressed air plant underwent some satisfactory bench tests in the club-room.

Paddington and Districts (77, Swinderby Road, Wembley).

MEMBERS will please note that the usual flying ground will now be closed for a few weeks until the grass is cut. A temporary ground on Mr. Perkins' farm is available to those members who wish to use same.

Monthly Report.—Less flying than usual has been done by members this month owing to adverse winds, the best performances being by Mr. T. Carter with his tractor monoplane. May 9th, Mr. W. E. Evans, after one good flight with his 8-oz. twin-propeller Olympia monoplane, landed it in a tall tree. May 16th, some good flights by Messrs. R. Bird, T. Carter, M. Levy, F. W. Johnson, H. Woolley and W. E. Evans, the latter testing single-screw Olympia model with larger plane and elevator and with various propellers. His best durations were 51, 53 and 56 secs. Mr. M. Levy was testing a long single-screw monoplane with fair success.

Reigate, Redhill and District (The Cottage, Woodlands Avenue, Redhill).

Monthly Report.—During the month a fair amount of flying has been done, and members have been busy in workshop with machines for forthcoming Rawson Cup Competition. Mr. Sutton has been doing some experimental work with different tractor screws on his Olympia tractor, getting about 30 secs. finishing always with a good glide. On the 29th, he was out with his J.W.B. type tractor, longest flight 168 yds.; this is a triangular *fuselage*, not covered in, and is heavier loaded than Olympia tractors; it has now been handed to Mr. Hooton, a younger member, to learn something from. On the 16th, Messrs. Sutton, Hooton, Funnell and Hoyle were out; there was a high wind blowing, and Mr. Sutton's tractor was displaying its inherent stability with credit. He was experimenting with Olympia floating tail r.o.g., placing fin in different positions, including under line of thrust. Mr. Hooton was getting high flights with h.l. mono. best about 300 yds. Mr. Funnell 40 to 45 secs. with 8-oz. r.o.g. mono., afterwards looping with same. Mr. Hoyle was getting over 60 secs. with his Olympia r.o g. mono.; this is always reliable, and he has some good propellers. Messrs. S. G. and R. G. Wilson have been out with a 10-oz. floating tail r.o g. mono., getting best 59 secs., also 40 to 45 with 6-oz. floating tails. On the 20th, Messrs. S. G. Wilson, Key, Norton, Sutton, Hooton, Funnell and Hoyle were out, the event of the evening being Messrs. Key's, Norton's, and Sutton's Olympia tractors, which were to be observed for club records. They were being continually flown for two hours without mishap, and were flying to perfection, being steered at will to left or right by rudder. Mr. Sutton set up a record of 33 secs. for duration, and Mr. Norton a record of 165 yds., after circling, for distance; many flights were gauged so that they circled and landed on Golf Green, from whence they started, thus a splendid view was obtained of the landing, which was perfect. Spectators were deeply interested, staying all the time flying was in progress, which is not usual when only models of the "stick" specie are being flown. Messrs. Kennard and Young have been flying experimental machines, and are also building for Rawson Cup.

Sheffield Ae.C. (41, Coniston Road, Abbeydale, Sheffield).

MAY 30TH, hydro-aeroplane contest, 4.30 p.m. June 6th, 3 p.m., demonstration by Mr. Gumpert at Standhouse Aerodrome with 4-ft. compressed air monoplane; also novices h.l. and record raising.

Monthly Report.—May 2nd, at Intake, the contest for the cup and silver medal given by Mr. E. W. Colver for r.o.g. machines in very gusty winds. Master C. Dewsnap proved the winner with 81½ secs. duration. Mr. W. H. Bagshaw's machine on its second trial flight flew upside-down for about 100 yds. Misfortune overtook Mr. Bagshaw on his last trial, his machine vanishing at the end of 78 secs. He was awarded the second prize of a bronze aviation medal. Mr. E. S. Elliott acted as judge, Mr. W Bagshaw (sen.) and Mr. Cudworth as observers. May 15th, general meeting at Broomheads, when Mr. E. W. Colver presented another cup to the club for competition for the purpose of bringing out further scientific developments in aviation with power-driven machines, other than rubber or spring motors. The cup is to be competed for by home-made power plants and machines, and is to be open to all England, but the competitors must be members of the K. and M.A.A. It will be competed for the first time on August Bank Holiday, and the rules, &c., governing same will be announced later. Mr. Colver was heartily thanked for his very generous gift by all the members. This is the third cup which has been presented by him, besides numerous other prizes given to the club. Messrs. E. W. Colver, C. F. W. Cudworth, W. H. Bagshaw (sen.) and Mr. H. Slack were elected as official observers. May 16th, tractor biplane contest for the silver aviation medal presented by Mr. Marcus D. Manton. Master C. Dewsnap proved the winner with 168 ft. 5 ins. straight.

South-Western Aero Club (373, Brixton Road, S.W.).

Monthly Report.—A meeting was held on May 2nd, when the club was constituted and the officers elected, with a committee. It was decided that the entrance fee should be 2*s*. 6*d*. The workroom is stocked with all materials, &c., for model making, these being supplied at reduced rates, rubber, of course, included. The club is indebted to the president, Mr. Prodger, for the club premises, while the vice-president, Mr. A. H. Aloof, has kindly offered to provide any more tools above the club's present stock that are necessary. It is hoped that the club will shortly be in possession of a private flying ground; negotiations for same are now in progress. The hon. sec. will be pleased to hear from anyone in the S.W. district interested in aviation, and will be glad to provide any further information to intending members. Mr. Prodger, Jun., has been flying a twin-screw floating tail model in Brockwell Park, obtaining between 30 and 40 secs. Mr. Miller has had out a 7-oz. tractor, which flies well and shows great stability. Mr. Drake's Laing tractor put up a 90 secs. flight at Wimbledon, the average of six flights being 76 secs. each. Most of the members are busy making machines for the club *brevet* tests, for which a formula—design and construction × duration—will be used.

Wimbledon and District (165, Holland Road, W.).

MAY 30TH and 31st, flying as usual. June 1st, handicap competition for r.o.g. machines at 3.30.

Monthly Report.—During the past month there has been a good deal of flying, and several new machines have been out. The most interesting event was the remarkable success of Mr. D. Laing's new tractor. This machine was first out on May 2nd, and on May 3rd it broke the h.l. duration record for tractors with a flight of 102 secs., during which it rose to a height of about 80 ft., finishing with a splendid glide. Mr. Laing then turned his attention to hydros., and on the evening of the 9th this machine had its first trials on the water, making several short flights. The following day it was flying extremely well, rising with and against the wind, and finishing up with a fine flight of 58 secs., constituting a club record for tractor hydros. Messrs. Boniface and Tucker have had out new tractors of similar design, flying very high and averaging 50 secs. duration. Mr. Hayden has been experimenting with a new twin-screw machine, the span of which is equal to the length, viz., 4 ft., and the loading of which is 6 ozs. It climbs very well, but as yet no good glides have been obtained, and the duration does not exceed 60. Mr. Powell's Olympia twin-screw has also been flying high, doing great distances, on one occasion being lost over the woods, but recovered. Mr. Davies, however, was not so lucky when his machine disappeared in the same direction, for it has not been seen since.

Windsor Model and Gliding Club (10, Alma Road.).

Monthly Report.—The summer season has started with some fine model flying, Messrs. S. Spicer, E. Stanbrook, F. Camm, S. Camm, S. Dandridge and J. E. Rogers taking part. The machines used were mostly tractors, this type easily outdoing the propeller machine in flying and efficiency. Two of the machines were of exceptional interest, these being F. Camm's, "Antoinette," and E. Stanbrook's Weiss type. Both models weighed over the pound, and also exceeded 4 ft. in span. Some splendid flights were obtained. Mr. S. Dandridge has finished his steam plant, and will now begin testing it. There is some extremely fine work embodied in it, and it is altogether a very creditable piece of work. It will be fitted into a machine of the tractor class, Etrich type. Extremely satisfactory progress has been made with the full-sized machine. The *fuselage* is very nearly erected, only the assembling of the various members remaining. The construction adopted for the *fuselage*, has exceeded expectations, a very rigid and light structure resulting. The chassis is of the wheel and skid type. Quite a lot of work will have to be done on the engine, it being intended to fit new bearings and gudgeon pins. From the foregoing it will be seen that the building of the machine will soon be an accomplished fact. This is very gratifying when one thinks of the humble origin of the club. It is hoped that those members who have been somewhat lax in their attendances of late will kindly make known their intentions in regard to the future. Mr. A. A. Somerville, M.A., has kindly consented to give a donation towards the fund, and is also taking a great interest in it. Any persons in the locality who would like to assist in the work, should visit the workshops any evening during the week.

UNAFFILIATED CLUBS.

Bedford and District Model Ae.C. (22, Park Avenue, Bedford).

MR. B. C. HUCKS will give a demonstration of "looping the loop" and upside-down flying on the Polo Ground, Ampthill Road, on June 12th and 13th. Special arrangements for admission, &c., are being made for members. A flying meeting will be held on the Putnoe Lane Ground, Kimbolton Road, on Sunday, June 7th. Flying starts at 11.30 sharp. Distance and duration competitions for r.o.g. models have been arranged. The club extends a cordial welcome to non-members at their meetings.

Monthly Report.—The club, which has only recently been started, has now earnestly started work. On May 17th the club held a very successful meeting. The *pièce de resistance* was the flying of Mr. C. L. Matson's twin r.o.g. with swept back wings. It was with this model that Mr. Matson successfully raised the Stony Stratford Model Club's record for r.o.g. distance and duration at Flitwick some weeks ago. Much amusement was caused by one bashful member bringing the club linoleum rising gear to the flying ground, together with his models in a bath chair, carefully covered with a green dust sheet. Mr. W. R. Bowick had out a single-propeller pusher h.l. monoplane and a twin-propeller hollow spar h.l. model. He obtained some very good durations with the former, which showed excellent stability. Mr. Conyers had a small tractor monoplane, which showed itself quite an adept in the art of "looping" and "tail sliding." Mr. T. S. Williams had out an A frame with swept back main plane, which is quite fast. Several models are in course of construction, among which may be mentioned Mr. Robinson's scale Blériot (1 in. to 1 ft.), to which one understands a rotary engine of his own invention for compressed air or steam is to be fitted. Mr. Bowick is making a scale Morane, to be driven by a rubber motor. Members are requested to send their annual subscription (2*s*. 6*d*.) to the hon. sec. at their earliest convenience. The club pamphlets, &c., will have by this time gone to press. Anyone interested in model aviation in this district is invited to make application for club pamphlets and other literature to the hon. sec. at the above address.

Birmingham Aero Club (8, Frederick Road, Edgbaston).

JULY 4TH, competition for Club's Challenge Shield for the Championship of England. Entry fee for non-members, 1*s*. July 25th, a model competition for Championship of the Midlands. Entry fee for non-members, 1*s*. A silver medal is given for this event. Both the above competitions take place on the club's aerodrome at Billesley, Yardley Wood Road.

Burton and District Aero Club. (156, Shobnall Road.)

A WATERPLANE contest is being held by the club on Whit Monday.

Monthly Report.—Competitions held on Good Friday. Duration: 1st, H. Robinson, 36 secs.; 2nd, C. G. Lamb, 28 secs. Distance: 1st, H. Robinson, 250 yds.; 2nd, C. G. Lamb, 220 yds. Junior event. Duration: 1st, H. Robinson; 2nd, W. Makin. R.o.g. event abandoned owing to strong wind. Silver medal first prize in each event. F. Robinson made the finest flight yet made by a club machine. C. Lamb with his single, 6 ft. 9 ins. in length and 4 ft. 9 ins. across wings, 15-in. propeller driven by 18 strands of ¼ elastic, has had some remarkable flights. May 20th saw the best turn-out of the club, G. C. Robinson, C. G. Lamb, H. Robinson, F. Dowson, flying singles, H. F. Metcalf, F. Robinson, J. Starbuck, B. Donaldson and H. Robinson flying twin machines. Col. R. F. Ratcliff has given a silver cup, and the Marquess of Anglesey a silver challenge shield for waterplanes. There is now every inducement to join up, as only members of Midland clubs will be eligible to compete.

Finsbury Park and District (66, Elfort Road, Highbury, N.).

JUNE 6TH, h.l. duration contest for tractor Models at Finsbury Park, 4.30 p.m.

Monthly Report.—Mr. S. Gibbs out with Etrich tractor also D.F.W. biplane, which showed great stability, A. Richards with Deperdussin mono., B. H. Barnard, Blériot type with working controls, R. Mullin, twin-screw canard. Mr. S. Gibbs raised the distance record for r.o.g. tractors to 390 ft. off rough grass on May 9th. The r.f.g. tractor duration contest on May 9th, resulted as follows:—S. Gibbs, 1st, average 25 secs.; A. Richards, 2nd, average 20 secs.: B. H. Barnard, 3rd, average 17 secs.: these were made off rough grass in very windy weather. May 16th, Mr. A. Richards up with tractor mono. own design, S. Gibbs, Etrich mono., B. H. Barnard, Etrich mono., working controls; H. Mullin, with twin screw, canard-type machine, all flying well. Competition programme for 1914 now ready, and will be sent on application.

Ilford Model Ae.C. (83, ENDSLEIGH GARDENS, ILFORD).

MAY 30TH, flying as usual at "Aerodrome," Hog Hill, Hainault Forest, Chigwell Row, at 9.30 a.m. (weather permitting). June 7th, "Second Competition' meeting, 9.15 a.m. sharp (weather permitting). Prize offered by Messrs. Charles and Co., coal merchants, of Ilford, will be competed for. Club records:—Twin propeller over 42 ins., r.o.g., 76½ secs., Mr. G. Warren, May 17th; twin propeller over 42 ins., h.l., 69⅘ secs., Mr. G. Warren, May 3rd; single propeller over 36 ins., r.o.g., 61½ secs., Mr. A. F. Lazell, May 17th; twin propeller ("lightweights") under 30 ins., r.o.g., 49 secs., Mr. J. L. Hartnoll, April 5th; twin propeller ("lightweights") under 30 ins., h.l., 51½ secs., Mr. J. L. Hartnoll, March 29th.

Monthly Report.—Owing to the Easter holidays no "official · flying meeting took place, however several members attended. April 10th, Messrs. B. Seabright and J. P. Leggett out testing machines. The former took out an A frame—successful flights obtained. Mr. Leggett's T frame, hollow-spar did some exceedingly good flights, finally lodging on top of a tall tree, which (the machine) was recovered a week later no worse for being exposed to the wind and rain storms. April 11th, Messrs. B. Seabright and J. P. Leggett out testing more machines. Mr. Leggett had the misfortune to smash his large "hollow-spar" *fuselage* monoplane through the walls of the spar being too thin and weak. April 12th, Mr. B. Seabright's A frame obtained 50 secs. Mr. R. C. Nicholl's "Lizzie" biplane flew exceedingly well and was exceedingly fast. His average flights were roughly 45 secs. Mr. J. L. Hartnoll's "lightweight" flew in its usual grand style, obtaining an average of about 50 secs. Mr. R. C. Nicholls unfortunately smashed his "single pusher" early in the morning, so was unable to demonstrate its real flying capabilities. Mr. J. P. Leggett, with a new hollow-spar *fuselage* monoplane, flew excellently well. Mr. E. Jenkinson's small "looper" could not be persuaded to loop. His "gull-wing-shaped" propellers seem to be very efficient though they "rev." a trifle too fast. April 13th, Mr. B. Seabright obtained 51 secs. Mr. J. L. Hartnoll's "lightweight" "r.o.g.-ed" in splendid style and flew very well indeed. Miss L. M. Johnson put in her first appearance with an A frame monoplane which obtained very good results. Mr. A. Tapper brought out a machine composed of bits of scrapped machines, some being of the lamented "Lizzie" which is lying in hospital. Mr. E. Jenkinson's machine was not very successful owing to its weight, and being underpowered. April 19th, Mr. G. Warren's huge monoplane obtained 58⅗ secs. The redoubtable (not to mention repaired) "Lizzie" once more showed itself, it simply "roars" up to between 100 and 150 ft. and flies for about 50 secs. Mr. E. Jenkinson at last persuaded his small "looper" to loop. Mr. J. L. Hartnoll's wonderful little "lightweight" flew exceedingly well. Mr. J. P. Leggett's "Wobbler" flew very well. Mr. A. F. Lazell smashed his machine. Mr. G. Warren's flew very well. Mr. R. C. Nicholls easily obtained the ¼ mile. April 26th, Mr. G. Warren obtained 63⅕ secs. His machine looks splendid, being doped with "Cellon." Messrs. G. Warren, B. Seabright, and R. C. Nicholls got their machines up to about 200 ft., and others flying were Mr. E. Jenkinson with his "looper." Mr. J. P. Leggett, Mr. F. Kappey (twin "pusher") and Mr. S. B. Potter. May 17th, the "First Competition Meeting." Results:—Senior section. Event I. Twin "pushers" over 42 ins., r.o.g.: 1st, Mr. G. Warren, 76·5 secs., marks, 185; 2nd, Mr. B. Seabright, 135·6. Event II. Single "pushers" over 36 ins., r.o.g.: 1st, Mr. G. Warren, 46·5 secs., marks, 155·6; 2nd, Mr. A. F. Lazell. 118·6. Event III. Open handicap, h.l., 1st Mr. G. Warren, 65 secs., marks 192·3; 2nd Mr. A. F. Lazell, 173·6. Junior section. Owing to the poor number of entries only one event was held. Event I. Open handicap, h.l.: 1st, Mr. J. L. Hartnoll, 37·5 secs., marks, 76·5; 2nd, Mr. J. L. Hartnoll, 65·6. Messrs. E. Jenkinson, J. P. Leggett, T. Hyett, R. C. Nicholls, F. Kappey, H. Triggs, and A. W. Yelton obtained some very good flights. Judges for above competition: Messrs. H. Corrigan, F. M. Connellan, and J. B. Fitzsimons. Timekeeper: J. B. Fitzsimons. Any one wishing to join the above club should communicate with the hon. sec. immediately, addressed, Mr. J. B. Fitzsimons, hon. sec., I.M.Ae.C., 83, Endsleigh Gardens, Ilford, Essex.

Liverpool Aero Research Club (62, CEDAR GROVE, LIVERPOOL).

Monthly Report.—The Model Aero Exhibition held at the Y.M.C.A. Hall, Mount Pleasant, on May 2nd, proved exceedingly successful. T. W. Bennett exhibited two r.o.g. floating tail machines of excellent finish, fitted with detachable chassis of a very clever design, together with a 30-in. span r.o.g. "canard,' and an h.l. 1–1–0–P2 with swept back planes, the workmanship being a pleasure to look upon, a feature worth noting being a movable vane on the 30-in. canard, intended to aid in setting the model dead-on to the wind, enabling a cleaner set-off, an ingenious contrivance that took the fancy of many. This member holds a very fine set of kites, having on show a ¼ full size Cody man-lifting kite, a winged box kite just on 6 ft. long of his design for signalling purposes, four hawk kites ranging from 8 ft. 6 ins. downwards, and a good array of others; an exhibition that put the finishing touch to the show. The G. H. Kilshaw exhibit included a large scale military divided tail mono., 5 ft. 8 in. span, a new feature being the *ailerons* placed beneath the main planes, a 4-ft. tractor r.o.g. monoplane (3 member *fuselage*), a neat tractor biplane, 30-in. span (4 members, half covered in *fuselage*), two r.o.g. twin-screw canards, 33 and 26 ins. span respectively, two h.l. 1–1–0–P2, a 26-in. span twin r.o.g. floating tail mono., and a propeller testing apparatus for testing propeller thrust; a most variable exhibit in all.' W. Beale showed three machines, a twin h.l. biplane canard, divided lower plane, a diminutive r.o.g. 12-in. span tractor, and a large r.o.g. tractor, 33-in. span, the main plane designed on the gliding gull-wing principle, giving the machine a distinctively graceful appearance. The B. Tear exhibit, besides showing an h.l. twin canard and an h.l. pusher canard biplane, had on view a neatly built r.o.g. 1–1–0–P2 wings, an elevator built on the Dunne principle, in addition to a fine scale model Antoinette, 5 ft. 4 ins. span; a most commendable exhibit. W. F. Woods showed a large model glider, covered-in *fuselage*, 36-in. span, and M. Payne a large h.l. tractor. J. Kilshaw showed an r.o.g. canard, E. Kay exhibiting a twin canard r.o.g. biplane and a tractor r.o.g. mono., conspicuous for the absence of vertical surfaces. E. Kilshaw showing a 24-in. span. r.o.g. tractor, 26-in. r.o.g. canard mono., and one h.l. 1–1–0–P2. Mr. W. P. Thomson, after judging for design and construction, spoke most highly of the exhibits, remarking that this show easily eclipsed anything held in Liverpool by previous clubs, regretting the absence of the ornithopter type of model; the secretary's regret, however, being the absence of hydroplane models. The Aero Research Trophy has been won by Mr. T. W. Bennett, for his extensive exhibits, May 2nd, also gaining the hand-painted diploma for kites. G. H. Kilshaw being awarded the "Diploma of Merit." Next quarter the Aero Research Trophy will be awarded in a competition for r.o.g. machines, covered-in *fuselage*, any type. Further particulars to be published later. This should prove a most scientific contest. May 9th, members out testing "show" models. B. Tear and T. W. Bennett making some good flights towards the close, the latter finishing proceedings with a fine high flight with a large h.l. back swept wing canard machine. May 16th, members were in attendance at the Drill Hall, Edge Lane, where the club had on view the greater part of the previous exhibition models. The G.H.K. 6-ft. "warplane" (divided tail), on this occasion fitted with floats, forming a very attractive machine: C. Kirby's 1–1–0–P2 r.o.g. being an extra addition. This show was arranged in aid of a prominent local Scout Cadet Corps. May 23rd, contests for exhibition prizes took place at Stanley Park, and provided a lively meeting, Mr. A. G Pugh timing in the two events. Result:—H.l. machines: 1st prize, T. W. Bennett, 49 points; 2nd prize, G. H. Kilshaw, 25; 3rd, B. Tear, 19¾. R.o.g. machines: 1st prize, T. W. Bennett, 29 points; 2nd prize, G. H. Kilshaw, 25⅔; 3rd, E. Kilshaw, 20. The weather was by no means ideal for model display, and Mr. Bennett in carrying off the two first prizes fully deserves his win, his consistency in the h.l. competition being great. It has, in all, been a busy month, and members are to be congratulated on the good show they have made.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

MAY 30TH, Woolwich Common, 3.30 p.m. until dusk. May 31st, Blackheath, 6.30 to 10 a.m.

Monthly Report.—After a very busy winter members are looking forward to an equally busy summer—if the weather permits. Mr. W. Rowland Ding, who is already well known in connection with the Ding-Sayers aeroplanes, and who has recently purchased a 100 h.p. Handley-Page biplane, and Mr. H. H. Groves, the popular exponent of steam-driven aeroplanes, have been elected vice-presidents. The club considers itself extremely fortunate in obtaining two such practical men to strengthen its efforts to popularise model-aviation as a *science* and not merely a pastime. To enumerate individually the members who have been flying models this past month would be too tedious, but appended are the names of those who have been extremely energetic, or who have obtained the most noteworthy results. R.o.g. tractors flown by Messrs. Arthur and Charles Beere, F. W. Edwards (double-surfaced planes), G. H. Westwood, whose model, not unlike "Mary's lamb," can be trusted to take care of itself whatever the atmospheric conditions; A. D. Nicholls with a very realistic machine, A. F. Chinnery, whose large "Etrich" type mono., has made some of the best flights ever secured from so big a model driven by an elastic motor; and most successful results from a geared mono. have been obtained by S. Hunt. Splendid flights from twin-propeller machines have rewarded the efforts of Messrs. H. H. Groves, F. Plummer, F. Dixson, F. W. Edwards, R. W. Prance, G. H. Westwood, and A. D. Nicholls, but extraordinary flights have been accomplished by A. B. Clark's twin-propeller hollow-spar monoplane, fitted with elevator *and* floating tail, the chief features being the height at which they are made and the magnificent glide with which they terminate. This model's exhibitions have been described in the local press as "the acme of spectacular flying." Amongst those who have been deservedly successful with single propeller machines may be mentioned W. Jones, whose model has an extremely high factor of efficiency, Messrs. McLaughlin, Rippon, and Barnett, the latter's mono. being fitted with a tail in addition to the orthodox elevator. One of the renowned "Gnat" single propeller models has been flown by H. G. Wilkinson, with extremely satisfactory results. It has been decided to institute a series of club duration records, open to all types of r.o.g. or water models, and it is hoped that members will at once set about "making the fur fly." They would, however, be well advised to confine their efforts to scientific models and not build special record-breaking "flying-sticks." Entries are now being received for this quarter's "Trophy" competition, and they should be sent to the hon. sec. at the above address. He will also be pleased to answer any enquiries, or to acknowledge subscriptions. A social aeromodellists' club is now being formed in East Dulwich, and residents who are interested in aviation, or who would like to see more model flying in their vicinity, are requested to kindly communicate with Mr. G. Greenwood Bentley, at "Mabledon," 5, Waveney Avenue, Peckham Rye.

St. John's Model Ae.C., Hensingham (Hon. Sec., J. J. POSTLETHWAITE, 19, BEDFORD STREET, HENSINGHAM, WHITEHAVEN).

Monthly Report.—On May 16th, the members held their first flying meeting at the club's flying ground, Egremont Road, Hensingham. The best flights of the day were obtained by the secretary with his A frame monoplane. Only two flights were timed, one 30 secs., and the other 35 secs. Meetings are held on alternate Friday evenings and Saturday afternoons, and the members would be very pleased to see anyone interested in models. The club has already had a model and a medal presented for competition, and a beginners' competition for the model is now in progress.

Twickenham and District (74, CLIFDEN ROAD, TWICKENHAM).

MAY 30TH, 31st, and on June 1st, meeting for the "May" prizes at Whitton Park. Flying at Whitton Park in the evenings as usual this next week.

Monthly Report.—During this month much flying has been done, and a general improvement has been noticed, both in the construction and in the actual flights of the machines. May 2nd, Messrs. Maynard, Franklyn, Stagg, Williams, Ord, Whyte and Rice-Skinner with tractors, also Messrs. Ferry, Maynard, Ord and Whyte out with "pusher types." May 3rd, all the above out with their respective machines, also Mr. Digby, a new member. May 9th, 10th, Messrs. Maynard, Stagg, Franklyn, Ord and Whyte, Ferry and Williams flying. Messrs. Maynard and Ferry flying out of sight with their "pusher types." After a diligent search they were discovered in some orchards. Also Messrs. Barnes and Harries out with new tractors. May 16th, 17th, all last week's members out. Mr. Stagg experimenting with single prop. machine, good durations obtained, also Mr. Franklyn out with "single-sticker." May 23rd, 24th, not much flying, too wet. Nevertheless Messrs. Stagg, Franklyn, Whyte, Maynard and Rice-Skinner out with a few machines. At the weekly meetings (indoor) this month, Mr. Stagg read a paper on the "Evolution of Flight," Mr. Williams on the "Pioneers of the Air," and the secretary on Bird Flight. The club badges are now to be had, and members who have not taken their *brevets* should do so as soon as possible, so as to be qualified for the badges.

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CONTENTS.

Editorial Comment:

PAGE
The Army Air Manœuvres 587
Men of Moment in the World of Flight: Lord Carbery 589
Flying at Hendon 590
The Aerial Derby 593
Eddies. By "Æolus" 595
From the British Flying Grounds 598
Royal Aero Club Official Notices 599
The Prince Henry Circuit, 1914 602
Factors of Safety desirable in Aeroplanes 606
The Flying Machine from an Engineering Standpoint. By F. W. Lanchester 607
Foreign Aircraft News 609
Models. Edited by V. E. Johnson, M.A. 611
Correspondence... 612

EDITORIAL COMMENT.

The Army Air Manœuvres. The present concentration of the Royal Flying Corps at Netheravon should set at rest the minds of those who still will have it that we are doing nothing—or next to nothing—to bring our aerial defences into line with modern requirements. Seventy machines, over a hundred flying officers, 150 transport vehicles, and a staff of 650 air-mechanics, makes a fairly respectable showing for a small army like our own. In fact, so far as the records are there to show, it is the largest concentration of aerial strength that has been seen in any army, large or small. On this much we are justified in priding ourselves, and the more so because we felt that our personnel is at least equal to, and probably better than, that of any other of the Great Powers. There is this reservation to be made, however, that we must not allow the present, magnificent as it may seem, to blind us to the needs of the future. It is always possible to misread these object-lessons unless one is particularly careful to view things in their true proportions. What we mean is this: by a process of exhaustive concentration, in which the Army authorities have called up for concentration the uttermost available unit, we are able to show to the world the greatest aerial force that has ever assembled in one place, and, on the face of it, the lesson might be taken to read that we have reached an absolutely unassailable position in the air. In fact, the unthinking might easily take it to mean the same as the enormous demonstrations of naval strength that Britain occasionally shows to a wondering world when our Government deems it necessary to give to some other Power a more or less friendly hint of the strength and preparedness of the British Navy. In the last case, indubitably the strength is there, and the whole world knows it is, so that the lesson is not lost. But in the case of our air forces, the world at large knows as well as we ourselves that it would tax our resources to the utmost to put another machine or man into the field, and the lesson is thus lost upon a possible rival. On the British public the impression might easily be something quite different. Here, they might say, is the most wonderful assemblage of aeroplanes the world has ever seen. Who said that the Government was neglecting the aerial branch of our national defences? And on the face of things there is only one answer to this query, but when we go deeper there may be quite another. We are not suggesting at all that this concentration has been devised for merely spectacular effect, but it will possibly be as well if the observer will keep his mind perfectly clear in the matter, and will realise that this concentration is one of our uttermost man and machine. What France or Germany could do under similar circumstances we frankly do not know further than they could make a much better numerical showing, and one which would doubtless impress the world with a feeling that whichever had thought it worth while to carry out must be in a state of preponderating strength. Which might, or might not, be the case. The main point is that we do not want to allow the merely spectacular to blind us to the real state of things. A lot of progress has been made recently, but we still have a long way to go before we can rest assured that our position is absolutely a safe one, or even comparable to that of our rivals.

It is not, however, our purpose to gird at the Government. All we are concerned with at the moment is that the public shall not receive a false impression of things, but rather that they should remember that, wonderful as is the muster at Netheravon, it could easily be beaten abroad if only the leaders among the Great Powers chose to go out of their way to give a real demonstration of aerial strength.

So far as concerns the manœuvres themselves, the lessons that are being learned are mainly such as will appeal to the professional rather than the lay mind, and it would be somewhat out of place were we to attempt to dogmatise on them. In a general way, however, it may be said that they must have an enormous bearing on the future of war in the air, since it is apparent from what is allowed to transpire, that the tests through which the pilots and their machines are being put are exhaustive in the extreme. The whole gamut of military operations in relation to aircraft is being gone through with a thoroughness characteristic of modern soldiership. Apparently, great stress is being laid on flying by night, and it seems to have already been pretty clearly proved that aircraft—aeroplanes as well as dirigibles—will be of almost incalculable use during the hours of darkness. The flights that have been made over the camps are earnest of this. If the reports are to be trusted, it would seem that aeroplanes actually passed low over points of concentration without being seen at all, although the pickets and sentries were on the look-out and actually were able to locate their approximate whereabouts by the sound of the motors. If the conditions really reproduced were war conditions, then something has been learned of the possibilities of night operations against camps and bivouacs. Then, a great many signalling and wireless experiments have been carried out, and apparently with uniform success. Another operation which at the time of writing has not been carried out but which it is understood is to be tried, is that of sending out a number of machines to search for and destroy the enemy's air fleet. It is impossible to reproduce the conditions of actual war in these things, but even so it may be taken for granted that much will be learnt which will prove of extreme value. In conclusion, we can only say that the whole business of the concentration is well conceived and seems to have been as well carried out. That our soldier-aviators will profit by the lessons they will learn we know them too well to doubt.

* * *

ROYAL FLYING CORPS.

The following appeared in the *London Gazette* of the 2nd inst. :—

R.F.C. Military Wing.—*Supplementary to Regular Corps.*—Second Lieut. (on probation) Henri C. A. de la F. Biard resigns his commission. Dated June 3rd, 1914.

ROYAL FLYING CORPS (MILITARY WING).

War Office summary of work for week ending May 30th, 1914 :—

No. 2 Squadron.—During the week No. 2 Squadron, with aircraft, mechanical transport and *personnel*, proceeded to Northampton from Lincoln, thence to Oxford. They all arrived at Netheravon on the 30th, and are now engaged in settling in to the Military Wing Concentration Camp.

No. 3 Squadron.—Reconnaissance flights were made daily over Salisbury Plain and the surrounding district.

No. 4 Squadron.—The pilots of this squadron were out practising observation every day.

Nos. 5 and 6 Squadrons.—Cross-country reconnaissances were made daily, the machines of both squadrons arrived at Netheravon for the Concentration Camp on the 29th and 30th. All mechanical transport and *personnel* followed by road and rail.

Nos. 1 and 7 Squadrons.—These squadrons will remain at Farnborough during the concentration at Netheravon. Besides reconnaissance work they will be occupied with technical training.

Headquarter Flight.—During the week this unit was engaged in experimental work ; the machines, mechanical transport and *personnel* reached Netheravon on the 30th ult.

Aircraft Park.—The Aircraft Park have sent on some of their plant to Netheravon. The remainder of the *personnel* and mechanical transport will proceed on June 1st.

General News.—The machines and nearly all the *personnel* have arrived at Netheravon for the Concentration Camp.

A co-ordinated programme of progressive training has been drawn up by the Officer Commanding the Military Wing. The programme includes combined aircraft exercises and reconnaissances, mechanical transport convoy work, mobilization practice and lectures and conferences on military and technical subjects.

Advantage will also be taken of the concentration to hold various inter-squadron and Military Wing athletic competitions.

THE R.F.C. UNDER CANVAS AT NETHERAVON, SALISBURY PLAIN.—A general view of the camp.

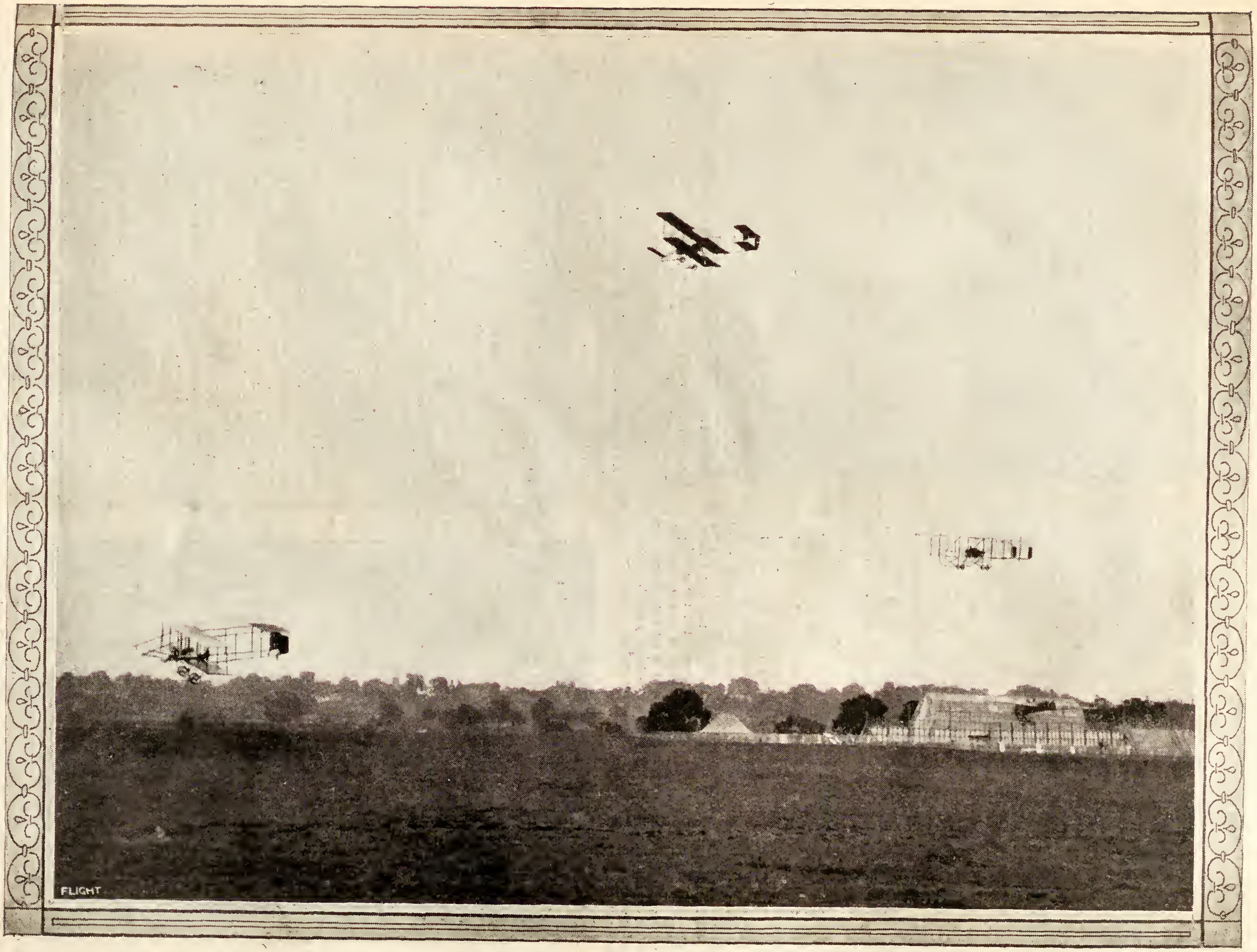
MEN OF MOMENT IN THE WORLD OF FLIGHT.

LORD CARBERY, the well-known amateur who flies a Morane for sport. He made a surprise flight from Paris to London in the middle of last August, soon after securing his *brevet*. He has entered for the Aerial Derby.

FLYING AT HENDON.

The Eighth London Aviation Meeting, which opened at Hendon on Saturday afternoon last and closed on Whit-Monday, was one of the best shows that has been seen at the aerodrome for some time, for in addition to numerous exhibition flights there was excellent racing on the Saturday and Monday. On both these days the weather was fine though somewhat windy, but on the Sunday showers of rain rendered the proceedings a trifle unpleasant; the attendance on each occasion was also very good. The new Viennese orchestra and Miss Murray's singing in the paddock enclosure were much appreciated. Saturday's proceedings opened shortly before 3 o'clock with exhibitions by R. J. Lillywhite and N. Howarth on the G.-W. bi-rudder 'bus, Louis Noel on the 70 h.p. Maurice Farman, and R. H. Carr with a passenger on the 80 h.p. Blériot. F. W. Goodden then ascended on the 80 h.p. Morane-Saulnier and gave a demonstration of looping the loop, for the first time in public, executing three single loops at altitudes of about 1,000 ft. and two tail slides. Noel in the meanwhile made two passenger flights in the Maurice Farman, whilst W. Brock blossomed forth as a Morane pilot. His first flight was short, as engine trouble let him down at the far end of the aerodrome, but after some adjustments had been made he put up a longer and more successful flight. Noel then tried an 80 h.p. Le Rhone-Henry Farman—the same machine on which P. Verrier made an attempt for the Monaco rally just recently—which has been acquired by the Grahame-White Co., and Carr and Verrier gave exhibitions on the G.-W. tractor biplane "Lizzie" and a 70 h.p. Maurice Farman respectively. Verrier performed all sorts of "stunts," including nearly a circuit of the aerodrome standing up in the *nacelle* waving his arms about. The first heat (4 laps) of the speed handicap for the "Daily Telegraph" Cup was then flown, there being five starters as follows:—A. E. Barrs on G.-W. 'bus No. 107 (2 mins. 25 secs.); N. Howarth on G.-W. 'bus No. 109 (2 mins. 6 secs.); R. H. Carr on "Lizzie" (1 min. 3 secs.); W. L. Brock on the 80 h.p. Blériot (22 secs.); and F. W. Goodden on the 80 h.p. Morane-Saulnier (scratch). All got away without incident with the exception of Goodden who met with a mishap in starting which might, but for his presence of mind, have resulted in a very serious accident. As his machine started on the fall of the flag it made a sudden swerve to the right and went straight for the enclosure railings behind which were sitting a number of spectators. Although Goodden switched off immediately, the machine continued on its course with some considerable force, so he shoved the control lever far forward in order to bring the machine on its nose and so prevent it from dashing into the crowd. In this he was partially successful, for as the machine crashed into the railings it turned over on its nose, and according to rumour, hit the back of a taxi-cab with its tail. Fortunately the spectators managed to jump clear and no one was injured in any way, whilst Goodden, who had strapped himself in as it was his intention to loop the loop after the race, remained intact in his seat. All the damage done, therefore, was a broken propeller, slightly injured planes, and some half-a-dozen chairs (but recently occupied) demolished. The machine was soon brought back to a more dignified position and returned to its hangar, and we were then able to turn our attention to the progress of the race. Barrs, who was flying his first race in fine style, maintained the lead throughout, whilst Carr made a fine effort to obtain first place which he lost by one second, Brock being third 14 seconds behind him. Whilst this heat was in progress J. L. Hall had ascended on his 50 h.p. Avro to an altitude of several thousand feet, from which height he descended *à la mode* with his engine stopped. The second heat of the speed race resulted in a magnificent finish, all four competitors coming home within two seconds. The starters for this heat were:—R. J. Lillywhite on the G.-W. bi-rudder 'bus (1 min. 55 secs.); W. Birchenough on his new mount—which he handles in fine style—the Maurice Farman (1 min. 7 secs.);

HENDON AERIAL DERBY.—A view of the enclosures.—*Verb. Sap.:* Go early.



"Flight" Copyright.

RACING AT HENDON.—The second heat of the Speed Handicap on Whit Saturday. From left to right the machines are: Messrs. R. J. Lillywhite (G.-W. twin rudder), Verrier (Maurice Farman), W. Birchenough (G.-W.-Maurice Farman), and L. Noel (Blériot).

P. Verrier also on a Maurice Farman (50 secs.); and Louis Noel with a passenger on the 80 h.p. Blériot (scratch). They all kept in the order in which they started until the end of the last lap, when Verrier and Birchenough changed places. Lillywhite, therefore, came in first with Verrier second, only $\frac{1}{5}$ sec. behind and $\frac{4}{5}$ sec. ahead of Birchenough, Noel being last 1 sec. behind the latter. Immediately after the third heat W. Newell made his first public demonstration of a parachute descent from an aeroplane. A special platform had been fitted on the front of the left skid of the 100 h.p. Grahame-White aerobus, whilst a rope seat was provided on the chassis struts. Having taken his position with the parachute on his lap, the aerobus with Carr as pilot, Goodden as "pusher off," and Chapman as mechanic, ascended to a height of 2,000 feet, where Newell made a head-first dive to earth with the parachute behind him. He fell some three or four hundred feet before the parachute opened and let him down gracefully into a field just outside the aerodrome behind the railway, the descent taking 2 mins. 8 secs. Just before the final heat of the speed handicap was flown two passengers were taken up by Noel and Lillywhite on the Maurice Farman and the bi-rudder 'bus respectively, whilst M. Zubiaga ascended on his 60 h.p. Gnome Caudron biplane which he damaged somewhat on landing. The final heat of six laps provided plenty of excitement, especially when the machines were rounding No. 6 pylon on the last lap, when Carr had to turn out of the course in order to avoid a collision. Verrier crossed the line first 12 secs. ahead of Barrs, Lillywhite being third 4 secs. behind the latter.

	Result of the Final Heat. (6 laps.)	Handicap.	Handicap Time.
		m. s.	m. s.
1.	P. Verrier (70 h.p. Maurice Farman biplane)	0 47	11 57
2.	A. E. Barrs (50 h.p. G.-W. biplane) ...	2 48	12 9
3.	R. J. Lillywhite (50 h.p. G.-W. biplane) ...	2 32	12 13
	R. H. Carr (50 h.p. G.-W. tractor biplane)	scratch	retired

Before the proceedings were brought to a close several more exhibition and passenger flights were made, including a looping demonstration by Carr on "Lizzie." Hall took the writer for a "joy ride" up to about 2,000 ft. and demonstrated the excellent gliding properties of his 50 h.p. Avro, which is now in splendid form and certainly flies very steadily. For a tractor biplane the observation qualities of this machine are remarkably good. Claude Grahame-White made a flight towards the end of the evening on the Henry Farman.

Mr. W. Newell, who has been again making parachute descents at Hendon, comfortably tucked up on his perch, prior to a descent last week-end.

Mr. W. Newell's parachute descent from aeroplane at Hendon—a distant snap taken a few moments after he had parted from the aeroplane.

As previously mentioned, a drizzling rain on Sunday prevented much flying from taking place. Many of the Hendon pilots, however, gave exhibitions. Louis Noel was out on the 80 h.p. Henry Farman, W. Birchenough and P. Verrier flew Maurice Farmans, and various members of the Grahame-White stud went up on the G.-W. 'buses. R. H. Carr also gave a demonstration of looping on "Lizzie." J. L. Hall made pretty flights and glides on his 50 h.p. Avro.

Whit-Monday was a very busy day, and two racing events were down on the programme, a 9-mile speed handicap of two heats of four laps each and a final heat of six laps for the Hendon Cup, and a 30-mile cross-country handicap for the Giesler Challenge Trophy and a purse of 100 gns. The weather was ideal, and spectators arrived on the scene as early as noon, from which time until the start of the first heat of the speed handicap at 2.30 p.m., numerous exhibition and passenger flights were made, including a fine altitude flight by W. L. Brock on the 80 h.p. Morane-Saulnier, during which he reached an altitude of 8,300 ft. Unfortunately this splendid flight terminated with a slight mishap on landing, which resulted in a smashed propeller and other minor injuries to the machine, but none to the pilot. The first heat of the speed handicap produced five starters as follows:—N. Howarth on a 50 h.p. G.-W. 'bus (2 mins. 55 secs.); R. J. Lillywhite on a similar machine (1 min. 55 secs.): W. Birchenough on the 70 h.p. Maurice Farman (1 min. 22 secs.); Louis Noel on the 80 h.p. Henry Farman (37 secs.); and W. L. Brock on the 80 h.p. Blériot (scratch). The finish of the heat was one of the closest seen at Hendon for some time, for Noel and Birchenough both flew a very fine course and put up an exciting fight for first place, which Noel obtained by a bare $\frac{1}{5}$ sec. The scratch man, Brock, came in a good third, $\frac{2}{5}$ sec. behind Birchenough, and $\frac{4}{5}$ sec. in front of Lillywhite who took his pylons in really excellent style and maintained the lead until the last moment. Five also started in the second heat, viz.: E. F. Norris (2 mins. 47 secs.) and A. E. Barrs (2 mins. 10 secs.) on G.-W. 'buses, P. Verrier on a 70 h.p. Maurice Farman (36 secs.), C. Grahame-White on "Lizzie" (20 secs.), and R. H. Carr on the 80 h.p. Blériot (scratch). Norris and Barrs kept ahead all the time, the latter gradually catching up Norris, who crossed the line first, but at the last moment Grahame-White overhauled Barrs, and obtained second place by 1 sec., 13 secs. behind Norris. Carr came in fourth, 13 secs. after Barrs, but Verrier retired. Before flying the final heat a start was made for the cross country handicap, for which there were six starters. These were:—R. J.

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Lillywhite on the bi-rudder 'bus (7 mins. 55 secs.); W. Birchenough on the Maurice Farman (5 mins. 25 secs.); P. Verrier on another Maurice Farman (3 mins. 27 secs.); Louis Noel on the Henry Farman (2 mins. 5 secs.); R. H. Carr on "Lizzie" (1 min. 55 secs.); and W. L. Brock on the Blériot (scratch). The course was six laps of the Bittacy Hill circuit. This race also produced an exciting finish, for on the last lap the machines returned in a bunch. Noel crossed the line first, and 43 secs. after, Brock, who had dived in under the two Maurice Farmans which were racing side by side, came in second. Neither Birchenough nor Verrier gained on the other and they crossed the line together, a perfect dead heat, 7⅗ secs. behind Brock. Lillywhite came in next, but Carr had to retire on the fifth lap owing to engine trouble. Immediately after the race Mr. Forestier, on behalf of the Giesler Champagne Co., presented Noel with the cup—containing Giesler champagne—and said that he hoped to do the same next year. After passing the cup round (with the champagne) cheers were given for Louis Noel and Mr. Forestier, and then the final of the speed handicap was flown. The starters in this heat were:—E. F. Norris on 'bus 109 (2 mins. 57 secs.); W. Birchenough on the Maurice Farman (1 min. 21 secs.); C. Grahame-White on "Lizzie" (15 secs.); and Louis Noel on the Henry Farman (scratch). The first home was Grahame-White, Birchenough coming in second only ⅖ sec. behind, and Noel third 3⅗ secs. after. Shortly after the race Carr took up four ladies on the aerobus and Grahame-White gave Mr. Forestier a trip on the Maurice Farman, whilst Hall on his Avro, and Howarth and Norris on the 'buses gave exhibitions. Then Carr on "Lizzie" and Goodden on the repaired Morane-Saulnier gave a combined demonstration of looping, Carr making six loops at altitudes varying from 1,000 to 800 ft., and Goodden in addition to looping executed a tail slide. Before the proceedings were brought to a close, passengers were taken up by Lillywhite on the bi-rudder 'bus, Birchenough on the Maurice Farman, Noel on the Henry Farman, and Carr on the Blériot. Hall also made a flight on his Avro, descending with his engine stopped to a few hundred feet of the ground, and then diving and starting the engine again. Further exhibitions were also given by Barrs, who made a fine high flight on the bi-rudder 'bus, Howarth on the same machine, Goodden on the Morane-Saulnier, and Noel on the Maurice Farman on which he executed a pretty *vols sans force*.

Final Heat of Speed Handicap. (6 laps).	Handicap.	Handicap Time.
	m. s.	m. s.
1. C. Grahame-White (50 h.p. G.-W. tractor biplane)	0 15	11 47
2. W. Birchenough (70 h.p. M. Farman biplane)	1 21	11 47⅖
3. Louis Noel (80 h.p. Henry Farman biplane)	scratch	11 51
4. E. F. Norris (50 h.p. G.-W. biplane) ...	2 57	12 22

Cross-Country Handicap (30 Miles) for the Giesler Trophy.		
1. Louis Noel (80 h.p. Henry Farman biplane)	2 5	31 18
2. W. L. Brock (80 h.p. Blériot monoplane)...	scratch	32 1
3. W. Birchenough (70 h.p. M. Farman biplane)	5 25	32 8⅗
3. P. Verrier (70 h.p. Maurice Farman biplane)	3 27	
4. R. J. Lillywhite (50 h.p. G.-W. biplane) ...	7 55	33 56
R. H. Carr (50 h.p. G.-W. tractor biplane)	1 55	retired

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THE AERIAL DERBY, 1914.

(Postponed from May 23rd.)

To-morrow (Saturday) the Aerial Derby round London will take place, starting from the London Aerodrome, Hendon, at 4.15 p.m. This race, it will be remembered, was to have been flown on May 23rd last, but had to be postponed on account of the unfavourable weather. In our issue of May 22nd we published full particulars of all the machines, as well as photographs and silhouettes, to enable our readers to easily identify the various machines as they passed overhead. In addition we published portraits of the pilots and a key map and detailed maps of the course.

A comparison of the table of pilots and machines printed on this page, with the similar table in our issue of May 22nd, will show that the number of machines entered remains the same, but that some of the machines and pilots have been replaced by others. The new comers are Bjorkland on a Blériot, W. Birchenough on a M. Farman, and W. L. Brock on a Morane. In our present issue we again publish silhouettes of the various types of machines with their new numbers, and in addition we give portraits of the three pilots who were not entered in the previous list. For full particulars of the machines, and other portraits of the pilots, we therefore refer our readers to our issue of May 22nd last, in which they were all fully dealt with, and which forms, in fact, a complete guide to the race.

The course—a complete circuit of London—covers a distance of 95 miles, and after leaving the Hendon Aerodrome at 4.15 p.m. the aviators, passing over Wembley, Ealing, and Hounslow, will make for the first turning-point at Kempton Park, *i.e.*, a square brick chimney, 230 ft. high, just north of Kempton Railway Station. They will then head towards Epsom, and after rounding the grand stand at the top of the downs, will enter the longest section of the course, passing near Croydon, Beckenham, Bromley, Sidcup, Bexley and Dartford, then crossing the Thames to West Thurrock, where the turning point is the cement works slightly to the east of West Thurrock Church. At this point the airmen will have covered 51 miles, more than half the course, and the real struggle will commence. The machines enter the fourth section, setting their course for Epping, and after passing round Epping Church Tower, they will steer for Hertford, the last point on their homeward journey, passing Broxbourne. From Hertford, where the turning point will be indicated by a large white cross in a field adjoining the railway station north of the town, the pilots will make their final dash to the finishing line at the Hendon Aerodrome, passing near Potter's Bar, High Barnet, and Mill Hill, the winner being expected to arrive shortly after 5 p.m.

In addition to the *Daily Mail* Gold Cup and the Shell £250 prize for the fastest time, a sealed handicap for the Shell trophy and a £100 prize will be run off in connection with the race, whilst the second and third men will receive £75 and £25 respectively.

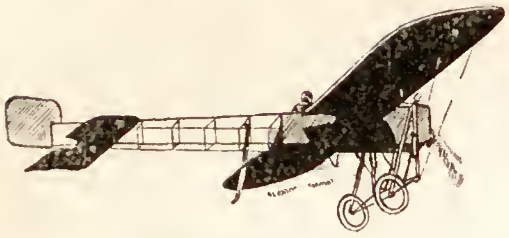
Special accommodation has been provided in the aerodrome enclosures, which will open at 12 noon, and it is announced that looping displays and passenger flights will be given from 1 p.m. to 4 p.m. and at intervals during the afternoon.

AERIAL DERBY, JUNE 6th. Particulars of Machines, &c.

New No.	Old No.	Pilot.		Machine.		Type.	Engine.
							h.p.
1	—	Filip Bjorkland	Sw.	Blériot	F.	Monoplane ...	50 Gnome
2	—	W. Birchenough	B.	M. Farman	F.	Biplane ...	70 Renault
3	2	R. H. Carr	B.	Grahame-White	B.	Biplane ...	50 Gnome
4	3	M. Zubiaga	Sp.	Caudron	F.	Biplane ...	60 Gnome
5	11	L. Noel	F.	H. Farman	F.	Biplane ...	80 Le Rhone
6	4	P. Verrier	F.	H. Farman	F.	Biplane ...	80 Gnome
7	5	J. Blatherwick	B.	Martinsyde	B.	Biplane ...	65 Antoinette
8	6	L. A. Strange	B.	Blériot	F.	Monoplane ...	80 Gnome
9	7	J. Alcock	B.	M. Farman	F.	Biplane ...	100 Sunbeam
10	8	W. R. Ding	B.	Handley Page	B.	Biplane ...	100 Anzani
11	10	F. Goodden	B.	Morane	B.	Monoplane ...	80 Gnome
12	—	W. L. Brock	U.S.	Morane	B.	Monoplane ...	80 Gnome
13	—	Name of pilot to be announced		Morane		Biplane ...	80 Gnome
14	12	Lord Carbery	B.	Morane	F.	Monoplane ...	80 Le Rhone
15	13	H. Blackburn	B.	Avro	B.	Biplane ...	80 Gnome
16	15	R. H. Barnwell	B.	Vickers	B.	Biplane ...	100 Gnome
17	16	V. Waterfall	B.	Martinsyde	B.	Monoplane ...	120 Austro-Daimler
18	19	Name of pilot to be announced		Sopwith	B.	Biplane ...	80 Gnome
19	9	S. V. Sippe	B.	Bristol	B.	Biplane ...	80 Gnome
20	14	F. P. Raynham	B.	Avro	B.	Biplane ...	80 Gnome
21	20	H. Pixton	B.	Sopwith	B.	Biplane ...	100 Gnome

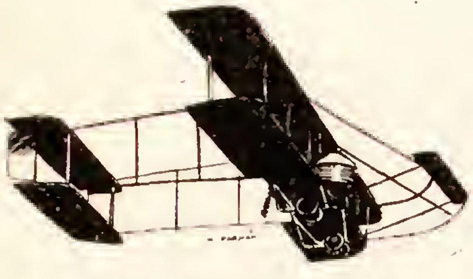
B. = British. F. = French.
Sp. = Spanish. Sw. = Swedish. U.S. = United States.

HOW TO RECOGNISE THE MACHINES.



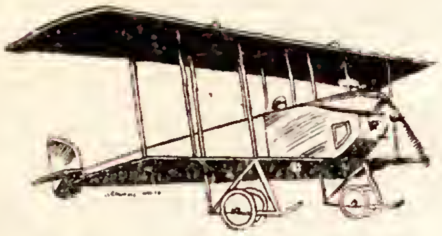
Blériot Monoplane.

No. 1. Filip Bjorkland.
No. 8. L. A. Strange.



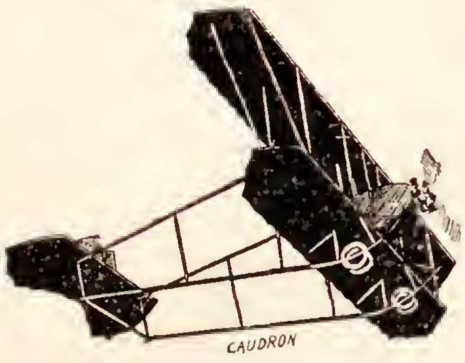
M. Farman Biplane.

No. 2. W. Birchenough.
No. 9. J. Alcock.



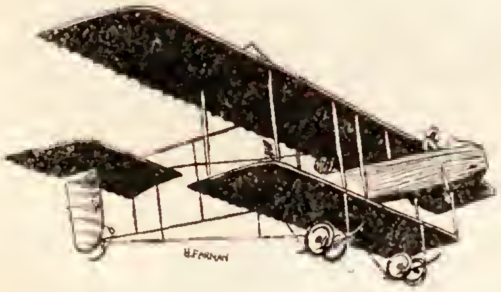
Grahame-White Biplane.

No. 3. R. H. Carr.



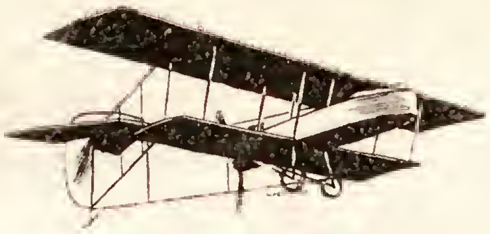
Caudron Biplane.

No. 4. M. Zubiaga.



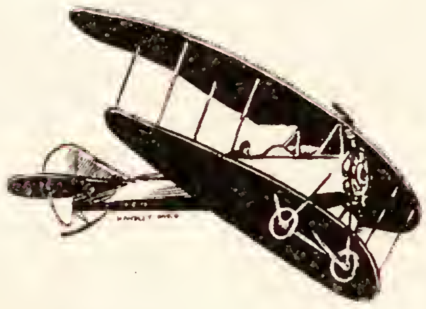
H. Farman Biplane.

No. 5. L. Noel.
No. 6. P. Verrier.



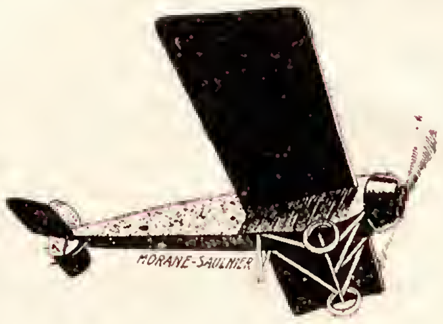
Martinsyde Biplane.

No. 7. J. Blatherwick.



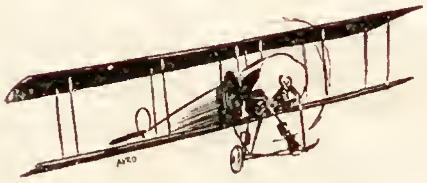
Handley Page Biplane.

No. 10. W. R. Ding.



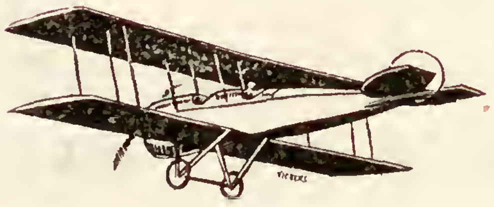
Morane-Saulnier Monoplane.

No. 11. F. Goodden.
No. 12. W. L. Brock.
No. 13. Pilot not announced.
No. 14. Lord Carbery.



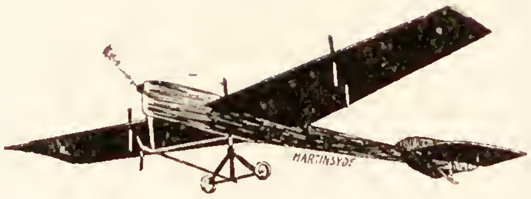
Avro Biplane.

No. 15. H. Blackburn.



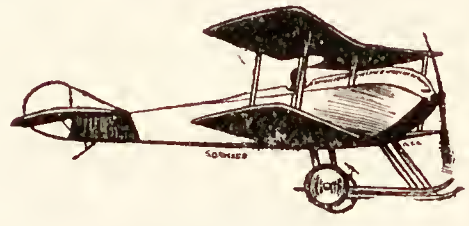
Vickers Biplane.

No. 16. R. H. Barnwell.



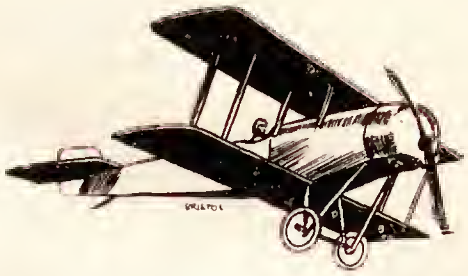
Martinsyde Monoplane.

No. 17. V. Waterfall.



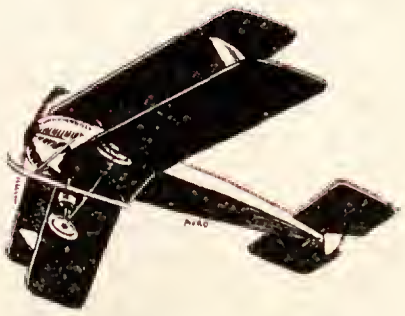
Sopwith Biplane.

No. 18. Pilot not announced.



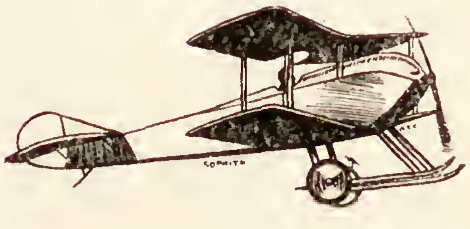
Bristol Biplane.

No. 19. S. V. Sippe.



Avro Scout Biplane.

No. 20. F. P. Raynham.

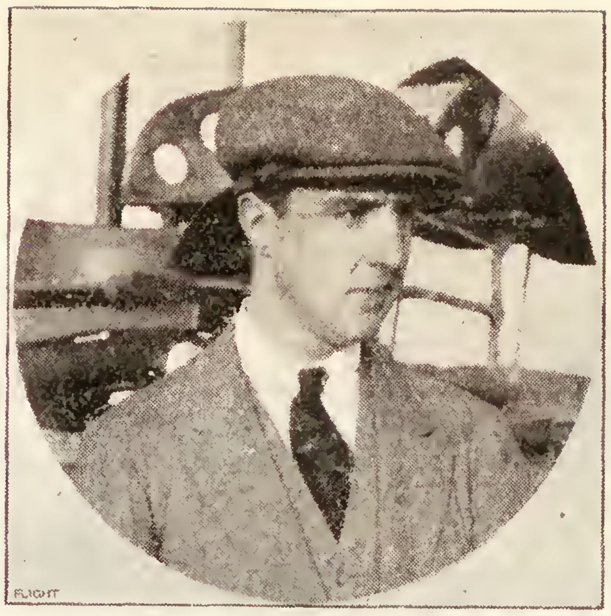


Sopwith Biplane.

No. 21. C. H. Pixton.

From the above silhouettes it will be seen that of the 21 machines entered 7 are monoplanes, 9 tractor biplanes and 5 "pusher" biplanes. The Blériot monoplanes may be recognised by their rounded wing tips and open *fuselage*, and the Moranes by the enclosed *fuselage* and angular wing tips. The Martinsyde monoplane will be easily identified by its long narrow *fuselage* and tapering wings. Of the tractor biplanes the Handley Page is characterised by crescent-shaped wings, whilst the wings of the Avro scout slope backwards. The Sopwith and Bristol scouts may be identified by bearing in mind that the Sopwith has its planes set at a dihedral angle and its chassis fitted with skids, whilst the Bristol has straight wings and no chassis skids. The Vickers biplane resembles the Sopwith and Bristol, but has a wider *fuselage*. The Grahame-White biplane differs from the other above-mentioned tractor biplanes in that the upper plane is of larger span than the lower one, whilst the gap between the planes is unusually large. The Caudron biplane, although of the tractor type, has its tail planes carried on an outrigger similar to those of the "pusher" biplanes. Of the machines belonging to the latter type the two M. Farmans may be recognised by their front elevator, whilst the H. Farmans are characterised by the large overhang of their upper planes. The Martinsyde biplane resembles the H. Farmans, but has staggered planes.

Filip Bjorkland (No. 1).



W. Birchenough (No. 2).

W. L. Brock (No. 12).

AERIAL DERBY.—The three new pilots.

* * *

EDDIES.

RAYNHAM, "the Glider," had a few very exciting moments the other Sunday, when flying from Hendon to Brooklands on the little Avro scout. When about five or six miles from Brooklands his engine wrenched the rear engine plate loose and twisted round until the magneto and oil pump, &c., were up against the top of the *fuselage*. As by this time the connections had been broken the engine stopped. Raynham then thought it was about time to look for a likely-looking field in which to land, but finding that he had a following wind he decided to try and reach Brooklands aerodrome. Thanks to the excellent gliding angle of the Avro scout he succeeded in making the "bowl" at a sufficient altitude to make a half turn and land head to wind in front of the "Blue Bird."

× × ×

The Martinsyde trans-Atlantic "liner" is growing apace. The wings are ready to be covered, in fact, by the time these lines appear they should be nearly finished; and last week the *fuselage* was nearing completion. A faint idea of the size of the wings can be obtained from the accompanying photograph. Each wing is built up in two sections, of which the inner section is rigid whilst the outer one can be warped. The workmanship is, as one expects from a firm enjoying such a reputation as Messrs. Martin and Handasyde, of the very highest quality. In its general shape the *fuselage* resembles those of previous Martinsydes, but constructionally it differs in that cross-wiring is employed instead of the three-ply panels which have always formed one of the characteristics of these machines. I saw the *empennage* marked out on the floor, and it gave one the impression of having nearly as large area as the wings of some small monoplanes. In

Sig. Caruso is engrossed with the flying at Hendon.

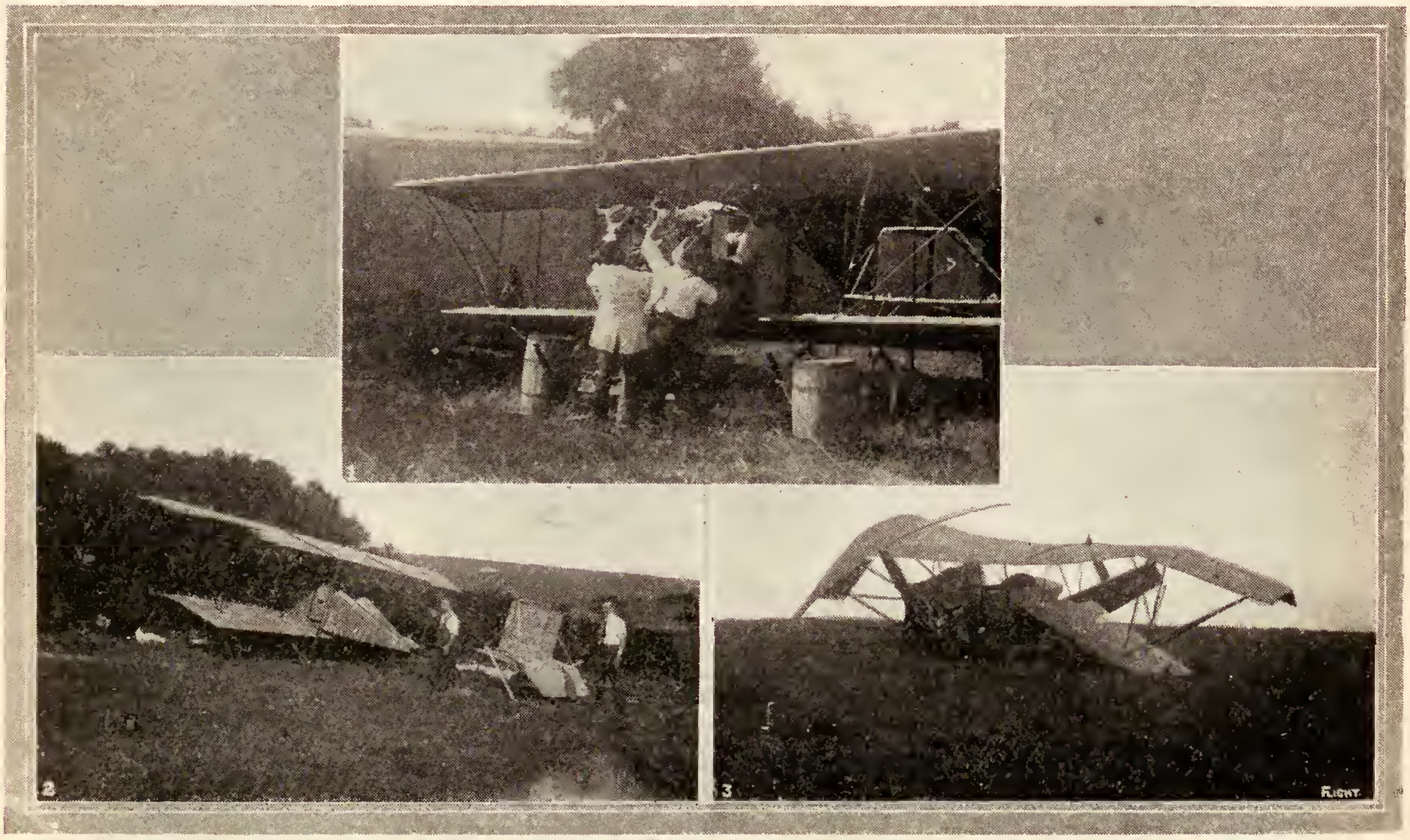
addition to the two extra hangars which they have taken in view of all the parts being duplicated, the Martinsyde firm are building a large shed a short distance beyond the Blériot works in which to erect the new machine.

× × ×

One of the wings "in the making" of the Martinsyde trans-Atlantic "liner."

Building and flying an aeroplane out in South Africa is not exactly a Sunday school picnic, according to a letter I have received from Mr. A. K. Robertson, of Chiselhurst, Cambridge, Cape Province. Mr. Robertson's handiwork bears a slight resemblance to the Caudron biplane and took six months to build, only such materials as were unobtainable out there being imported. The work of construction was enlivened occasionally in the most unusual manners. Once, for instance, during a temporary suspension of operations, a family of rats was found comfortably installed in one of the extensions of the upper plane. On another occasion a swarm of bees took a fancy to the machine, much to the disgust of the erecters who did not relish the idea of working in a beehive, whilst it was an everyday occurrence for tarantulas to promenade up and down the ribs.

However, ultimately the machine was finished, and hauled down behind a motor car at night (to avoid the traffic) to the local racecourse. One fine morning, with a wind of only 10 m.p.h., the machine was tried, with the result shown in one of the accompanying photographs. Mr. Robertson, who had no previous experience in piloting an aeroplane, got into the seat, and a friend took hold of a wing tip while the engine was run throttled down. After deciding that everything was behaving "according to Cocker," Mr. Robertson nodded to his friend to let go, but the latter, not quite understanding the complexities of starting an aeroplane, "hung on like a true Briton," and did some giant leaps when the throttle was opened out. He was ultimately persuaded to let go, and after a run along the ground the machine was elevated a few feet and did a hop of about 400 yards. At this moment she was caught by a gust and rose to a height of about 50 ft.



Mr. Robertson's home-made South African biplane.—1. Mounting the 60 h.p. Anzani engine. 2. Before the smash, sheltering from the wind. 3. After the smash.

Before Mr. Robertson could get her nose down again she stalled and did a pancake from which there was no time to recover.

Mr. Robertson finishes his letter with the following brief but eloquent sentence: "I am rebuilding."

That's the right spirit. Stick to it, and better luck next time!

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I learn from Mr. F. Murphy, who is responsible for the design of the Hamble River seaplane, that the machine is now nearing completion after having been partly redesigned, and that it will be tested shortly. One wishes this newcomer to the aeroplane industry every success, as the machine embodied at the time of its appearance at the last Olympia Aero Show several innovations representing distinct advances in design and construction, although, as regards its general arrangement, following more or less standard lines.

× × ×

Mr. Dukinfield Jones, who, it will be remembered, did such good flying on the Isaacson-engined Flanders biplane, has now joined the D.F.W. firm and will in the future fly the well-known machines of that make. Mr. Jones already handles the big D.F.W., as if he had never piloted anything else, and he speaks very highly of this machine. One of the small fast 100 h.p. reconnaissance-type biplanes is expected over here shortly, so that Mr. Jones will then have a chance of showing what he can do on a really up-to-date fast machine.

× × ×

The Flanders biplane has, I understand, been bought by Mr. R. E. B. Hunt, who got his ticket at the Eastbourne Aviation Company's flying school in, if I am not mistaken, December last, and who is now making a tour in the Midlands. By the way, Mr. Howard Flanders is now on his way back from Australia, where he has been recuperating from his motor cycle accident some months since. Mr. Flanders' health has undergone a marked improvement during his stay in the southern hemisphere, and it is to be hoped that we may soon see him in harness again, for it would be a thousand pities should the aeroplane industry lose a man of such unquestionable ability as Mr. Flanders.

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Mr. J. L. Hall has discovered a new method of working his way, so to speak, from place to place. Like so many other great discoveries, it was made accidentally. It came about in this wise. Last Friday Mr. Hall set out for Brooklands with Miss Dulcebella Clifford, who is a pupil at the Hall flying school at Hendon, as a passenger on his Avro. The trip was made without incident, but as it was getting rather late Miss Clifford decided to take the train home. Mr. Hall had intended to spend the night at Brooklands, but as the telephone was found to be out of order he was unable to let his mechanics know of his decision to remain at Brooklands, and so to save them worry Mr. Hall decided to attempt the return journey. All went well until he ran into some dense clouds, then, as his compass was not reliable, he came down to a lower altitude to get his bearings, and incidentally noticed that according to his oil gauge there was precious little oil left, so little in fact that it would have been unwise to attempt to complete the journey. He therefore landed in the first likely-looking field.

Mr. Hall soon experienced that difficulty which has beset so many pilots who have had to make a forced

Commander Samson finds time at Hendon to appreciate the lighter side of things on *terra firma*.

landing *en route*. Within a couple of minutes his machine was surrounded by a crowd of people, who displayed a greater amount of interest than was altogether beneficial to the machine, sitting on the wings and trying to poke their fingers through the fabric. Several asked for passenger flights, and one or two managed to raise fifteen shillings each and were taken for short flights. Mr. Hall was rather pleased, as he had come away with a minus amount of cash about him, and the money thus raised paid for the two policemen who kept watch over the machine during the night, and also covered the bill respectfully tendered by the keeper of the inn in which Hall spent the night.

The Aerial Derby round London, which was to have taken place on Saturday, May 23rd, but which was postponed on account of bad weather, will be flown to-morrow (Saturday). Those who saw the performances of the Sopwith and Avro scouts at Hendon on May 23rd will have an idea of the speeds to be expected in the race. In addition to these machines, there are entered two other fast scouting biplanes—the Bristol and the Vickers scouts—which are expected to be as fast, if not faster, than the Sopwith "tabloid," whilst the four Morane monoplanes entered will be well matched, being all of the same engine power. "ÆOLUS."

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—Monday last week, much too windy for flying, and only one machine was out, No. 150 Avro, 50 h.p.

Tuesday, rather windy, No. 104 Sopwith, 80 h.p.; No. 153 Bristol tractor, No. 49 B.E., No. 31 Henry Farman, 70 h.p.

Wednesday, windy. No 31 Henry Farman, 70 h.p., to Isle of Grain; No. 50 B.E.; No. 70 M. Farman, 70 h.p., from Isle of Grain.

Thursday, rather windy. No. 31 Henry Farman, 70 h.p., to Whitstable; No. 70 M. Farman, 70 h.p., only machines out.

Friday, fine. No. 70 Maurice Farman, 70 h.p., to Isle of Grain; No. 31 Henry Farman, 70 h.p.; No. 2 Short, 50 h.p.; No. 104 Sopwith, 80 h.p., Lieut. Marix, to Oxford; No. 49 B.E.; No. 45 Caudron, 50 h.p.; No. 64 Short, 50 h.p., to Whitstable.

Saturday, fine. No. 104 Sopwith from Oxford.

Civilian Flying.—Mr. Alec Ogilvie was out twice during the week on his 50 h.p. Wright. Mr. Leo Jezzi was out on Saturday evening, and had a short flight on his machine, 35 h.p. Little Jap, but had to give up as the engine was not working properly.

Brooklands Aerodrome.

Monday morning last week the Bristol and Vickers pupils out. Lieut. P. B. Joubert de la Ferté flew to Netheravon on Blériot 260. In the afternoon, Mr. Sippe on the Bristol "Scout," and Mr. Jack Alcock on the 100 Sunbeam.

On Tuesday morning, Mr. Alcock for three flights on the 100 Sunbeam; in the afternoon, Bristol biplanes out for cinematograph purposes, Mr. Waterfall on the Martinsyde, Mr. Mahl up to 5,000 ft. on the Sopwith. Arrival of No. 6 Sopwith "Scout."

Vickers and Bristol pupils out on Wednesday morning, and Mr. Gower on the 50 Blériot; in the afternoon, Mr. Sippe on the Bristol "Scout," Mr. Dukinfield Jones on the D.F.W., Mr. Gower two flights on Blériot, and Blériot, Bristol, and Vickers pupils out.

Bristol, Vickers and Blériot pupils out on Thursday, Mr. Dukinfield Jones on the D.F.W., and Mr. Waterfall on Martinsyde. Mr. L. Parker passed his *brevet* tests (altitude 400); in the afternoon, Mr. Strutt on Bristol, Mr. Waterfall on Martinsyde, Mr. Dukinfield Jones for three flights on D.F.W., Mr. Alcock on 100 Sunbeam, Mr. Gower on 50 Blériot, and Blériot, Vickers, and Bristol pupils out.

On Friday, Bristol, Blériot, and Vickers pupils out, Mr. Gower on 50 Blériot, Mr. Sippe on Bristol "Scout" and Mr. Dukinfield Jones on D.F.W.; in the afternoon, Mr. Waterfall on Martinsyde, afterwards taking up Lieut. Blatherwick, R.N., as passenger, and then off to Farnborough for test; Mr. Gower on 50 Blériot, Mr. Sippe on Bristol "Scout," engine test of Vickers "Scout," Mr. Sippe on Bristol "Scout" for cinematograph, Mr. Alcock to Sunbury on 100 Sunbeam, Mr. J. L. Hall and lady passenger came in from Hendon on 50 Avro. Mr. Mahl on Sopwith. Bristol, Blériot and Vickers pupils out. *Brevets*: Mr. Racine Jacques on Bristol (altitude 350) and Mr. Jack Collins, A.B. (altitude 550).

Brevet tests by Mr. T. S. Duncan on Vickers biplane (altitude 600) on Saturday morning. Mr. Alcock on 100 Sunbeam, Mr. Waterfall arrived back from Farnborough on Martinsyde with Mr. Claude Joubert de la Ferté as passenger. In the afternoon, Mr. Alcock to Sunbury on 100 Sunbeam, Mr. Mahl on Sopwith two-seater and "Scout," Mr. Gower on 50 Blériot, Mr. Dukinfield Jones on D.F.W., Lieut. Collett, R.N., on D.F.W., Mr. Sippe with Mr. Stutt in from Farnborough on 80 Bristol tractor in 19 mins., Mr. Stutt on 50 Bristol, Mr. Sippe on Bristol "Scout."

On Sunday, Mr. Mahl was first out on Sopwith two-seater, followed by Mr. Alcock on the 100 Sunbeam, and Mr. Gower on the 50 Blériot. The winner of the free passenger flight—Miss Kitty Allen—was taken across country by Mr. Alcock on the 100 Sunbeam.

On Whit-Monday there was plenty of interesting flying during the course of the motor racing, by Messrs. Mahl (Sopwith), Pixton (Sopwith "Scout"), Dukinfield Jones (D.F.W.), Alcock (100 Sunbeam), and Gower (Blériot). Seven of the ten entrants started in the Whitsun Aeroplane Handicap, which was won by Mr. Knight on the 50 Vickers, followed by Mr. Stutt on the 50 Bristol, Mr. Waterfall on the Martinsyde, Mr. Sopwith on the Sopwith "Scout," Mr. Sippe on the Bristol "Scout," Mr. Mahl on the 80 Sopwith two-seater, and Mr. Alcock on the 100 Sunbeam. Mr. Knight, who was on limit with Mr. Stutt, took the lead at the start, and the back division were unable to overhaul him. The struggle between the two machines of the "Scout" type was particularly interesting.

Vickers School.—Monday last week, Lieut. Gillman on biplane with instructor.

Wednesday. With pilot:—Lieuts. Eberli and Gillman, and Messrs. Collins, Parker and Steinbach. Messrs. Collins, Steinbach and Wilson solos. Messrs. Miller and Klingenstein with pilot.

Thursday. With pilot:—Lieut. Eberli and Messrs. Klingenstein and Miller, and Lieut. Tennant. Messrs. Wilson, Collins and Steinbach, and Lieut. Tennant solos.

Friday. With pilot:—Lieuts. Tennant and Eberli, and Messrs. Klingenstein and Miller. Messrs. Steinbach, Collins and Wilson, and Lieuts. Tennant and Eberli solos. Mr. Collins for *brevet*, getting through in fine style.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Thursday last week, Messrs. Lui, Shepherd, Wyles, Boyesen, Robinson, Lowe, and Major Peck straights with Instructors Birchenough, Howarth, and Barrs. Mr. Howett solo straights and right-hand turns. Messrs. Carpenter, Cowley, and Weber solo circuits.

Friday, Messrs. Weber, Carpenter, Cowley, Howet, solo circuits, figures of eight, &c., Messrs. Winter, Robinson, Boyesen, solo straights and circuits. Messrs. Lui, Palmer, Shepherd, Wyles, Lowe, and Major Peck, straights with Instructors Howarth and Lillywhite. Mr. Gruning rolling and afterwards making straights with Instructors. Mr. Carpenter later completing his *brevet* tests.

Saturday, Messrs. Shepherd, Lui, Wyles, and Major Peck, straights with Instructor Barrs. Messrs. Cowley, Weber, solo circuits, figures of eight, &c., Mr. Boyesen, solo circuits.

Beatty School.—Pupils during last week, with Instructor M. Baumann on machine. Wright 50 h.p. gyro biplane. Messrs. Bentley, 21 mins.; Elverson, 10; Allen, 25; Banks-Price, 20; Ruffy, 25; Maclachlan, 18; Boyesen, 14; Cheung, 7; Dr. Roe, 15; Lieut. Macguire, 6; Capt. Bass, 35. Doing circuits alone: Messrs. Watts, 18; Stewart, 15.

British Caudron School.—Monday last week, too windy for school to go out. Tuesday and Wednesday, the same. Thursday, school out at 4.30 a.m. under the instruction of W. T. Warren and R. Desoutter. W. T. Warren test flight. Mr. Macgregor doing circuits and figures of eight in good style. Rene Desoutter flight. At 5 o'clock, Friday, school was out, under the instruction of W. T. Warren and R. Desoutter. Mr. Macgregor doing his two sets of figures of eight for his *brevet*. Saturday, school out at 5 o'clock. W. T. Warren and Rene Desoutter flights.

Hall School.—Instructors for week: T. Clappen and C. Virgilio. Sunday last week, J. L. Hall on Avro, two flights, quarter of an hour at 2,000 ft. Later took M. Henri Lonchamp and Miss Hanson passenger flights. Monday and Tuesday, very windy. Wednesday, J. L. Hall on Avro at 3,000 ft. Thursday, Henry Gearing six good straight flights. A. F. Arcies seven very good flights at 60 ft. At 5 a.m., Friday, Henry Gearing six well-judged straights at 15 ft. J. Rose four straights and one short flight on No. 1 Caudron. In evening, A. F. Arcies made three excellent circuits at 300 ft. with well-banked turns, landing with a well-judged *vol plané*. H. Gearing now ready for circuits. J. L. Hall, out in afternoon, flew over to Ealing on Avro. In evening J. L. Hall, accompanied by Miss D. Clifford (pupil), mounted to 4,000 ft., and flew over to Brooklands. As dusk approached, J. L. Hall started off alone from Brooklands, but got caught in heavy rainstorm, and running short of castor oil had to make a landing in a hayfield near Southall. Saturday, in early morning, J. L. Hall continued his flight from Southall, and arrived safely at Hendon. After breakfast several passengers were taken aloft in the Avro. Mr. Gearing, sen. (father of pupil), who scales at 16 st., was taken up to 1,000 ft.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Diary of Events.

June 6 ...	Aerial Derby. Hendon Aerodrome.
June 10 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
June 27 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
July 11 ...	International Correspondence Schools Race, London–Paris–London. Hendon Aerodrome.
July 11 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
Aug. 1–15	*Daily Mail* £5,000 Circuit of Britain Race. Starting from Southampton Water.
Aug. 22–29	Gordon-Bennett Eliminating Trials. Salisbury Plain.
Sept. 19–28	Gordon-Bennett Aviation Race. Buc, France.

AERIAL DERBY, HENDON AERODROME.

To-morrow, Saturday, starting at 4.15 p.m.

Members of the Royal Aero Club will be admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards. The Membership Card admits the Member only—motor cars must be paid for.

Balloon Race at Hurlingham.

Wednesday, June 10th, 1914, at 3 p.m.

A Hare and Hounds Balloon Race for a Cup presented by Mr. John Dunville will start from the Hurlingham Club, Fulham, S.W., on Wednesday next, the 10th inst., at 3 p.m. Mr. John Dunville will pilot the "Hare" Balloon, and competitors will follow at short intervals. The competitor who lands nearest the "Hare" Balloon will be the winner. The following entries have so far been received :—

Mr. John Dunville	Balloon "Banshee II"
Major The Hon. Claud Brabazon ..	Balloon "Zeta"
Lieut. T. G. Hetherington	Balloon "Dunlop"
Lieut.-Col. E. M. Maitland... ...	Balloon "R.F.C."
Mr. A. Mortimer Singer	Balloon "Planet"
Mr. Lionel H. Mander	Balloon "Meteor"
Capt. Lionel L. Atherton	Balloon "Thistledown"

Members will be admitted free to the Hurlingham Club on presentation of their Club Membership Cards.

Daily Mail £5,000 Circuit of Britain Race.

The following entries have been received :—

Messrs. White and Thompson—
1. Curtiss Biplane. Two 100 h.p. Curtiss engines. Pilot: Mr. A. Loftus Bryan.
2. Curtiss Biplane. 125 h.p. Anzani engine. Pilot: Capt. Ernest C. Bass.

Sopwith Aviation Co., Ltd.—
1. Sopwith Biplane. 150 h.p. Sunbeam engine. Pilot: Mr. C. Howard Pixton.
2. Sopwith Biplane. 100 h.p. English *monosoupape* Gnome engine. Pilot: Mr. H. G. Hawker.

Grahame-White Aviation Co., Ltd.—
Grahame-White Biplane. 100 h.p. English *monosoupape* Gnome engine. Pilot: Probably Mr. C. Grahame-White.

Messrs. A. V. Roe and Co., Ltd.—
Roe Biplane. 150 h.p. Sunbeam engine. Pilot: Mr. F. P. Raynham.

Eastbourne Aviation Co., Ltd.—
Tractor Biplane. 120 h.p. Green engine. Pilot: Mr. F. B. Fowler.

Blackburn Aeroplane Co., Ltd.—
Blackburn Hydro-Biplane. 130 h.p. Salmson engine. Pilot: Mr. Sydney Pickles.

Late entries will be received up to 12 noon, June 30th, 1914, in which case the Entrance Fee will be £150.

Rule 4, "Qualification of Aircraft," has been revised and now reads as follows :—

The complete aircraft and all its parts, including the motor, must have been entirely constructed within the confines of the British Empire, but this provision shall not be held to apply to raw material, *or the magneto.*

WORLD'S AVIATION RECORDS TO MAY 6th, 1914, PASSED BY THE FÉDÉRATION AÉRONAUTIQUE INTERNATIONALE.

ISSUED BY THE ROYAL AERO CLUB.

AVIATION.

SPEED. Closed Circuit without Alighting.

Distance.	Aviator.	Country Holding Record.	Date of Record.	Time.		
kiloms.	*Aviator only.*			h.	m.	s.
5	J. Vedrines	United States	Sept. 9, 1912	0	1	43⅖
10	M. Prevost	France	,, 29, 1913	0	2	56⅗
20	M. Prevost	,,	,, 29, 1913	0	5	54⅕
30	M. Prevost	,,	,, 29, 1913	0	8	52⅕
40	M. Prevost	,,	,, 29, 1913	0	11	50⅕
50	M. Prevost	,,	,, 29, 1913	0	14	48⅕
100	M. Prevost	,,	,, 29, 1913	0	29	40
150	M. Prevost	,,	,, 29, 1913	0	44	38
200	M. Prevost	,,	,, 29, 1913	0	59	45⅗
250	J. Vedrines	,,	Jan. 9, 1913	2	1	53⅗
300	Gobioni	Italy	Mar. 28, 1912	2	49	0
350	Gilbert	France	Dec. 30, 1912	3	26	16
400	Gilbert	,,	,, 30, 1912	3	55	27⅗
450	Gilbert	,,	,, 30, 1912	4	24	44⅘
500	Gilbert	,,	,, 30, 1912	4	54	6⅕
600	Gilbert	,,	,, 30, 1912	5	52	38
700	Fourny	,,	Sept. 11, 1912	9	31	1
800	Fourny	,,	,, 11, 1912	10	44	45⅘
900	Fourny	,,	,, 11, 1912	11	59	9⅗
1,000	Fourny	,,	,, 11, 1912	13	1	12
kiloms.	*Aviator and One Passenger.*			h.	m.	s.
5	H. Bier	Austria	Oct. 1, 1912	0	2	58
10	G. Legagneux	France	July 20, 1912	0	4	24⅘
20	G. Legagneux	,,	,, 20, 1912	0	8	51
30	G. Legagneux	,,	,, 20, 1912	0	13	18⅗
40	G. Legagneux	,,	,, 20, 1912	0	17	44⅘
50	G. Legagneux	,,	,, 20, 1912	0	23	13
200	H. Bier	Austria	Oct. 1, 1912	2	3	49
250	E. Guillaux	France	Feb. 11, 1913	2	34	48⅖
300	E. Guillaux	,,	,, 11, 1913	3	4	50
350	E. Guillaux	France	Feb. 11, 1913	3	34	46⅘
400	E. Guillaux	,,	,, 11, 1913	4	4	42⅗
kiloms.	*Aviator and Two Passengers.*			h.	m.	s.
5	Ch. Nieuport	Austria	June 30, 1912	0	2	52
10	Ch. Nieuport	,,	,, 30, 1912	0	5	45
20	Ed. Nieuport	France	Mar. 9, 1911	0	11	59⅖
30	Ed. Nieuport	,,	,, 9, 1911	0	17	52⅗
40	Ed. Nieuport	,,	,, 9, 1911	0	22	44⅖
50	Ed. Nieuport	,,	,, 9, 1911	0	29	37⅖
100	Ed. Nieuport	,,	,, 9, 1911	0	59	8
kiloms.	*Aviator and Three Passengers.*			h.	m.	s.
5	P. Mendelli	Austria	Aug. 16, 1912	0	3	48
10	G. Busson	France	Mar. 10, 1911	0	6	16⅗
20	P. Mendelli	Austria	Aug. 16, 1912	0	12	3
30	P. Mendelli	,,	,, 16, 1912	0	17	37
40	P. Mendelli	,,	,, 16, 1912	0	23	11
50	P. Mendelli	,,	,, 16, 1912	0	29	47
100	P. Mendelli	,,	,, 16, 1912	0	56	33
kiloms.	*Aviator and Four Passengers.*			h.	m.	s.
5	G. Busson	France	Mar. 10, 1911	0	3	34
10	G. Busson	,,	,, 10, 1911	0	7	8
20	G. Busson	,,	,, 10, 1911	0	14	0⅗
30	Champel	,,	April 15, 1913	0	21	53⅘
40	Champel	,,	,, 15, 1913	0	29	13⅖
50	Champel	,,	,, 15, 1913	0	37	31
100	Champel	,,	,, 15, 1913	1	13	1⅕
150	Champel	,,	,, 15, 1913	1	49	11⅘
200	Champel	,,	,, 15, 1913	2	25	2⅕
250	Champel	,,	,, 15, 1913	3	1	17
kiloms.	*Aviator ana Six Passengers.*			h.	m.	s.
10	Garaix	France	April 22, 1914	0	5	35
20	Garaix	,,	,, 22, 1914	0	11	12⅕
30	Garaix	,,	,, 22, 1914	0	16	48⅘
40	Garaix	,,	,, 22, 1914	0	22	28⅕
50	Garaix	,,	,, 22, 1914	0	28	5⅖
100	Garaix	,,	,, 22, 1914	0	56	44

GREATEST SPEED. Closed Circuit without Alighting.

Aviator.	Country Holding Record.	Date of Record.	Speed per Hour in a Flight of 5 Kiloms.
Aviator only.			
M. Prevost	France	Sept. 29, 1913	203·850 kiloms.
Aviator and One Passenger.			
G. Legagneux	France	July 20, 1912	135·952 kiloms.
Aviator and Two Passengers.			
E. Nieuport	France	July 20, 1912	102·855 kiloms.
Aviator and Three Passengers.			
P. Mendelli	Austria	Aug. 16, 1912	106·029 kiloms.
Aviator and Four Passengers.			
G. Busson	France	Mar. 10, 1911	87·251 kiloms.
Aviator and Six Passengers.			
Garaix	France	April 22, 1914	107·642 kiloms.

DISTANCE. Closed Circuit without Alighting.

Aviator.	Country Holding Record.	Date of Record.	Distance Covered.
Aviator only.			
A. Seguin	France	Oct. 13, 1913	1,021·200 kils.
Aviator and One Passenger.			
E. Guillaux	France	Feb. 11, 1913	410 kiloms.
Aviator and Two Passengers.			
H. Bier	Austria	Oct. 1, 1911	112 kiloms.
Aviator and Three Passengers.			
Mendelli	Austria	Aug. 16, 1912	110 kiloms.
Aviator and Four Passengers.			
Champel	France	April 15, 1913	250 kiloms.
Aviator and Six Passengers.			
Garaix	France	April 22, 1914	110 kiloms.

DISTANCE. In a Straight Line without Alighting.

Aviator and One Passenger.

Deroye	Italy	July 17, 1913	784 kiloms.

TIME. Closed Circuit without Alighting.

Time.	Aviator.	Country Holding Record.	Date of Record.	Distance.
hours.	*Aviator only.*			kiloms.
¼	M. Prevost	France	Sept. 29, 1913	50
½	M. Prevost	,,	,, 29, 1913	100
1	M. Prevost	,,	,, 29, 1913	200
2	J. Vedrines	,,	Jan. 9, 1913	246·937
3	M. Tabuteau	,,	,, 24, 1912	310·281
4	Gilbert	,,	Dec. 30, 1912	401·900
5	Gilbert	,,	,, 30, 1912	510
6	Bournique	,,	,, 31, 1910	490
7	M. Tabuteau	,,	,, 30, 1910	522·935
8	Fourny	,,	Sept. 11, 1912	585·200
9	Fourny	,,	,, 11, 1912	661·200
10	Fourny	,,	,, 11, 1912	744·800
11	Fourny	,,	,, 11, 1912	820·800
12	Fourny	,,	,, 11, 1912	904·400
13	Fourny	,,	,, 11, 1912	980·400
hours.	*Aviator and One Passenger.*			kiloms.
¼	G. Legagneux	France	July 5, 1912	31·020
½	G. Legagneux	,,	,, 5, 1912	66·639
1	G. Legagneux	,,	,, 5, 1912	133·469
2	E. Guillaux	,,	Feb. 11, 1913	191·900
3	E. Guillaux	,,	,, 11, 1913	291·900
4	E. Guillaux	,,	,, 11, 1913	391·900
hour.	*Aviator and Three Passengers.*			kiloms.
1	P. Mendelli	Austria	Aug. 16, 1912	106·029
hours.	*Aviator and Four Passengers.*			kiloms.
¼	Champel	France	April 15, 1913	20
½	Champel	,,	,, 15, 1913	40
1	Champel	,,	,, 15, 1913	82·343
2	Champel	,,	,, 15, 1913	164
3	Champel	,,	,, 15, 1913	247·303
hour.	*Aviator and Six Passengers.*			kiloms.
¼	Garaix	France	April 22, 1914	20
½	Garaix	,,	,, 22, 1914	50
1	Garaix	,,	,, 22, 1914	104·141

DURATION. Closed Circuit without Alighting.

Aviator.	Country Holding Record.	Date of Record.	Time.
Aviator only.			
Langer	Germany	Feb. 3, 1914	14 h. 7 m.
Aviator and One Passenger.			
Gaubert	France	Aug. 30, 1913	6 h. 42 m. 49⅗ s.
Aviator and Two Passengers.			
Shirrmeister	Germany	Nov. 12, 1913	6 h. 16 m. 30 s.
Aviator and Three Passengers.			
Gaell	Germany	Sept. 2, 1913	3 h. 11 m. 14 s.
Aviator and Four Passengers.			
Champel	France	April 15, 1913	3 h. 1 m. 17 s.
Aviator and Five Passengers.			
Faller	Germany	Jan. 9, 1913	1 h. 10 m. 17 s.
Aviator and Six Passengers.			
Garaix	France	April 22, 1914	1 h. 2 m. 25⅗ s.
Aviator and Seven Passengers.			
L. Noel	Great Britain	Sept. 22, 1913	17 m. 25⅖ s.
Aviator and Eight Passengers.			
Frantz	France	Mar. 2, 1913	11 m. 28⅖ s.
Aviator and Nine Passengers.			
L. Noel	Great Britain	Oct. 2, 1913	19 m. 47 s.

ALTITUDE.

Aviator.	Country Holding Record.	Date of Record.	Altitude.
Aviator only.			
G. Legagneux	France	Dec. 28, 1913	6,120 metres.
Aviator and One Passenger.			
Linnekogel	Germany	Mar. 24, 1914	5,500 metres.
Aviator and Two Passengers.			
Oblt. von Blaschke	Austria	June 29, 1912	3,580 metres.
Aviator and Three Passengers.			
Thelen	Germany	Mar. 20, 1914	3,700 metres.
Aviator and Four Passengers.			
Garaix	France	Feb. 25, 1914	3,050 metres.
Aviator and Five Passengers.			
Garaix	France	Feb. 4, 1914	2,230 metres.
Aviator and Six Passengers.			
Garaix	France	Jan. 31, 1914	1,750 metres.
Aviator and Seven Passengers.			
Garaix	France	Mar. 17, 1914	1,600 metres.
Aviator and Eight Passengers.			
Garaix	France	Mar. 28, 1914	1,530 metres.
Aviator and Nine Passengers.			
Garaix	France	Mar. 30, 1914	1,590 metres.
Aviator and Fifteen Passengers.			
Sykorsky	Russia	April 25, 1914	300 metres.

BALLOONS.

DISTANCE.

Holder of Record.	Voyage Effected.	Country Holding Record.	Date of Record.	Distance.
				kiloms.
Hugo Kaulen ...	Bitterfeld (Germany)-St. Petersburg–Perm (Siberia, Russia)	Germany	Dec. 13–17th, 1913	2,827·900

DURATION.

Holder of Record.	Voyage Effected.	Country Holding Record.	Date of Record.	Time.
Hugo Kaulen	Bitterfeld (Germany)–St. Petersburg–Perm (Siberia, Russia)	Germany	Dec. 13–17th, 1913	87 hours

ALTITUDE.

Holder of Record.	Voyage Effected.	Country Holding Record.	Date of Record.	Altitude.
Suring and Berson	From Berlin	Germany	June 31st, 1901	10,800 m.

DIRIGIBLES.

DISTANCE.

Dirigible	Voyage Effected.	Country Holding Record.	Date of Record.	Distance.
				kiloms.
P. 5 ...	Verona – Sanguinetto – Modena – Casena – Ancona – Venice – Monte-Belluna – Vicenza–Verona	Italy ...	July 30th, 1913	810

DURATION.

Dirigible	Voyage Effected.	Country Holding Record.	Date of Record.	Time.
P. 5 ...	Verona – Cremona – Pavia – Turin – Chivasso – Mortara – Milan–Brescia–Verona	Italy ...	June 25th, 1913	15 hours.

ALTITUDE.

Dirigible	Voyage Effected.	Country Holding Record.	Date of Record.	Altitude. metres.
Conté ...	Issy-les-Moulineaux ...	France	June 18th, 1912	3,080

SPEED.

Dirigible	Voyage Effected.	Country Holding Record.	Date of Record.	Speed per hour. kiloms.
P. 5 ...	Verona – Sanguinetto–Modena–Casena–Ancona–Venice–Monte-Belluna–Vicenza–Verona	Italy ...	July 30th, 1913	64·800

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

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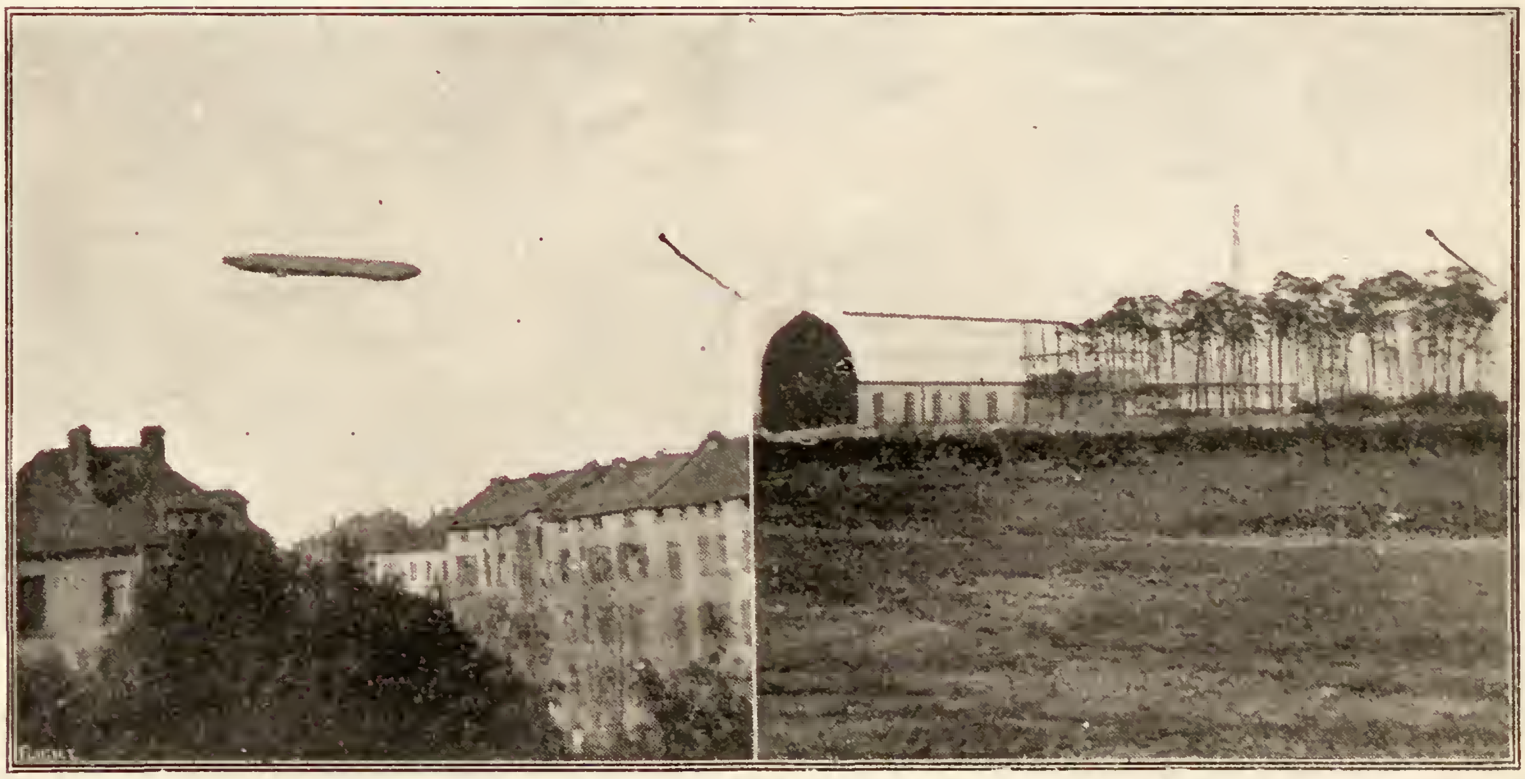
The *Daily Mail* Circuit of Britain.

When the entries for the *Daily Mail* Circuit of Britain closed at ordinary fees on Saturday last they numbered eight. The entries close finally on June 30th. At present they include two Curtiss machines, entered by Messrs. White and Thompson, one to be piloted by Mr. Loftus Bryan, fitted with two 100 h.p. Curtiss engines; while the other, to be flown by Capt. Bass, will have a 125 h.p. Anzani engine; two Sopwith biplanes, one with 150 h.p. Sunbeam engine, which C. H. Pixton will pilot, and the other, with a 100 h.p. British-Gnome motor, of which Hawker will be in charge; a Grahame-White biplane, with 100 h.p. British-Gnome motor, which Mr. Claude Grahame-White may pilot; an Avro with 150 h.p. Sunbeam engine, with Mr. E. P. Raynham as pilot; an E.A.C. biplane, with 120 h.p. Green engine, which Mr. F. B. Fowler will pilot, while the eighth is a Blackburn monoplane, with 130 h.p. Salmson, which Mr. Sydney Pickles is to pilot.

Testing the Langley Machine.

Readers of Flight will recall that at the beginning of this year it was stated that the Smithsonian Institution, the great national museum of the U.S.A., announced that while it could not allow the original Langley machine to be taken from its place in order to be tested, they would willingly allow anyone every facility to obtain dimensions in order to build an exact duplicate. A cable message from New York states that the flying capabilities of the machine designed by Langley were demonstrated on Friday last week by Glenn Curtiss in a short flight over the lake at Hammondsport, New York. Instead of the catapult launching device used by Langley, however, the machine was fitted with floats and rose from the water. This test has a purpose in view, besides vindicating Langley. It is held that by this proof of the capability of the Langley machine to fly, certain patent claims can be successfully overcome.



THE "VICTORIA LOUISE" AIRSHIP OVER FRANKFURT.—On the right the Zeppelin hangar at Frankfurt. These photographs reach us from Mr. L. F. Hutcheon, who writes as follows: "These prints are from negatives taken by myself at Frankfurt-am-Maine this year. The 'Victoria Louise' (owned by the town of Frankfurt) was taken from my bedroom at six o'clock in the evening when it was cruising over Frankfurt. On cruises such as this only the forward propellers and the engines in the first gondola are used. Passenger flights cost 200 marks (about £10

THE PRINCE HENRY CIRCUIT, 1914.

THIS year's Prince Henry Circuit, which took place from May 17th to 25th, was one of the greatest events of its kind ever held in Germany, no fewer than 40 machines taking part in the circuit. Half of these were military machines piloted by military aviators, whilst the other half were entered by civilian firms and flown by civilian aviators. The rules of the race stipulated that the owner of the machines as well as the pilot had to be subjects of the German Empire. Each pilot had to carry a passenger, who, in view of the

THE PRINCE HENRY CIRCUIT.—On the left, v. Thüna, the winner of the Kaiserprize, with Lieut. v. Kleist, his observer, and their 100 h.p. Mercedes biplane. On the right (from right to left), Prince Henry of Prussia, Messrs. Trutz, Geheimer Rat Büxenstein, Winter (K.F.A.C.). (From the *Allgemeine Automobil Zeitung*.)

Particulars of Machines and Pilots entered for the Prince Henry Circuit.

Start No.	Pilot.	Observer.	Type of machine.	Speed.	Span.	Length.	Area.	Weight, empty.	Engine.	h.p.
			Army Machines.							
				m.p.h.	ft.	ft.	sq. ft.	lbs.		
1	Lieut. Canter	Lieut. Böhmer	Rumpler Taube	74	46	27	300	1320	Mercedes	100
2	Capt. v. Detten	Capt. v. Falkenhayn	Albatros Taube	64	50	34	380	1320	,,	,,
3	Lieut. Hantelmann	Lieut. Zimmer-Vorhaus	,,	64	50	34	380	1320	,,	,,
4	Lieut. Joly	Lieut. Felmy	Gotha Taube	74	46	28	300	—	,,	,,
5	Lieut. Kastner	Lieut. Niemöller	Albatros Taube	64	50	34	380	1320	,,	,,
6	Lieut. Kolbe	Lieut. Rohde	,,	64	50	34	380	1320	,,	,,
7	Lieut. Ladewig	Lieut. Trenkmann	Rumpler Taube	74	46	27	300	1320	,,	,,
8	Lieut. Pfeifer	Lieut. v. d. Hagen	Albatros Taube	64	50	34	380	1320	,,	,,
9	Lieut. Pre'zell	Lieut. Wencker	,,	64	50	34	380	1320	,,	,,
10	Lieut. v. Beaulieu	Capt. Geerdtz	L.V.G. biplane	65	50	31	480	1670	,,	,,
11	Lieut. Bonde	Lieut. Müller	Albatros biplane	74	42	26	390	1270	,,	,,
12	Lieut. v. Buttlar	Lieut. v. Schröder	L.V.G. biplane	65	50	31	480	1670	,,	,,
13	Lieut. Carganico	Lieut. Friedberg	,,	65	50	31	480	1670	,,	,,
14	Lieut. Emrich	Lieut. Leonhardt	Otto biplane	62	50	—	440	—	,,	,,
15	Lieut. Geyer	Lieut. Kühn	Aviatik biplane	—	46	26	490	1470	,,	,,
16	Lieut. v. Hiddessen	Lieut. Müller	Albatros biplane	74	42	26	390	1270	,,	,,
17	Lieut. Schlemmer	Lieut. König	L.V.G. biplane	65	50	31	480	1670	,,	,,
18	Lieut. v. Thüna	Lieut. v. Kleist	,,	65	50	31	480	1670	,,	,,
19	Lieut. Walz	Lieut. Müller	,,	65	50	31	480	1670	,,	,,
20	Lieut. Wentscher	Lieut. v. Falckenstein	,,	65	50	31	480	1670	,,	,,
			Civilian Machines.							
21	Anslinger	Lieut. Zeumer	Goedecker monoplane	60	46	36	400	1100	Mercedes	100
22	Lieut v. Armin	Lieut. Kuntz	Arnim monoplane	—	—	—	—	—	Argus	120
23	Beck	Lieut. Schletter	Kondor monoplane	—	—	—	—	—	Mercedes	100
24	Freindt	Capt. Hellmich	Jeannin Steel Taube	75	42	30	230	1320	Argus	120
25	Friedrich	Lieut. Peters	Rumpler monoplane	72	46	27	308	1320	Mercedes	100
26	Höfig	—	D.F.W. monoplane	—	—	—	—	—	,,	,,
27	Klumsiek	Lieut. Plagemann	Hansa Taube	72	46	28	308	—	,,	,,
29	Schlegel	Lieut. Spang	Gotha Taube	72	46	28	308	—	,,	,,
30	Lieut. Steffens	Lieut. v. Weyhe	Etrich Taube	—	—	—	—	—	,,	,,
32	Hennig	Lieut. Deichmann	Schwade biplane	60	60	—	506	1012	Stahlhertz	80
33	Laitsch	Lieut. Koch	L.V.G. biplane	65	48	31	484	1670	Mercedes	100
34	Schauenburg	Lieut. Hug	A.E.G. biplane	70	48	32	440	1540	Benz	110
35	Schüler	—	Ago biplane	—	—	—	—	—	Argus	140
37	Sommer	—	Sommer biplane	—	—	—	—	—	Gnome	80
38	Stoeffler	Lieut. Krause d'Avis	Aviatik biplane	—	35	24	393	900	Oberursel	114
39	Thelen	Capt. Gheibel	Albatros biplane	70	42	26	396	1270	Mercedes	75
40	Weyl	Lieut. Sendel	Otto biplane	60	49	—	440	—	Argus	140
			Competing Unofficially.							
28	Paschen	Lieut. Creydt	Halberstadt Taube	92	48	30	340	1496	Mercedes	100
31	Stiefvater	Lieut. Zimmermann	Prince Sigismund Taube	—	—	—	—	—	Argus	120
36	Schröder	Schäfer	Sommer biplane	—	33	26	350	—	Gnome	100
40*a*	Lieut. Surèn	Lieut. v. Ascheberg	Gotha biplane	—	—	—	—	—	Oberursel	100
40*b*	Mühlig-Hofmann	Lieut. Suchland	Albatros biplane	70	42	26	396	1275	Mercedes	100

fact that the race included flying over fortresses, had to be an officer of the German Army or Navy. All the machines had to be German built, whilst the engines might be of any origin. Machines not owned by the Government had to pass the following tests before entering: (1) Climb to an altitude of 800 metres in not more than 15 mins., with a useful load of 200 kilogs., including pilot and passenger and sufficient fuel for a flight of 4 hrs. duration. (2) Rise after a run not exceeding 100 metres and alight after a run not exceeding 70 metres with the load mentioned above.

The circuit was divided in the following manner: *A. First part of reliability trials*, in two stages. First stage: Start from Darmstadt, fly over controls at Mannheim, Pforzheim, Speyer, Mannheim, Worms, and land at Frankfurt-a.-M. (400 kiloms.). Duration of stop at Frankfurt is optional. Second stage: Start from Frankfurt-a.-M., fly over controls at Wiesbaden, Coblenz, Cologne, and land at Frankfurt-a.-M. (375 kiloms.).

B. Second part of reliability trials in two stages. Third stage: Start from Frankfurt-a.-M., fly over controls at Marburg, Cassel, Braunschweig, and land at Hamburg (440 kiloms.). Duration of stop at Hamburg optional. Fourth stage: Start from Hamburg, fly over controls at Hanover, Minden, Herford, Münster, Osnabrück, Bremen, and land at Hamburg (565 kiloms.).

C. Strategical reconnoitring trials between Hamburg, Münster and Cologne, with landing at Cologne (400 kiloms.).

D. Tactical reconnoitring trials near Cologne.

When the Circuit commenced at Darmstadt on May 17th, the following pilots had either been unable to pass the reception tests or had failed to appear at the time of the start: (1) Canter, (2) v. Detten, (20) Wentscher, (21) Anslinger, (22) v. Arnim, (23) Beck, (26) Höfig, (30) Steffens, (32) Hennig, (35) Schüler, (36) Schröder, (37) Sommer, (40) Weyl. At four o'clock on the 17th of May the start for the first stage of 400 kiloms., from Darmstadt to Frankfurt, was given. The first and second stages had to be completed between 4 a.m. on May 17th and 8.30 p.m. on May 19th. The first to go was Lieut. Beaulieu. The weather was clear, but somewhat gusty. From Mannheim it was reported that the other controls were not yet ready, a fact which delayed the start of the other machines considerably. At 4.29, however, everything was in order, and the second to start was Lieut. von Thüna, who was followed by the civilian pilot Viktor Stoeffler. Shortly after, Lieuts. Bonde, Schlemmer, Emrich and Walz got away, followed a little later by Lieut. von Hiddessen, Lieut. Buttlar and Lieut. Pfeifer. Schauenburg on the A.E.G. biplane got into the air very quickly, in spite of the comparatively heavy loading of his machine. Others sent off were Lieut. Mühlig-Hoffmann, Lieut. Kolbe, Thelen, Lieut. Ladewig, Schlegel, Lieut. Joly, Lieut. Geyer, Paschen, Lieut. Hantelmann, Lieut. Pretzell, Friedrich, Freindt, Krumsiek and Lieut. Kastner. At 5 a.m. 25 machines had departed. During the start Schröder arrived on the Sommer biplane. Laitsch, who had been busy all night repairing his radiator, left at 7.15, but the new radiator fitted also commenced leaking, with the result that the observer, Lieut. Koch, was covered with a spray of hot water, and Laitsch had to land again, and ultimately gave up the attempt. At seven o'clock news arrived that Lieut. Walz and his observer, Lieut. Müller, had had a fall near Morsbrunn, in which Lieut. Müller lost his life owing to the machine catching fire. First to arrive at the aerodrome at Rebstock near Frankfurt was Lieut. v. Beaulieu, who landed at 8.19 and started again on the second stage at 8.34. The next to arrive was Viktor Stoeffler, who made the best time over the first stage. The three fastest times made were: V. Stoeffler (Aviatik biplane), 3 hrs. 55 mins.; Lieut. v. Thüna (L.V.G. biplane), 4 hrs. 4 mins.; Lieut. Pretzell (Albatros Taube), 4 hrs. 12 mins. After a short rest the majority of the pilots started for the second stage of 375 kilometres *via* Wiesbaden, Coblenz, Cologne, back to Frankfurt. Several of the pilots had to retire during this stage. The best times made over this part of the course were:—Lieut. v. Thüna (L.V.G. biplane), 3 hrs. 9 mins., aggregate time, 7 hrs. 13 mins.; Lieut. v. Beaulieu (L.V.G. biplane), 3 hrs. 23 mins., aggregate time, 7 hrs. 40 mins.; Lieut. v. Buttlar (L.V.G. biplane), 3 hrs. 9 mins., aggregate time, 7 hrs. 48 mins.

The Prince Henry Prize for aeroplanes, in the Prince Henry Circuit, modelled by Karl Korschann, of Frankfurt, and won by Krumsiek.

Although three days had been set apart for the first and second stages, little flying was done on May 18th and 19th, as nearly all the competitors had either completed the course or withdrawn on May 17th. Lieut. Joly only got as far as Cologne on May 17th, and left for Frankfurt at 4.33 a.m. on May 18th, arriving at the latter place at 6.58 a.m. Lieut. Ladewig completed the first stage only on May 17th, and spent the night at Frankfurt, from where he started the next morning and completed the second stage by 8.25. Thelen was prevented by radiator trouble from completing more than the first stage on May 17th. He started again at 4.35 a.m. on May 18th and completed the second stage, arriving back at Frankfurt again at 8.56. The third and fourth stages had to be completed between 4 a.m. on May 20th and 8.30 p.m. on May 22nd; but several of the competitors had either completed the last two stages on May 20th or were *hors de concours*.

4 a.m. on May 20th was the official starting time for the third stage from Frankfurt to Hamburg (440 km.), at which hour any competitor could get off. The first pilots arrived in Hamburg about 9 o'clock. Of these Lieut. v. Buttlar, Lieut. v. Beaulieu, and Lieut. v. Thüna took a short rest, whilst Lieut. Schlemmer continued on the fourth stage—*via* Hanover, Minden, Herford, Münster, Osnabrück, Bremen, back to Hamburg—without landing. Among those who did not arrive in Hamburg until May 21st were: Lieut. Ladewig, Lieut. Geyer, Lieuts. Schlemmer, Schauenburg and Thelen, whilst Lieuts. Hantelmann and Joly did not complete the last stage until May 22nd.

When the time limit for the fourth stage (565 km.) expired, at 8.30 p.m. on May 22nd, only 12 pilots out of the 40 entered, had officially completed the reliability trials. The days from May 23rd to May 25th, were set apart for Military reconnoitring trials in which 40 officer-pilots took part. Below we give the aggregate times of each competitor for the four stages (1,800 km.) of the reliability trials.

	h.	m.
1. Lieut. v. Thüna (L.V.G.-Mercedes, bi.)	17	16
2. Lieut. v. Beaulieu (L.V.G.-Merc., bi.)	17	29
3. Lieut. v. Buttlar (L.V.G.-Mercedes, bi.)	17	56
4. Lieut. Bonde (Albatros-Mercedes, bi.)	21	54
5. Lieut. Geyer (Aviatik-Mercedes, bi.)...	22	34
6. Krumsiek (Hansa-Taube-Mercedes) ...	23	14
7. Schauenburg (A.E.G.-Benz, biplane)...	26	31
8. Lieut. Schlemmer (L.V.G.-Merc., bi.)	26	52
9. Thelen (Albatros-Mercedes, biplane)...	27	34
10. Lieut. Joly (Gotha-Taube-Mercedes)...	28	14
11. Lieut. Ladewig (Rumpler-Taube-Merc.)	29	15
12. Lt. Hantelmann (Albatros-Taube-Merc.)	30	15

The Emperor's prize (for officer-pilots) was awarded to Lieut. von Thüna, and the Prince Henry prize (for civilian pilots) to Krumsiek. Prizes were also presented by the King of Bavaria, the Grand Duke of Baden, the Grand Duke of Oldenburg, the Duke of Braunschweig and Lüneburg, City of Cologne, City of Münster, Bavarian War Office, City of Hamburg, City of Bremen, Prussian War Office, the Prince of Hohenzollern, the Prince of Hatzfeldt, the Prince of Schaumburg-Lippe, City of Minden, County of Minden.

The following civilian aviators received 4,500 marks each; Krumsiek, Schauenburg and Thelen; whilst Stoeffler and Schlegel received 750 marks each.

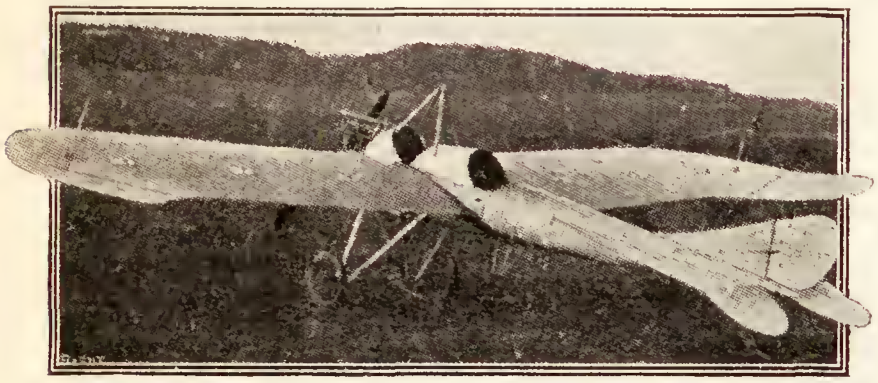
MACHINES IN PRINCE HENRY CIRCUIT.

On page 602 we give a table of the pilots and machines taking part, and a short description of some of the individual machines follow thereunder. For the photographs we are indebted to *Flugsport* and *Deutsche Luftfahrer-Zeitschrift*.

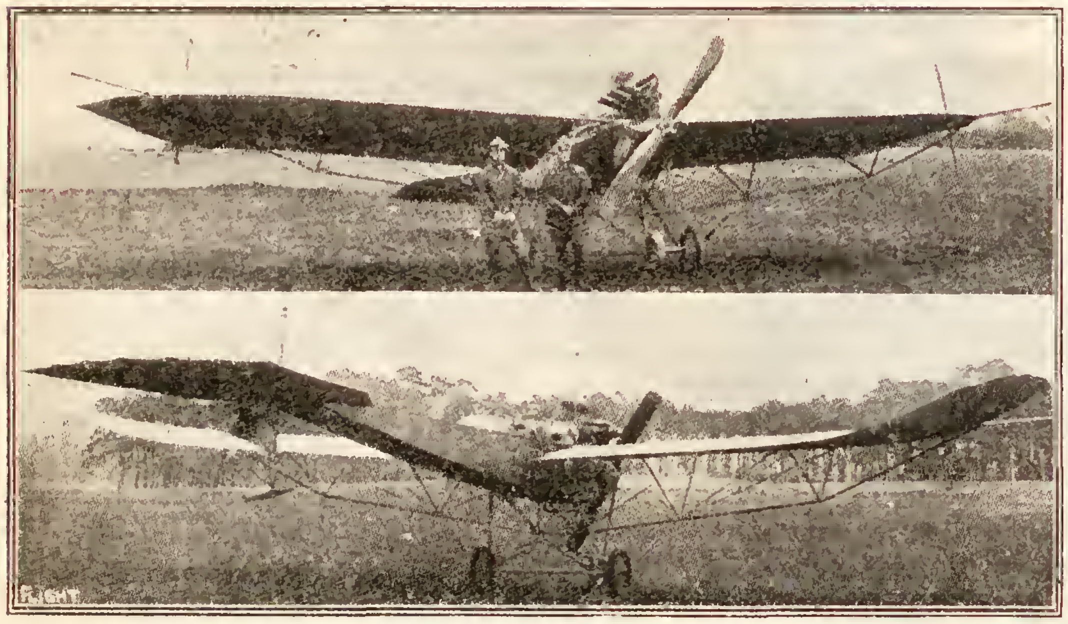
The **Halberstadt Taube** is characterized by a monocoque *fuselage* covered with fabric inside and out. The main planes are of the usual Taube form, but the girder structure under the wings has been replaced by ordinary cable bracing top and bottom. For purposes of observation and in order to facilitate photography openings have been provided in the wings on each side of the observer's seat, and these openings are fitted with glass covers. The chassis consists of two pairs of V tubes from which is slung the tubular axle by means of rubber shock absorbers.

The **Goedecker Monoplane** is also of the Taube type, but in this machine the girder structure under the wings has been retained, no top bracing cables being fitted. The wing spars, as in all Goedecker machines, are steel tubes, and provision has been made for quick erecting and dismantling. By substituting a pair of floats for the wheels, this machine can be very quickly converted into a hydro.

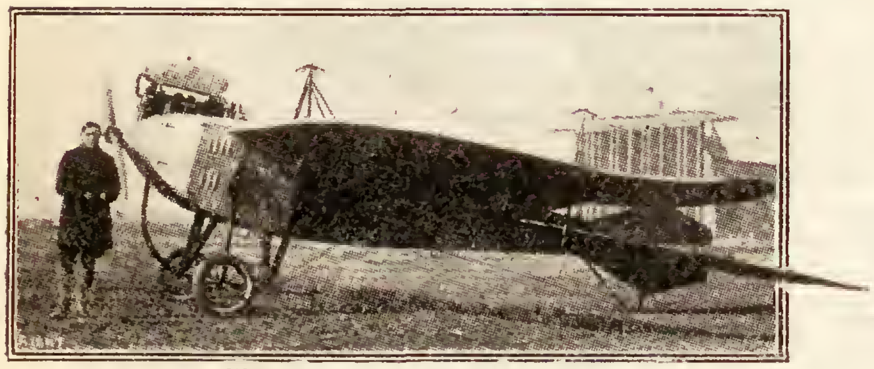
The **Jeannin Steel Taube** is, as the name implies, built of steel practically throughout. The main planes are of the usual Taube type with back-swept, upturned wing tips. Wing bracing of the ordinary kind is employed, the upper bracing cables being taken to a top pylon, whilst the lower lift cables run to the lower extremities of the rear chassis struts. The divided axle, which is hinged to a short skid turned up in front to meet the nose of the *fuselage*, is sprung by means of telescopic tubes and rubber shock absorbers.


The Halberstadt Taube.

The **Gotha Taube** is one of the neatest of the machines entered, especially as regards the engine and radiator mounting, which has been carried out in such a manner that the nose of the machine forms a very good entry for the air. The chassis is of the simplest form, and offers very little head resistance, as all the tubular chassis struts are of streamline section. The wheel axle is sprung from the chassis in such a manner that the wheels are free to move slightly sideways as well as in an upward direction.

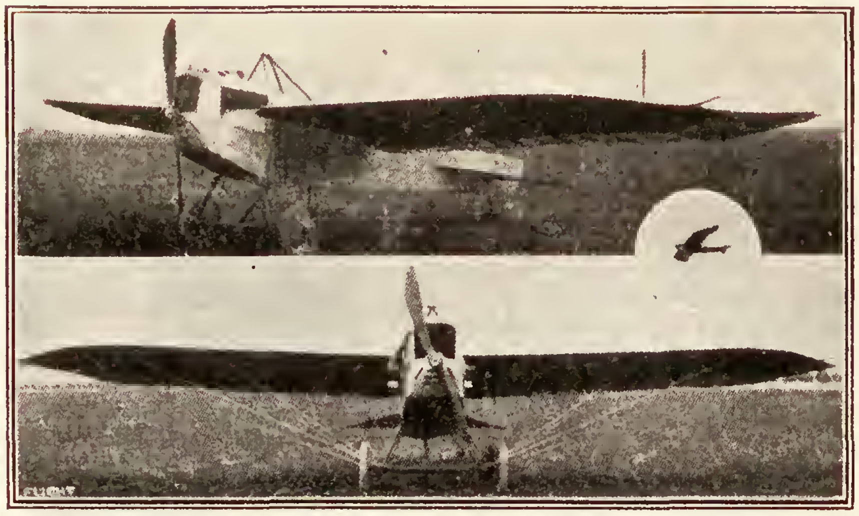

The Goedecker Taube.

The **Schwade Biplane** is the only machine of the pusher type with a rotary motor entered in the competition. It is somewhat reminiscent of the Henry Farman biplane, having a very pronounced overhang of the top plane. The engine is an 80 h.p. Stahlhertz rotary motor mounted in the rear end of the *nacelle*.


The Jeannin Steel Taube.

The **Rumpler Taube** is a very compact business-looking machine. The upper wing bracing, it will be seen, is now effected by cables running to a pyramidal pylon of steel tubes, and the Zanonia form of wing has been retained. Instead of the usual flexing wing tips, *ailerons* are fitted. These, it should be noted, are hinged along an axis forming an angle with the transverse axis of the main planes.

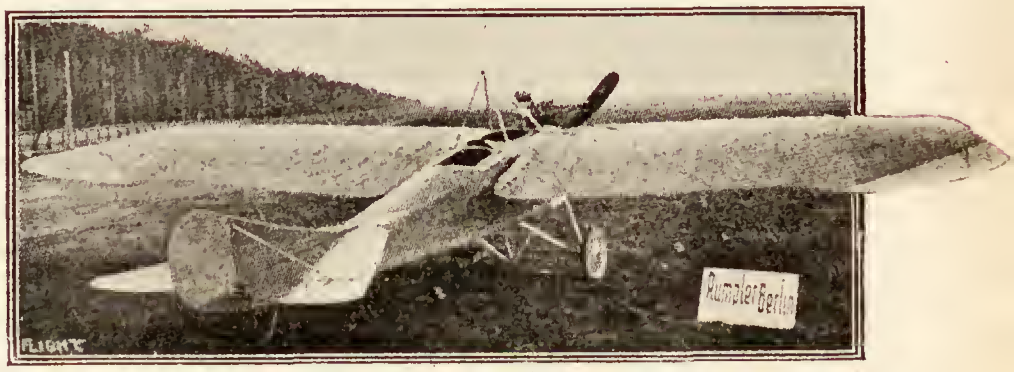
The **Sommer Arrow Biplane.**—The German Sommer Aircraft works have brought out a new Arrow type biplane for the Prince Henry Circuit. It is chiefly interesting on account of the fact that it is fitted with a rotary engine—a 100 h.p. Gnome—enclosed by an aluminium shield. In the bottom of this shield an opening has been cut in order to allow the exhaust gases to escape. In designing this machine, great attention has been paid to accessibility and ease of dismantling of the wings, an operation requiring only a few minutes' work.


The Gotha Taube.

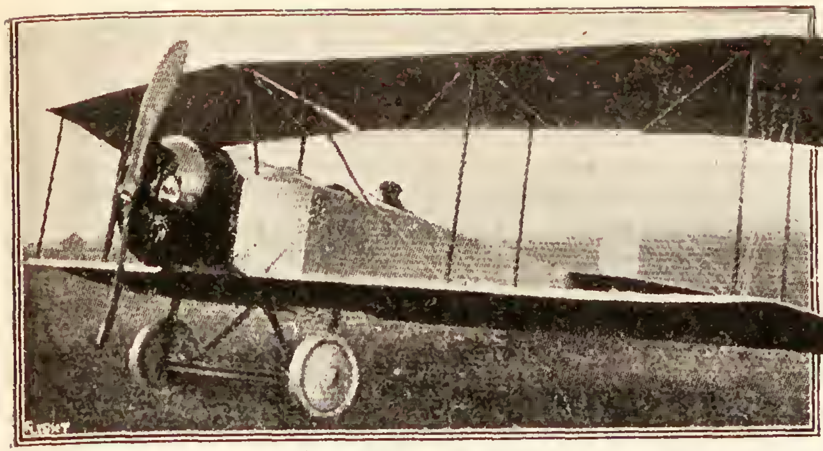
The Schwade biplane.

The **Hansa Taube** is practically identical with the Gotha Taube, with the exception of the wing bracing, which takes the form of a girder of steel tubes underneath the planes.

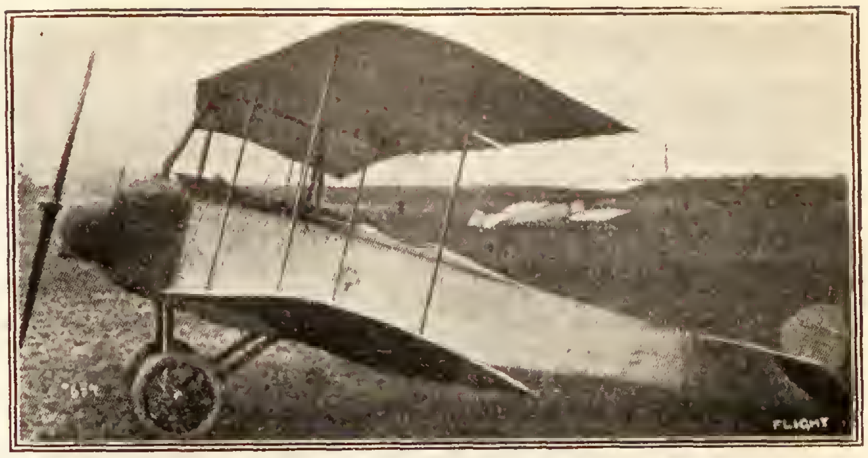
The **A.E.G. Biplane** is of the ordinary tractor type, having straight wings (as seen in plan, but set at a pronounced dihedral angle). The main planes are so designed that for purposes of transport they can be folded flat along the sides of the *fuselage*. The chassis has three wheels, of which the front one, the object of which is to protect the propeller, is sprung by means of coiled springs on a steel tube sloping backwards to the nose of the *fuselage*.



The Rumpler Taube.



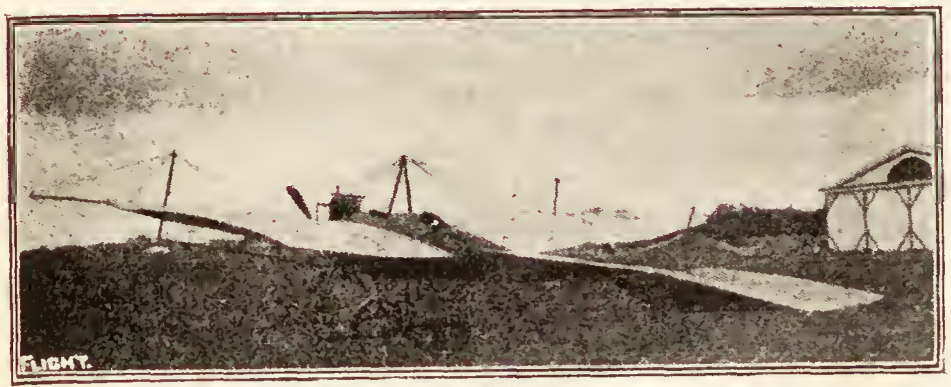
The Sommer biplane.



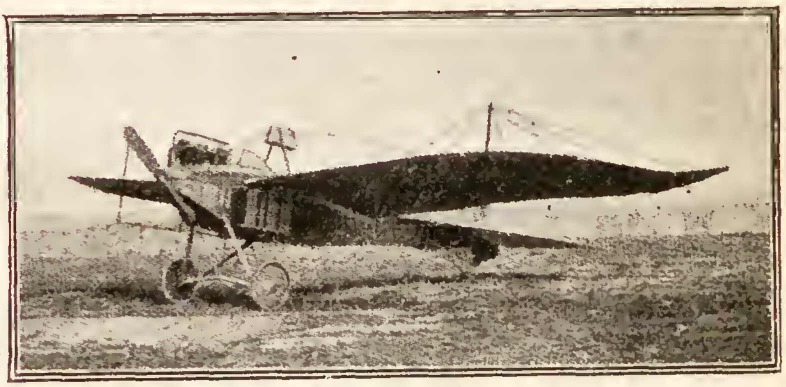
The Aviatik biplane.

The **Aviatik Biplane** follows standard lines as regards the general arrangement of its component parts. It is of the "Arrow" type, now so popular in Germany, and has an all-enclosed *fuselage*. The chassis is of modern simple type without skids. Pilot's and passenger's seats are arranged tandem fashion, the pilot occupying the rear seat.

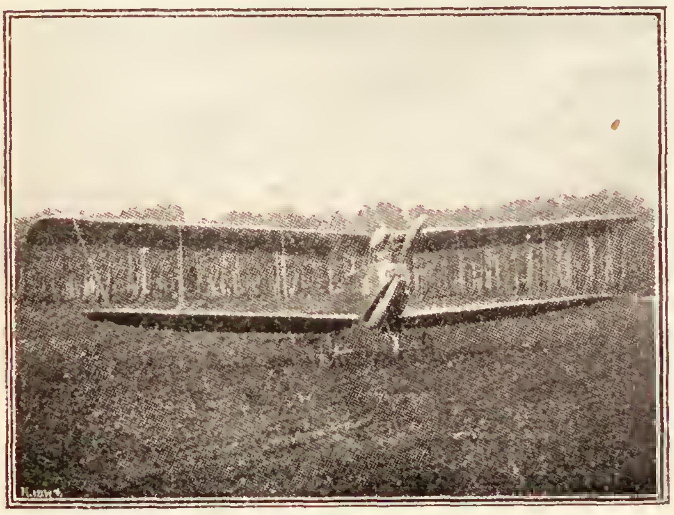
The **Albatros Biplane** is practically identical with the machine flown at Hendon by Herr Thelen recently, when it was fully described in the columns of FLIGHT. The *fuselage* of this machine, it will be remembered, is built up without the use of internal cross wiring, the necessary rigidity being provided by the three-ply wood with which the *fuselage* is covered.



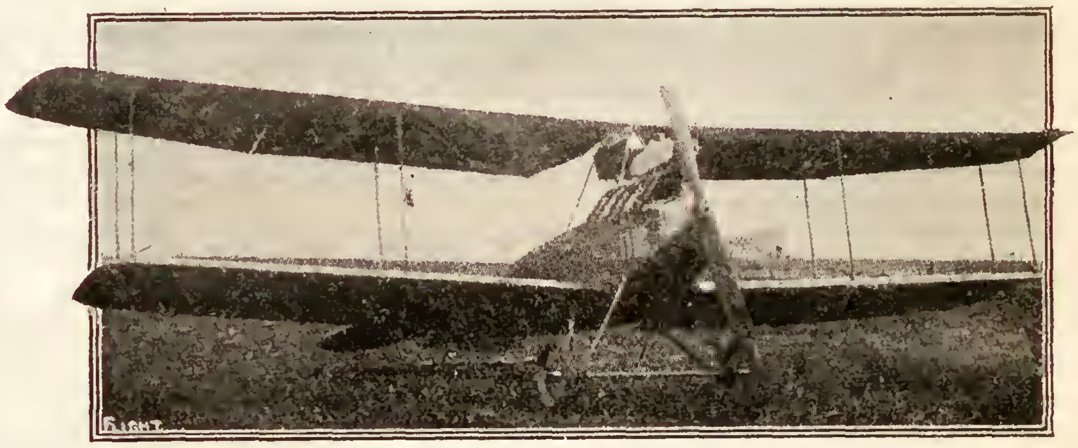
The Hansa Taube.



The Albatros Taube.



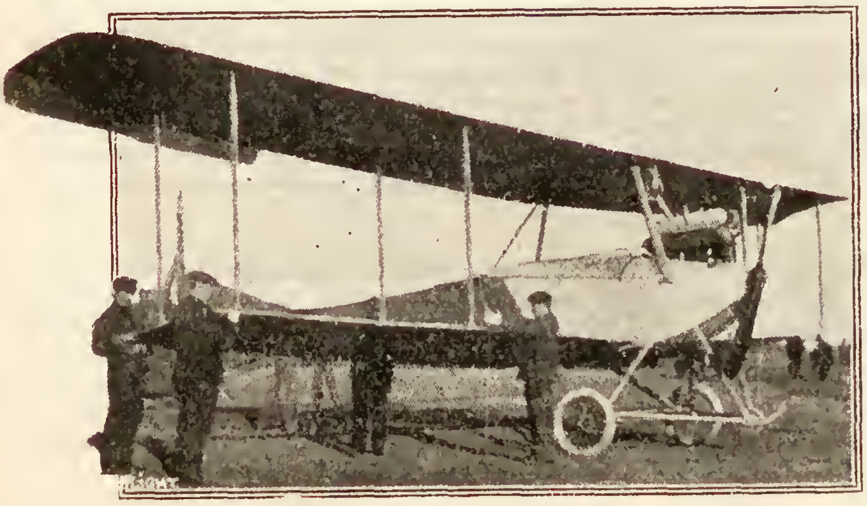
The A.E.G. biplane.



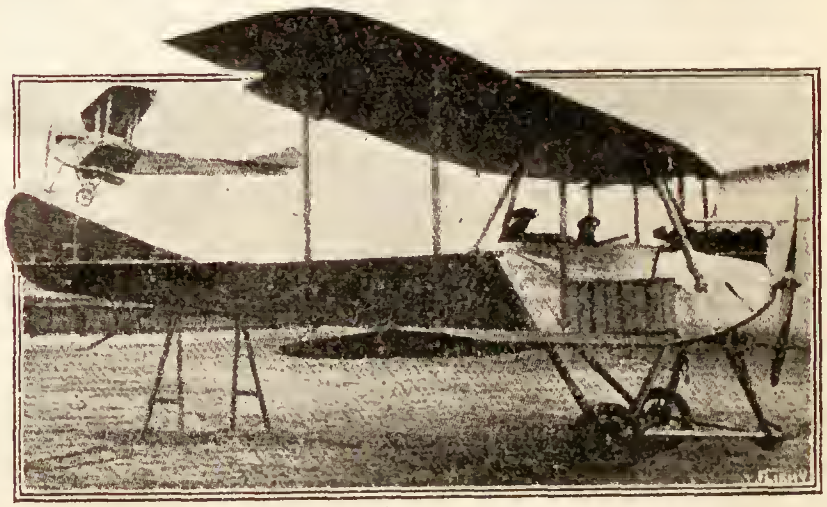
The Albatros biplane.

The **Albatros Taube** is characterized by a *fuselage* similar to that of the biplane with which our readers are already familiar through detailed descriptions in these columns. The wings are of the Taube type, and bracing is effected by a bridge girder structure of steel tubes under the wings. Provision has been made for folding the wings in a very short space of time. The chassis, which is also built of steel tubes, is very robust, and its different parts are standardised to facilitate interchange.

The **L.V.G. Biplane** is similar to those in use by the German Government, with the exception that the capacity of the tanks has been increased in order to allow of completing all of the various stages of the course without intermediate landings. These machines are, as will be seen from the accompanying photographs, of the tractor type, and have *fuselages* of similar shape to that of the Albatros biplane which was described in these columns some time ago.



The L.V.G. biplane.



The L.V.G. biplane.

FACTORS OF SAFETY DESIRABLE IN AEROPLANES.

WE have received an official *communiqué* from the War Office, a report from the Advisory Committee for Aeronautics. The Committee desire to call attention to some important considerations of a general character relative to the strength of the construction which it would appear desirable to attempt to obtain in the manufacture of aeroplanes—especially the strength of the wing. In view of the increasing severity of the conditions under which flights are now undertaken, they are of opinion than an endeavour should be made to produce machines having a higher margin of strength than is ordinarily allowed for in aeroplane design.

The term factor of safety is employed in a sense differing from that generally accepted in ordinary engineering usage, for whereas the engineer, after taking into account all known causes affecting the stresses a structure has to bear, allows a factor of safety to cover unknown sources of weakness, including defects in material and accidental errors of workmanship or design, in the case of the aeroplane the term is commonly used in relation to the calculated stresses in normal horizontal flight. The factor of safety, N, according to present usage is the ratio between the breaking stress in any part and the actual load carried by that part during horizontal flight in still air. The quantity N is to be regarded as made up of two separate factors, n and N_1, so that $N = nN_1$.

Of these N represents the maximum load, expressed as a multiple of the weight of the machine, which, so far as our knowledge goes, it may be expected to carry in flight, while n is a numerical factor by which we multiply N_1, in order to allow for uncertainty of calculations, flaws in the material, imperfect workmanship and the like. Of the two factors, the term factor of safety applies strictly only to n, and in what follows it is proposed so to apply it. We proceed to consider these two factors separately.

The weight of an aeroplane in horizontal flight in a steady wind is balanced by the resultant of the upward pressure on its wings, tail, &c., and the normal loading of the machine in this condition is equal to its weight. If the conditions of flight alter, the loading may be increased many times. Among the causes which contribute to this increase are gusts of wind, banking and flattening out, and it is desirable to form some idea of the effect of each of these.

Gusts.—Consider an aeroplane moving at its maximum speed in a horizontal wind, and suppose it suddenly enters a region where the wind, instead of being horizontal, has an upward direction, its speed remaining without serious alteration. The machine then experiences an upward gust; the angle of incidence on the planes is increased, the lift coefficient is increased, and the resultant upward thrust is in consequence increased. If we suppose that the maximum speed of the machine is twice its minimum speed, and that the attitude of the machine to the relative wind is so altered by the gust as to become that corresponding with the minimum speed, the lift coefficient will be increased four times by the change, and the loading immediately after entering the gust will be four times as great as previously; more generally the ratio of the two loadings will be equal to $(\text{maximum speed}/\text{minimum speed})^2$.

Banking.—This again causes an increase in loading corresponding with the angle of banking. If we take 45° as an angle often reached, the loading will be increased in the ratio $\sqrt{2}$ or 1·4 to 1, or, more generally, in the ratio sec α to 1, if α is the angle the wings make with the horizontal.

Flattening Out.—The increase in loading due to this may be very great; it depends on the speed reached by the machine before flattening, and the rate at which the manœuvre is performed.

Let us take a machine in which the lift coefficient at maximum normal speed is one-quarter of the maximum lift coefficient, and suppose that in order to flatten out the elevator is put instantaneously at its greatest or most effective angle; and that as a result the machine at once takes the attitude corresponding with maximum lift coefficient. The speed reached on a steep dive or glide before flattening may greatly exceed the maximum horizontal speed; let us suppose it has double that value. Then, while flattening out, the speed is twice the normal maximum speed, the upward thrust 16 times as great as its normal value, and the loading 16 times as high as in steady flight. A limit, however, is put to this, not only by the muscular effort required—it assumes that the elevator can be put over instantaneously, which is impossible—but also by the fact that the velocity reached in falling will necessarily be very much reduced in the process of flattening out before the attitude assumed is attained. A more careful calculation, based on the best data available as to the possible speed, and curvature of the path, would seem to show that in a case such as assumed the loading might be as much as eight times its normal value, but could hardly exceed this, and this figure can be greatly reduced by limiting the permissible speed of the machine.

Thus we have as outside figures:—For gusts, 4; for banking, 1·4; for flattening out, 8; with the fact that the last can readily be reduced to, say, 6, if care is taken not to fly the machine at a speed much greater than its maximum normal horizontal speed.

The question next arises whether it is possible for these conditions to occur together. It is clear that (1) and (2) may happen simultaneously. A machine may encounter a gust when banking. To allow for this we must multiply the two numbers 4 and 1·4 together and we get 5·6 to 1 as the ratio in which the loading may be increased by gusts and banking combined. The probability that extra heavy loading as a consequence of a gust will occur at the exact moment of flattening out is not large, and we may deal with these two conditions separately. Even in the case of temporary loss of control, when exceptionally high velocities may be reached owing to a vertical fall, it must be remembered that the air pressure coefficient cannot exceed a certain maximum value which occurs usually at an angle of incidence of about 16°.

We may thus perhaps conclude that with proper precautions an aeroplane will not in ordinary use be loaded to more than 5 or 6 times its weight. This would lead us to put $N_1 = 6$ in our formula.

We have now to consider the value of n, the factor by which N_1 is to be multiplied to allow for various uncertainties; that is the factor of safety properly so called. If usual engineering practice were followed, n would be considerable. The limitations imposed by the conditions of flight prevent this for the present, and we must be content to rely on careful inspection of work and materials and rigid tests, wherever possible, but it is clear that with the utmost care in the inspection and choice of materials n should be at least 2. This would make the value of N to be 12, and it is considered that this figure should be aimed at in the near future.

At present this desideratum is far from being reached. The figures before the Committee as to the value of N vary from 3 to 7, and the Committee realise that it is not possible at once to attain so high a value as 10 or 12. They are strongly of opinion, however, that machines ought not to be accepted for service unless the value of N is not less than 6, and even then it would appear possible that an occasion may occur, under the worst conceivable conditions, when the machine will be loaded up to its calculated breaking stress. The calculations should be made on the assumption that each part of the machine may have to bear the stress which would be produced by loading the machine to three times its weight; the stress thus found, when doubled, should be less than the breaking stress of that part of the machine.

It is proposed to investigate further the questions involved in the realisation of the degree of structural strength which is held, on general grounds, to be desirable. In nearly all machines the parts in which weakness is most liable to occur are the main wing spars, and the weight of these spars is not large in comparison with the total weight of the machine. Meanwhile attention should again be called to the fact that the exceptionally high stresses referred to in this Report do not occur under the ordinary conditions of flight provided a machine is carefully handled, and cannot arise to anything like the same degree in the less efficient types of machine. In accordance with the recommendation of the Monoplane Accidents Committee, the Committee desire to express the opinion that steep dives should be avoided, whether the engine is on or off, and, so far as is possible, care should be taken in descending that a speed exceeding by more than 15 or 20 per cent. the upper limit of the speed range is never reached.

In conclusion, the Committee recommends:—

(i) That for the future no machine be accepted for service unless the strength of the wing structure is such that the ratio of the breaking stress of any part to the stress produced in that part by a load equal to three times the weight of the machine is at least two;

(ii) That steps be taken without delay with a view of raising this figure, as soon as may be found possible, to double the above value.

* * *

New Special Reserve of the R.F.C.,

AN Army Order issued on Wednesday night states that it has been decided to enlist a limited number of men for service in the special reserve of the Military Wing of the Royal Flying Corps. These men will not be organised in units, but will be trained annually with Regular squadrons, and will be available on mobilisation for service at home and abroad with the Royal Flying Corps (Military Wing), but not in the capacity of pilots. The age for enlistment will be from 18 to 40 years, and enlistment will be for a period of four years. Annual training will consist of fifteen consecutive days, and whilst doing annual training or other military duty pay will be at Army rates, as follows: Second-class air-mechanic, 2*s.* per diem; first-class air-mechanic, 4*s.*; corporal, 5*s.*; sergeant, 6*s.*; flight sergeant, 7*s.* Non-commissioned officers and men discharged in consequence of injuries received in the performance of military duty will be eligible for pensions.

THE FLYING MACHINE FROM AN ENGINEERING STANDPOINT.

By FREDERICK WILLIAM LANCHESTER, M.Inst.C.E.

(Continued from page 577.)

Summarizing the position, it is clear that the tractive effort required to overcome flight resistance proper, namely, the aerofoil resistance, need not exceed 1 in 12 to 1 in 14, that is, 7 or 8 per cent., using an aspect ratio of about 6, and that values less than this are to-day actually reached in existing machines. It is futhermore apparent that if it is found practicable to employ really high aspect ratio, such as in my early flight models, there is every reason to suppose that a resistance coefficient as low as 6 per cent. or even 5 per cent. may prove to be attainable. This is the magnitude of the "constant gradient" of the motor-car analogy. We now pass to the consideration of body resistance.

4. *Body Resistance.*—The body resistance, as already stated, varies approximately as the square of the velocity. It is therefore evident that, with a machine of given weight, since the flight resistance proper (the aerofoil resistance) is constant, the higher the flight-speed the more serious relatively does the question of body resistance become, and the design of the car and its accessories, such as alighting gear, &c., is a matter of increasing importance as the contemplated flight velocity becomes greater. The calculation of body resistance involves the computation of the resistance of each individual element, and in some cases allowance for the interference or influence of one element or portion of another. Thus in the computation of body resistance it is necessary to have at command tabulated results of the resistance of spars of various sections, wires, wheels, and the like, in addition to a sufficiency of known data as to stream-line forms of various degrees of perfection. A considerable amount of experimental data has now been collected in this direction, but a great deal yet remains to be done.*

The resistance of the body-shape or *fuselage* is a factor on which at present the information available is at least satisfactory, since it is rarely possible for the designer to adopt a close approximation to a perfect stream-line form, or a form for which the resistance coefficient has been already determined; it is usually necessary to have recourse to model experiment in each individual case. This is no more than must be expected, in view of the fact that the same applies to the design of a ship's hull when any departure is made from existing practice.

A very few years since little or nothing was known as to the resistance of the so-called stream-line or ichthyoid body. In 1908–09 I made enquiries in the endeavour to obtain some figures on this subject. For bodies constituting a rough imitation of a good fish form, with ratio of length to diameter of about 6 to 1, the figures given in Table VII were supplied by the different authorities named; the figures, given to me in various forms, are here reduced to represent the equivalent of normal plane in terms of the maximum cross-section.

TABLE VII.

Authority.	Date.		Remarks.
Prandtl	1908	0·125	Given as approximate only
Colliex	1908	0·100	From rough experiments at the factory of Voisin Frères
Surcouf	1908	0·031	Given as an experimental determination by the late Col. Renard
British Admiralty	1909	0·032	Actual for water (ratio about 3 : 1)
		0·023	Probable for air

It would appear from more recent experiments carried out at the Royal A.F., and at the N.P.L., that for a well-designed stream-line form the best result so far recorded is approximately 0·07, the coefficient of fineness length/diameter being round about the value 4 : 1.

The plotting given in Fig. 20 is based on a series of determinations made at the R.A.F., with corrections (for which I take responsibility) to compensate for the difference in the coefficient of skin-friction between the velocity, 20 ft.-secs., actually employed, and an assumed flight-speed of 70 miles an hour. The plotting represents the resistance coefficient for bodies of about 2 to 3 ft. diameter.

When we turn our attention to the design of the body of machines as they exist to-day, we find that although it is becoming customary to give the *fuselage* a distinct fish-like outline, it is rare that any real attempt is made to adopt a definitely stream-line or true ichthyoid form, such as employed for the experimental determinations already cited, and commonly used for dirigible balloons. It is not sufficient to give a rough general outline to the body if a material reduction in the resistance is required; it is necessary to go further than this, and to avoid as far as possible corners and projections of every description. In many cases in the body-forms used to-day the resistance is nearly as great as that of a normal plane equal to the mid-section area, and a body with a coefficient of less than 0·5, in view of current practice, must be regarded as exceptionally good. As a consequence the resistance of the *fuselage* and passengers alone is often equivalent to some 3 or 4 sq. ft., whereas an equivalent considerably less than 1 sq. ft. ought to suffice. It is not only necessary to avoid up-standing projections such as wind-screens, &c., but even such things as longitudinal angles should be eliminated from the design; this latter point has been partially investigated by the N.P.L.

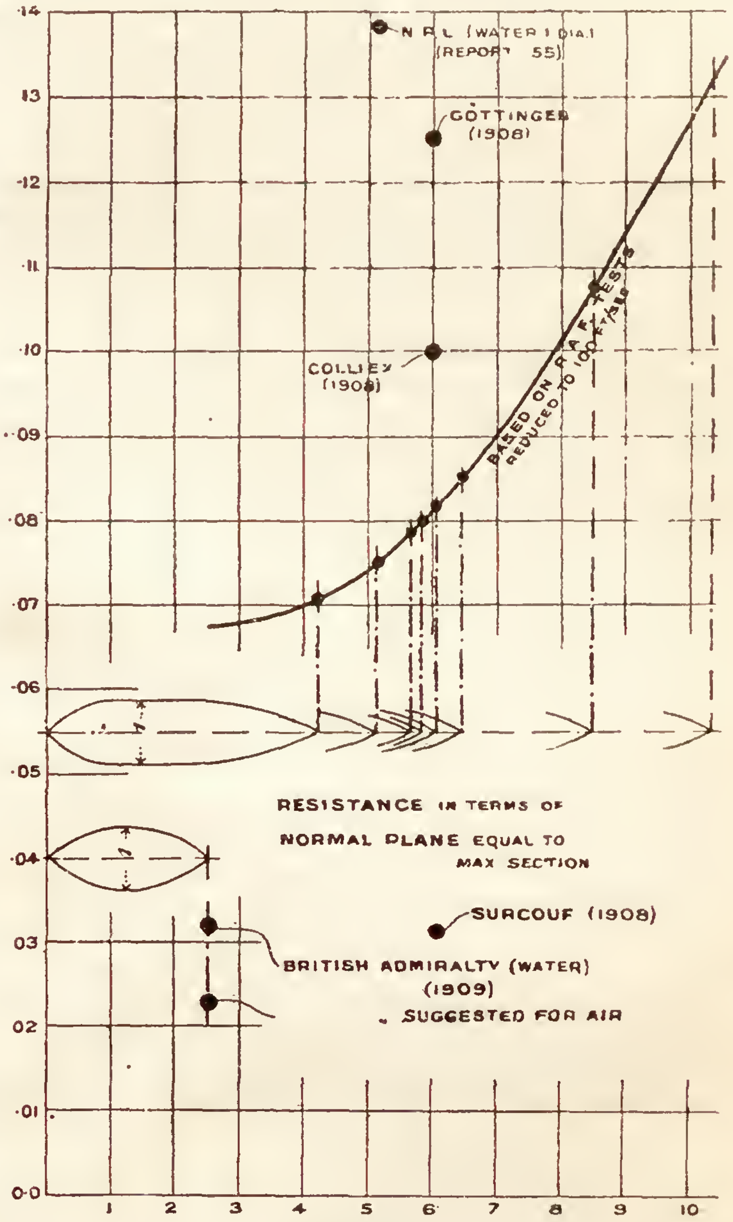
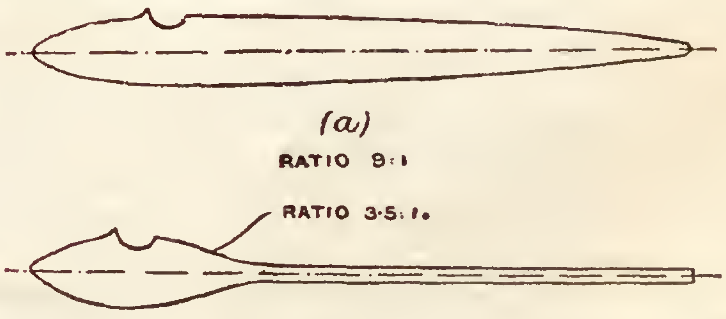


Fig. 20.



(a)

(b)

Figs. 21*a* and 21*b*.

In the Paulhan-Tatin machine, mentioned in the researches of Mr. Eiffel, the question of body form has been studied with extreme care, the form of body employed being substantially a solid of revolution, as given in Fig. 21*a*. The only irregularity in the *fuselage* is in the aperture for the pilot's body, which has clearly been reduced to the minimum possible. According to the results given in Fig. 20 it would be still better, from the point of view of resistance, to design the body on the lines shown in Fig. 21*b*, making the body only of sufficient length to contain the pilot, motor, &c.,

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* For the resistance coefficients of spars, wires, &c., reference should be made to the various reports of the Advisory Committee and the work of Mr. Eiffel and others, also section 9 following.

and carrying the tail organs from a tubular continuation. A model of this kind, made and tested at the N.P.L. (from designs of the R.A.F.), gave a normal plane equivalent of about one-fifth of its maximum cross section. The form was imperfect as a stream-line body, and the small scale ($\frac{1}{25}$ full size), otherwise rendered the resistance higher than it would be in actuality.—Advisory Committee Report 74, p. 177.

It is evident that with sufficient experience the body *fuselage* resistance of an ordinary two-seat machine should be capable of reduction to the equivalent of 1 sq. ft. area of normal plane, since a good model of stream-line body of 5 sq. ft. maximum section should in itself offer less than half this resistance. Added to this we have the alighting chassis and auxiliary surfaces, the resistance of which should be capable of being designed for an equivalent of 2 sq. ft. if the design be studied in every detail, making 3 sq. ft. in all. On the basis of 80 miles an hour the resistance will then amount to 60 lbs., or say, approximately, 5 per cent. The body resistance in the machines of to-day is very much higher; it is commonly the equivalent of at least some 5 sq. ft. of normal plane: Mr. Eiffel gives 1 sq. metre (= 10 sq. ft.) as usual.

5. *Total Resistance.*—Fig. 22 represents graphically the position with which the designer has to cope; the horizontal line *a a* represents an aerofoil resistance coefficient of 7 per cent. The curve 2 represents (from *a a* as datum) the additional coefficient due to body resistance on the assumption that we are dealing with a machine of 1,200 lbs. weight, in which the body resistance has the equivalent of 2 sq. ft. area of normal plane curve, 3 represents similarly the added body resistance on a basis of 3 sq. ft.; lines 4 and 5, 7 and 10 represent 4, 5, 7 and 10 sq. ft. respectively; curve 5 may be taken roughly to represent the best practice at the present time. It is evident that so long as flight-speeds were limited to 40 miles an hour or less, as was the case a few years ago, the body resistance remained a matter of minor importance; in fact, in the Wright machine, and in several other machines of that day, the pilot sat fully exposed, and little or no attempt was made to minimize resistance, whereas with speeds of 80 miles an hour the body resistance will, unless great care is taken in the design, considerably exceed the flight resistance proper. Fig. 22 does not represent the resistance of a given machine flown at different speeds, but rather the resistance of a series of machines of given weight, *each designed for least resistance at its own particular speed*, and with body resistance equivalent to the area indicated.

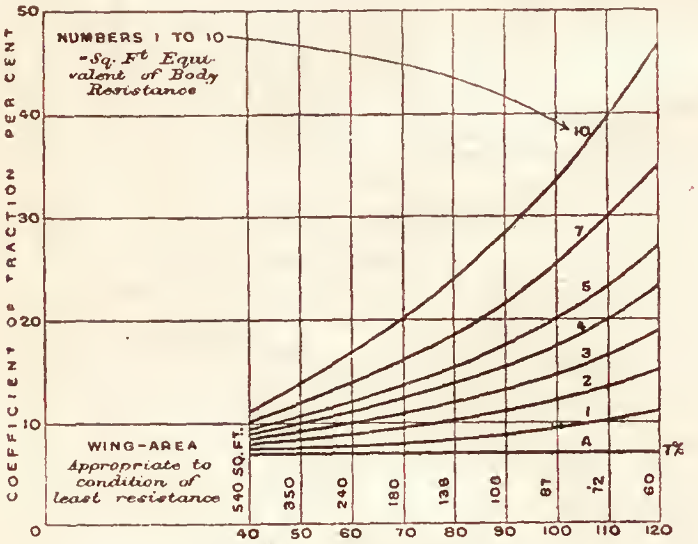


Fig. 22.

Referring to Fig. 22, it will be seen that the total traction coefficient in the case of curve 5 at 80 miles an hour is roughly 15 per cent., the gliding angle consequently being 1 in 6·7: this is slightly better than the best figures actually obtained in the military trials of 1912. The highest speed at the military trials did not touch 70 miles an hour, so that on the basis given the gliding angle should have been better than stated; no allowance was made for the drag of the propeller, it is possible the difference is due to this factor.

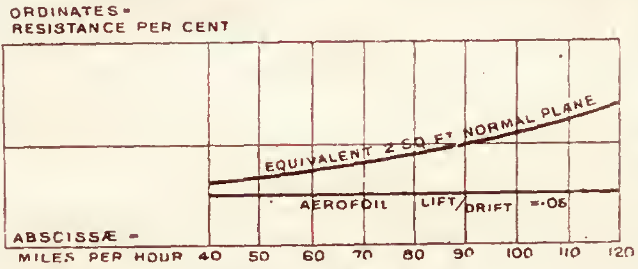
The question of body resistance has for some time been a matter of careful study by the staff of the Royal Aircraft Factory, and I understand that in some of the later models the equivalent normal plane area has been very considerably reduced. If we take an aerofoil coefficient of 7 per cent., and a curve representing 3 sq. ft. equivalent normal plane, we find that at 80 miles an hour the gliding-angle, or the resistance coefficient, should be approximately 12 per cent.; or at 60 miles per hour 10 per cent.; I believe this figure to be in sight, though it may not yet have been actually reached.

As illustrating the extent to which the present-day results have been anticipated by theory, in 1907, dealing with the question of the power expended in flight, I tabulated the results of calculations for gliding-angles as for complete machines ranging from 12° (approximately 1 in 5) to 6° (approximately 1 in 10). In the military trials of 1912 the worst gliding angle recorded was 1 in 5·3, and (as pointed out in the preceding paragraph), the present-day figure is gradually approaching 1 in 10.

If we try in the light of present data to look into the future it seems probable that the limiting gliding angle, or, rather, the minimum total coefficient of resistance, may even be materially less than 1 in 10; thus if it is found possible, in spite of structural difficulties, to obtain equal results in an actual machine to those obtained in wind channel model tests, namely a coefficient of resistance for the aerofoil approximately to 5 per cent., and if the body area equivalent, for a machine of 1,200 lbs. gross weight, can eventually be reduced to 2 square feet, a total coefficient of resistance as low as 8 per cent. may prove well within reach; whether the sacrifices necessary in order to achieve such results in practice would be justified the future alone can decide. The solution of any engineering problem is always to some degree a matter of compromise, and it would be rash to suggest that in the case of the flying-machine there are not considerations of sufficient importance to render it inadvisable to run after the last 1 per cent. reduction in tractive effort. A graph is given representing the coefficient of resistance on the basis of the present paragraph in Fig. 23. The aerofoil coefficient of traction is taken at 5 per cent. the weight of the machine as before assumed as 1,200 lbs., and the suggested total of 8 per cent. corresponds to a flight speed of nearly 80 miles an hour.

Before we have finished with the question of resistance we need to know something as to the gradient of ascent, or climbing-power required. A machine that is only capable of horizontal flight is evidently quite unserviceable; it is well understood, too, that any machine with an insufficient rate of ascent is intrinsically dangerous; not only does it remain too long at low altitude, where any "fluke" in the wind is liable to bring about disaster, but in bad weather when buffeted about by the wind a pilot may find himself incapable of making altitude altogether if his initial margin of power is insufficient.

The rate of ascent for which provision has to be made depends very much upon the service for which the machine is required, for the ordinary needs of the aeronaut who wishes to make cross-country flights under fair-weather conditions, a margin of power representing an upgrade of 5 per cent. or 6 per cent. appears to be ample; there is probably no real advantage in any greater provision. For military or naval service, on the other hand, there are without doubt occasions when everything may depend upon the rapidity at which the machine can make altitude. I feel that I cannot do better than quote from the specifications given by the Superintendent of the R.A.F. for two types of machine—namely, R.E. 1 Reconnaissance aeroplane, and F.E. 3 Gun-carrying aeroplane (*see* Report Advisory Committee 1912-1913, p. 267). For the first of these the rate of climbing demanded is 600 ft. per minute, or, taking the normal flight-speed at 70 miles per hour (the specification gives maximum 78 miles per hour, and minimum 48), we have a climbing gradient of approximately 10 per cent. For the gun-carrying machine the speed is given as 75 miles per hour, and the rate of climbing 350 feet per min., which, expressed as climbing gradient is a trifle less thon $5\frac{1}{2}$ per cent. Manifestly a machine carrying a gun of some kind (presumably a machine gun), and we may assume an adequate supply of ammunition, and perhaps a few square feet of bullet-proof armour plate, needs to sacrifice something in the matter of climbing power.



MINIMUM RESISTANCE
(ANTICIPATING THE LIMIT OF POSSIBILITY.)

Fig. 23.

There is good reason to suppose that if a demand for higher speeds than those at present attained is in the future to be satisfied, success will depend to some extent upon our ability to build larger and heavier machines. By reference to Figs. 22 and 23 it will be seen how soon with increased flight speeds the question of body-resistance becomes a disproportionate factor; it is manifestly impossible in a machine of given size to reduce the equivalent normal plane area beyond a certain point, but it is evident that by increasing the weight and power of the machine the effect of such body-resistances may be rendered less important since an increase in weight and power does not require a proportionately serious increase in the size of the members to which the body-resistance is due. Also since the square of the product of l and V varies directly as the weight (where l represents the linear size of the aerofoil) the value of ξ is also a function of the weight and diminishes slightly as the weight is increased. (*To be continued.*)

FOREIGN AIRCRAFT NEWS.

New Regulations for French Military Pilots.

Under date of May 20th the French military authorities have issued new regulations regarding the qualifications for aeroplane, balloon and airship pilots employed by the French Army. It is notified that the only certificate now recognised for aeroplane pilots is the military or, as it is more usually called—the superior certificate, for which the conditions are made more severe each year. For balloonists two certificates are recognised, the ordinary F.A.I. *brevet* and the superior certificate issued to officers and non-commissioned officers who have undergone a certain course of training. For dirigibles there are two *brevets*, pilot's and mechanic's; the former is issued to officers and non-commissioned officers who fulfil certain requirements, while the latter is granted to non-commissioned officers and men who pass through a course of training.

Fine Flight by Caudron Escadrille.

At the end of last week an escadrille of six Caudron biplanes, stationed at Douai and commanded by Capt. Peralda, completed a flight of 800 kiloms., calling at Evreux, Rouen, Dieppe, Crotoy and Calais.

2,000 Kiloms. on a Rep.

On Wednesday and Thursday of last week, Lieut. Campagne, on a Rep, fitted with an 80 h.p. Gnome motor, made a cross-country flight of 2,000 kiloms., starting from and finishing at Rheims, with stops at Nimes, Castelnaudary, Bordeaux and Buc.

Geneva to Lyon on a Dep.

On the Deperdussin monoplane which he had purchased from Vidart, the Swiss pilot, Durafour on the 28th ult. flew from Geneva to Lyon in 1 hr. 20 mins., not counting a short stop which was made at Amberieu.

A Prize for Hardelot Visitors.

The Society of Hardelot is offering a prize of 1,000 francs for the aviator who between June 1st and September 30th, makes the greatest number of landings on the beach at Hardelot. Only one landing may be made per day and it must be preceded by a cross-country flight of at least 30 kiloms.

Verrier's Flight for Pommery Cup.

The distance flown by Verrier in his winning flight for the Pommery Cup from Buc to Genthin in Germany has now been checked by geographical experts of the French Army and found to be 818·1 kiloms.

New M. Farman for French Army.

At Buc on Saturday last, Capt. Destouches and Capt. Grard witnessed tests with the new Maurice Farman biplane built for the French Army. The new machine has a span of 15·5 metres and is fitted with an 80 h.p. De Dion motor. The maximum flying speed is 105 k.p.h. and the minimum 55 k.p.h., but in one test with four hours' fuel on board and a passenger, Fourny flew at a speed of but 35 k.p.h. The machine leaves the ground after a run of only 50 metres and can be pulled up in a like distance. It can climb 1,000 metres in 9 mins. while it is designed to carry a useful load of 305 kilogs. A feature of the machine is the comfortable accommodation for both pilot and passenger, who are well protected from wind and rain.

A Pupil Drowned at Nice.

While a pupil, named Agostani, at a flying school at Antibes, near Nice, was flying over the sea on Saturday, the machine side-slipped when a sharp turn was attempted about half a mile from the shore. The pilot was drowned before help could reach him.

Aerial Touring.

Accompanied by Rougerie, Maurice Farman, on one of his latest type machines on Saturday flew from Buc to Etampes by way of Limours, Dourdan, &c., and later in the day returned by Rambouillet. Eugene Renaux, on a similar machine but with a 100 h.p. motor, flew from Etampes to Buc for the purpose of testing a new propeller, and afterwards took a passenger across to St. Cyr.

Flying in Morocco, &c.

After resting at Oudjda since May 11th, when they completed their flight from Tunis, the escadrille of five Farman machines, piloted by Lieuts. Cheutin, Menard, Battini, and Sergeants Hurard and Benoit respectively, on the 27th ult., flew the 250 kiloms. from Oudjda to Taza, being joined on the way at M'Coun, where a stop was made for replenishments, by three Deperdussins, piloted by Lieuts. Lalanne, Radisson, and Magnien. The next day the Farmans made a non-stop flight back to Oudjda. A further 410 kiloms. were covered in a flight to Tendrara and Bou-Denib on the 29th ult., while on Sunday last Lieuts. Battini and Menard and Sergeant Benoit flew the 160 kiloms. to Colomb-Bechar. Throughout these flights each pilot is accompanied by a mechanic. Since it started on May 6th from Tunis, the escadrille of 80 h.p. Gnome-H. Farmans has covered 2,300 kiloms.

A Fatality in Russia.

It is reported from Odessa that on Saturday last the machine of Lieut. Kouzminski fell from a great height. The pilot was killed on the spot, and the observer, Lieut. Toustanowski, was seriously injured.

Mr. Thornely on his biplane at the Münster Aerodrome, where he has been giving looping exhibitions last week, during the time that the Prince Henry flight was in progress. Tweer was also looping on a Blériot.

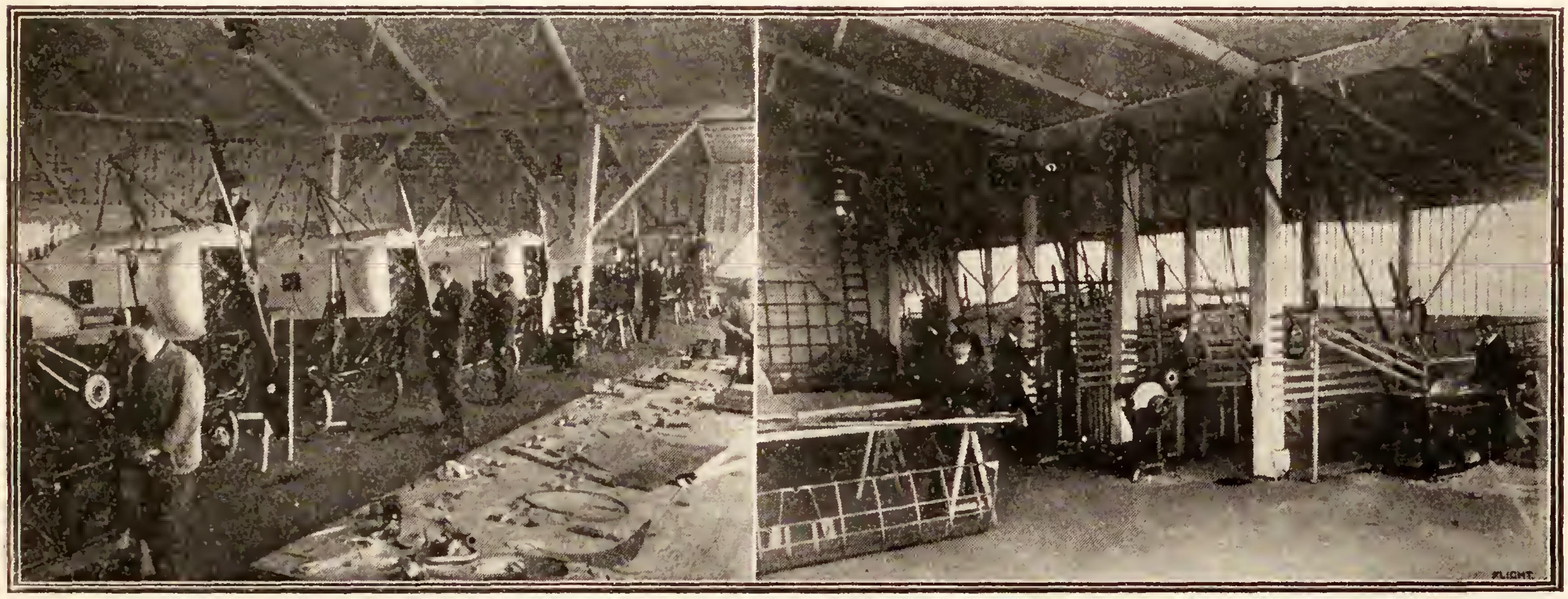
BLÉRIOT ACTIVITY.

ALTHOUGH the Blériot works at Brooklands have been in operation a few weeks only, M. N. Chereau, their general manager, has already made an excellent start by turning out a number of 80 h.p. two-seater British built Blériots. These machines, which were ordered by the British Government, are built at the Brooklands works throughout, and the workmanship is equal to, if not indeed better, than that of the French built machines. As one would expect from so capable a manager as M. Chereau, the works are excellently arranged.

Five of the hangars have been turned into one large erecting shop, the size of which may be easily realised by a glance at the accompanying photographs. About half a score of machines may be erected at one time, whilst in the woodwork department adjoining the erection shop are to be found all the latest improvements in woodworking machinery. The various departments are in charge of experienced foremen, each of whom is an expert in his own particular line of work.

The hangars adjoining the works have been turned into roomy well lighted offices, whilst another hangar is at present being turned into club rooms for the Blériot pupils. The front portion of this hangar will, when finished, be a lounge in which pupils can discuss the events of the day over a pipe, and at the back of this lounge the building will be divided into a number of small cabins, each assigned for a pupil, so that those of the pupils who wish to do so, may bunk in his cabin so as to be at hand early in the morning, and thus save valuable time, and draw advantage of the morning calms without wasting time in getting down to the aerodrome. We understand from M. Chereau that arrangements have been made with the authorities to train officers of the reserve and to offer facilities for those officers who have already obtained their *brevets* to practice at the Blériot school. With the works close at hand to effect repairs, and with the extensive accommodation for the personal comfort of the pupils, the Blériot school should become very popular both among officers and civilians.

The instruction will be in the hands of M. Jules Teulade-Cabanes, who has been appointed chief instructor, whilst Mr. Edwin Gower, who has been flying Blériots at Buc, will be chief pilot. Several 80 h.p. two-seaters of the new type will be manufactured shortly in addition to a number of school machines ranging from 50 h.p. *brevet* machines down to pingouin taxying machines.



A couple of interior views of the new British Blériot works at Brooklands. On the left a view of half a dozen machines in the shop, and on the right a portion of the wood-working department is seen.

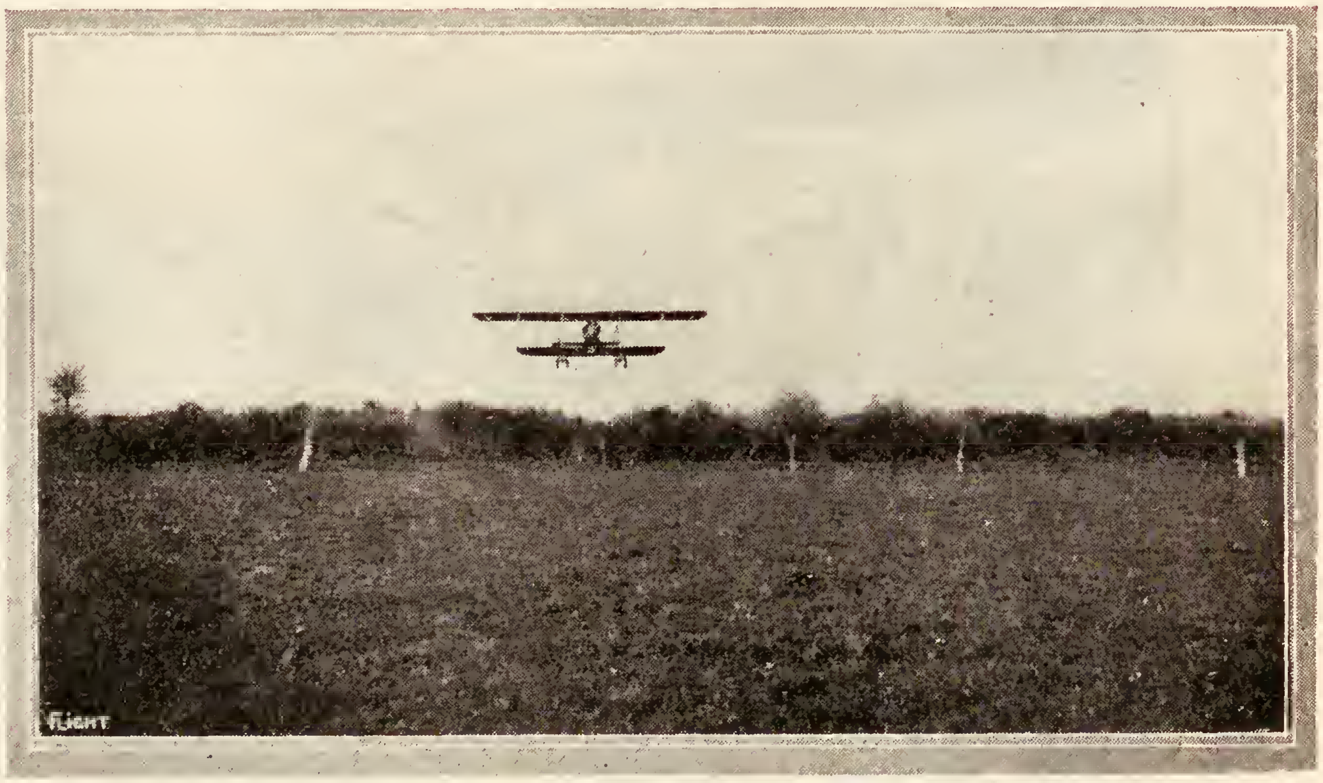
⊗ ⊗ ⊗ ⊗

Mr. Churchhill's Long Flight.

A CROSS-COUNTRY flight of a little under sixty miles was made by Mr. Winston Churchill on the 29th ult., when he was a passenger on a biplane piloted by Major Gerrard, of the Central Flying School, from Upavon to Portsmouth. Mr. Churchill had spent several days at Upavon, during which he had several flights over Salisbury Plain with Major Gerrard.

Lectures on Aeronautics at East London College.

THE first of a course of four lectures on Aeronautics, dealing with the Stability and Control of Aeroplanes was delivered by Mr. A. P. Thurston, D.Sc. A.F.Ae.S. at East London College, Mile End Road, E., on Wednesday last. The remaining lectures, which are open to the public, free of charge, will be given on succeeding Wednesdays.



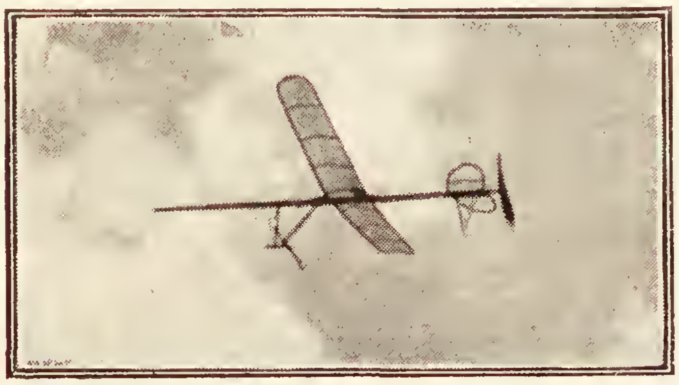
A snap of the brothers James on their biplane at Narberth, South Wales, where they are doing regular air work. The photograph shows the machine getting off in a field with the limited space of 200 by 220, which should give good practice for cross-country work.

Models

Edited by V. E. JOHNSON, M.A.

Mr. A. G. Boniface's Olympia Model.

THIS machine, which was exhibited at the last Aero Show, is of the single propeller tail type. The spar is 4 ft. long by ⅜ in. sq. silver spruce, being streamlined and braced with a central king-post on top only. The main plane is tapered slightly with a fairly deep camber washing out towards the tips, and a small dihedral angle; the span is 36 ins. and average chord 5½ ins. The tail is quite flat, having a span of 10 ins. and an area of 34 sq. ins. The main plane has an angle of incidence of 4°. A chassis, of the central skid type, is employed. The bamboo struts are attached on either side of the spar in order to accommodate the rubber underneath. The main feature of the chassis is the sprung axle which is lashed to the skid by a tight rubber band. This arrangement is similar in action to the leaf-spring in the Nieuport chassis, and has proved to be far superior to the perfectly rigid chassis, which often becomes *bois-cassé* in very rough landings. A double wire skid underneath the tail keeps the propeller clear of the ground. The power unit consists of an "integral" type screw of 10 ins. diameter and 18 ins. pitch driven by nine strands of thin ¼-in. strip rubber. The total surface is 228 sq. ins. and weight 6¾ ozs., thus giving a loading of 4¼ ozs. per sq. ft. The stability of this model is much better than that exhibited generally by the single-screw canard type of machine, and a flat steady glide with the propeller stationary is executed at the end of each flight. The model has frequently climbed to well over 80 ft. The best duration accomplished to date is 100 secs.



Mr. A. G. Boniface's Olympia model.

A Model Chassis, Pilot's Seat and Control.

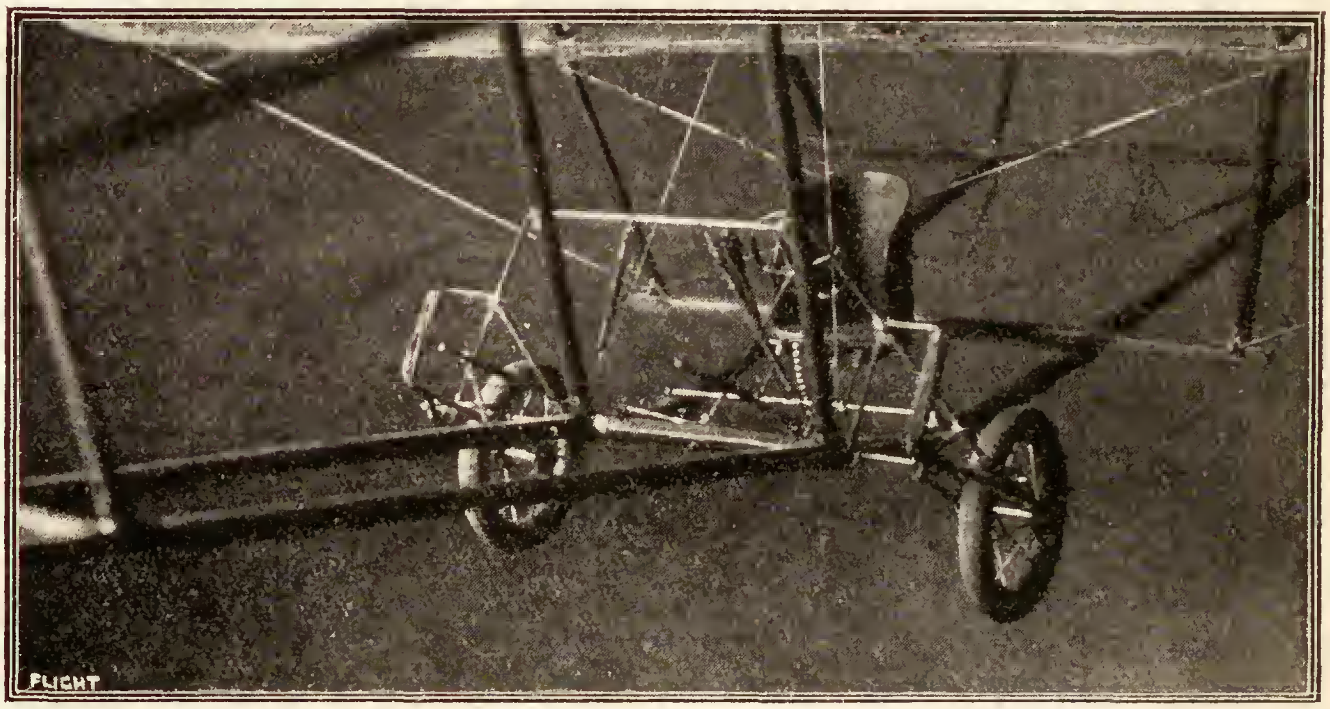
Mr. A. D. Wilkinson (Winnipeg, Western Canada), sends us the following description and accompanying illustration of an interesting model chassis, &c., employed by him on his new I-2-P2-0 model: "The elevator is controlled by a spring and ratchet, actuated by a lever to the right of the pilot's seat. The rudder is operated by wires from the automobile control (made of cycle spokes). There is another lever behind the elevator control, not shown in the illustrations, connected to the *ailerons*. The rubber sprung wheel-forks and all the metal portion of the landing carriage are made from cycle spokes. The machine is 45 ins. over all, with an upper main wing span of 36 ins. The rubber motor refuses to work (unwind) in below zero weather, but I tried the machine some time ago in a snowstorm and accompanying rise of temperature and it flew 100 yds. across the Red River, further progress being interrupted by a tree."

Mr. L. S. Wyatt's Models.

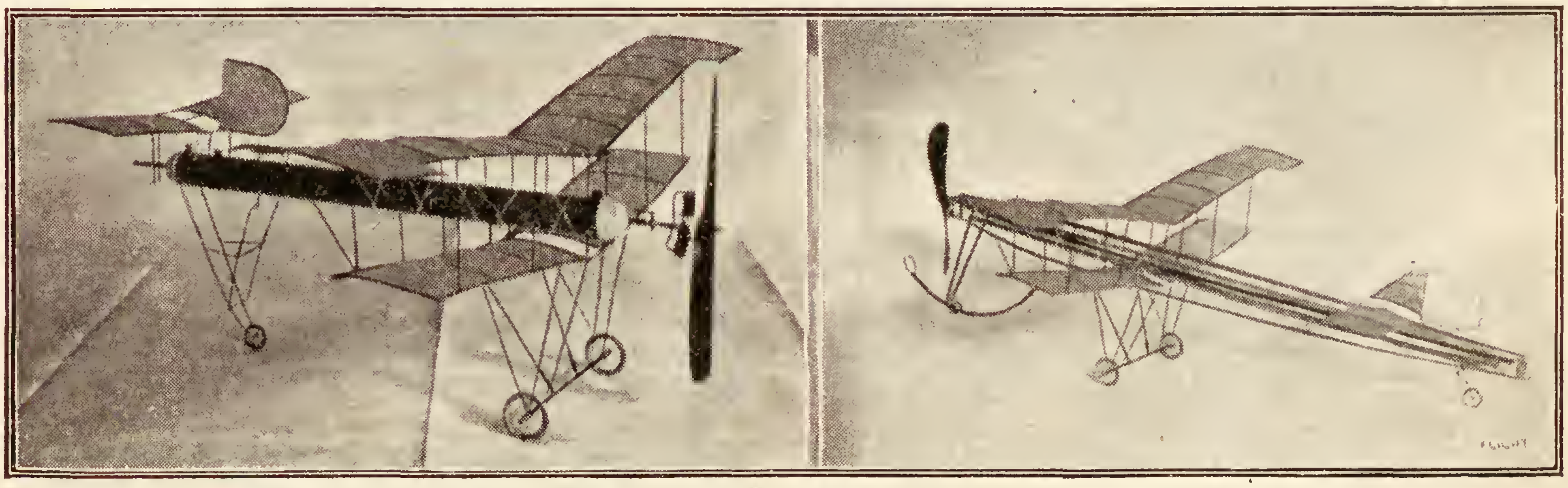
"I send you two photos, with dimensions, of two recent models I have made, which I intended to exhibit at Olympia, but could not get finished in time," writes Mr. Wyatt.

"One set of main planes and rudder serve both models as required, although quite different in themselves, the wheels being sprung fixtures to the above planes. Both are good fliers in the stability sense, but the rubber-driven model flies *three* times the distance of the compressed air plant." [Readers should carefully note this interesting item.—V.E.J.]

"*Compressed air plant* (canard type model): Single air chamber or reservoir purchased by itself, 3-cylinder rotary engine, 12-inch propeller, 20-inch pitch. *Main planes*, upper 30 in. span, 5 in. chord, with extended flaps. *Lower plane*, 20 in. span, 5 in. chord, gap



A neat model chassis, pilot's seat and control by Mr. A. D. Wilkinson.



TWO INTERESTING MODELS BY MR. L. S. WYATT.—On the left, compressed air canard; on the right, rubber tractor.

5·25 ins. Length of machine, 26·5 ins. *Elevator*, 12 in. span, 4 in. chords divided in two. *Landing chassis* sprung on four steel springs top and bottom. All struts and chassis rods fastened to steel clock springs with $\frac{1}{16}$ in. bolts and nuts. Weight complete, 12½ ozs.

"Everything takes to pieces in about 10 mins.

"*Rubber driven model* (tractor) geared 2 to 1 cogs. 18 strands $\frac{1}{4}$ in. strip rubber. Length of motor rod, 38 ins. 12 in. tractor screw, 21 in. pitch.

"Main planes as before, with same rudder and elevator. In the photo. the fabric covering the body is omitted to show the construction. The two top longitudinals are ash, the bottom one of bamboo, into which the skid is fastened, making an efficient shock absorber, the bamboo 'giving' about 1·5 ins. on landing. The tail end of this member is fastened with two $\frac{1}{16}$ in. bolts to the body to allow the planes to slide off. The c.g. is arranged aft of the planes when starting off the ground by the position of the wheels, and is in the right position when flying. Two miniature wheels are fixed in the skid to allow better landing. The back wheel is also sprung. Total weight 16·5 ounces. Steel is employed throughout in the construction of the first model, and also in this, except motor, *fuselage* and skid.

"I shall be pleased to supply anyone wanting drawings with the same."

* * *

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration ..	D. Driver... ...	85 secs.
Twin screw, do.	Distance ...	R. Lucas	590 yards.
	Duration ...	G. Hayden ...	137 secs.
Single screw, rise off ground	Distance ...	W. E. Evans ...	290 yards.
	Duration ...	W. E. Evans ...	64 secs.
Twin screw, do.	Distance ...	L. H. Slatter ...	365 yards.
	Duration ...	J. E. Louch ...	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance ...	C. C. Dutton ...	266 yards
	Duration ...	J. E. Louch ...	91 secs.
Do., off-ground	Distance ...	C. C. Dutton ...	190 yards.
	Duration ...	J. E. Louch ...	94 secs.
Single screw hydro., off-water	Duration ...	L. H. Slatter ...	35 secs.
Single-tractor, do., do. ...	Duration ...	C. C. Dutton ...	29 secs.
Twin screw, do., do. ...	Duration ...	L. H. Slatter ...	60 secs.
Engine driven off grass ...	Duration ...	D. Stanger ...	51 secs.

Competitions.—Entries for the *Model Engineer* Competition close this Saturday, June 6th, and any intending competitor should forward entry to H. A. Lyche, Esq., at 46, Templesheen Road, East Sheen, S.W. The 5th Annual Contest for the Gamage Cup will be held on Wanstead Flats on Saturday, June 27th, at 3 p.m. Entries close June 20th.

Official Trials.—The next official trials will take place on Wimbledon Common, on Saturday, June 20th, at 3 p.m., for the purpose of establishing records. It is hoped that members and friends will turn out on this occasion. Application forms can be obtained from the Gen. Hon. Sec., and must be returned to H. A. Lyche, Esq., 46, Templesheen Road, East Sheen, S.W., by June 13th.

Bristol International Exhibition, July 13th to 18th.—In connection with this exhibition an aviation section for models is being organised by the Bristol and West of England Aero Club. Prizes to the value of £17 are being offered. Full details will appear under the Bristol Club's notices. Any member or reader wishing for full programme of the meeting can have one forwarded by sending Mr. Akehurst a stamped addressed envelope.

27, Victory Road, Wimbledon. W. H. AKEHURST, Gen. Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, Leyspring Road).

June 7th, flying on Wanstead Flats, 6.30 a.m. At 10.30 a.m., twin-screw duration competition, 8-oz. models. 4-oz. loading models must rise off grass.

UNAFFILIATED CLUBS.

Finsbury Park and District (66, Elfort Road, Highbury, N.).

June 6th, practice flying at Finsbury Park, 3 p.m. H.l. duration contest for tractors at 5 p.m.

Scottish Ae.S. Model Ae.C. (5, Doune Quadrant, Glasgow).

June 6th, 13th and 20th, Paisley Racecourse, h.l., r.o.g., tractors. June 13th, second competition for "The Arthur Corbett Cup." Type, r.o.g. 25th, 26th and 27th, B C. Hucks and D. Manton at Scotstoun Show Ground, Whiteinch. July 4th, third and final competition for "The Arthur Corbett Cup." Type, waterplanes, at Maxwell Park Pond.

S. Eastern Model Ae.C. (1, Railway Approach, Brockley).

Usual flying meetings will be held this week-end.

* * *

PUBLICATIONS RECEIVED.

The Scientific Determination of the Merits of Automobiles. By Dr. A. Reidler. London: The General Oil Publishing Co., Ltd., 6, Broad Street Place, E.C. Price, cloth, 21*s.* net.

How to Understand Aeroplanes. By S. L. Walkden. London: Percival Marshall and Co., 66, Farringdon Street, E.C. Price 1*s.* net.

Technical Report of the Advisory Committee for Aeronautics for the Year 1912–13. Teddington: The National Physical Laboratory, Bushy House. Price 10*s.*

CORRESPONDENCE.

Brakes for Aeroplanes.

[1866] With reference to Mr. Frank Brook's letter appearing in the current issue of your paper on above matter, I should like to state through your columns that I designed an aeroplane brake, some time ago, which design was referred to in my letter appearing in Flight for October 26th, 1912. The brake can be fitted to either monoplane or biplane, and acts upon the wheels of the landing chassis, and being now in a position to proceed with the matter, I have communicated the design to the Royal Aircraft Factory, and shall also be pleased to give particulars to any builders of aircraft who may be interested.

81, Church Hill, Walthamstow. Vincent H. Mair.

Climbing Speeds of Machines.

[1867] In his letter (1,864) Mr. A. M. Coate states that a propeller working efficiently on a machine whose air-speed is 60 m.p.h. would not work efficiently with a following wind of 40 m.p.h. In short, assuming what he has to prove, perhaps Mr. Coate would state why this inefficiency of a propeller when there is a following wind.

W. Wimbledon, S.W. L. G. T.

* * *

Lieut Calderara Joins the Savoia Co.

Our readers will be interested to learn that Lieut. Calderara, one of the first pupils of Wilbur Wright in Europe, and whose name is associated with the design of Avion floats, has joined the Savoia Co. of Milan, the Italian branch of General Aviation Contractors, as technical adviser.

To Help W.A.L. Accident Fund.

A special *matinée* is to take place at the Court Theatre on July 3rd in aid of the Women's Aerial League Flying Accident Fund. The programme will consist of five short plays by Major Trevor—"A Marriage of Inconvenience," "Straying a Little," "Limited Liability," "Silence of Gold," "His Wild Oats." Applications for tickets should be addressed to the League Offices, 25, Denison House, Victoria, S.W.

* * *

NEW COMPANY REGISTERED.

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* * *

Aeronautical Patents Published.

Applied for in 1913.

Published May 21st, 1914.

12,212. W. Jungbecker. Flying machines and balloons.
12,371. G. Mees. Floats for aircraft.
27,078. F. G. Leslie. Aeroplane.

Published May 28th, 1914.

11,129. W. H. Nosworthy and S. J. Prescott. Aerial machines.
16,200. K. H. Fischer. Aircraft.
26,932. F. Porsche. Aerial machines.

Applied for in 1914.

Published May 21st, 1914.

2,600. W. A. Hutson and M. E. Freeman. Flying machines.

Published May 28th, 1914.

3,182. L. Blériot. Starting and landing apparatus for aeroplanes.

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CONTENTS.

Editorial Comment: PAGE
The Future of Naval War ... 613
The Safety of Flight ... 614
The Question of Welding ... 614
The 80 h.p. Avro Scout (with scale drawings) ... 616
The Aerial Derby, 1914 ... 619
Royal Aero Club Official Notices ... 624
From the British Flying Grounds ... 625
Eddies. By "Æolus" ... 627
Testing the Langley "Aerodrome" ... 630
The Aeroplane in War ... 632
The Flying Machine from an Engineering Standpoint. By F. W. Lanchester 634
Foreign Aircraft News ... 636
The German Triangle Race ... 637
Models. Edited by V. E. Johnson, M.A. ... 638
Correspondence ... 640

EDITORIAL COMMENT.

The Future of Naval War.

Sir Percy Scott's theory that the day of the battleship has passed has created a great deal of discussion among naval authorities, and opinion seems to be rather divided upon the question of whether the future of naval war is with the Dreadnought or the submarine and aircraft. It is not for us to pass judgment in this controversy. The point, however, that does appeal is that aircraft, and particularly the aeroplane, should have thus early reached a stage of development which has caused so drastic a modification of the views of so high an authority as Admiral Scott. It is within our recollection that not so very long ago Sir Percy was the out-and-out advocate of the big gun in the big ship—indeed, he might almost have been described as the arch-priest of the Dreadnought. Now, at the time in question, the submarine had been developed within reasonable range of its present possibilities. True, it has been improved in the meantime, and that considerably, but the point is that it had come to a stage which was quite far enough advanced to have given pause to the apostles of the big ship if its destiny was, or is, to supplant the latter type. But, apparently, it had not dawned upon naval authorities that the time was close at hand when the sea-battles of the world would be fought out in the under-water depths rather than on the surface of the ocean. Thoughtful students of naval war had, indeed, turned their attention increasingly towards the submarine and its potentialities, but it was more as a fleet auxiliary, so to speak, than as a possible successor of the surface craft. That it could ever supplant the latter had not come within their prevision. Nor, so far as we as laymen are in a position to know, has so much progress been made in the development of the submarine or submersible as to justify that view, were it not that in the interval the aeroplane has been developed so rapidly that it has become a most important factor in warfare, land and marine.

The point that seems to emerge from Sir Percy Scott's argument seems to be this: Against the submarine alone, the battleship—or perhaps, it would be more correct to include all floating warships—by reason of its speed and sea-keeping qualities would have more than a fighting chance, since the submarine has to act under conditions which put a very distinct handicap on its chances of waging successful war. It has a very limited range of vision; its speed, both on the surface and when submerged, is far inferior to that of the above-water craft, and it is dependent for its offensive power upon a weapon—the torpedo—which has never proved itself to be dependable in action. It is true that the latest types of these craft are equipped with guns, but they are of such small calibre as to be quite ineffective against modern armoured ships. The most they could be expected to do would be in the way of repelling an attack by hostile torpedo craft for long enough to enable the necessary preparations for submersion to be made. Reinforced, however, by aircraft, it would seem that the submarine is in a far better position than when acting by itself. Firstly, the aeroplane might be expected to act as the eyes of the submarine flotilla—to stand in the same relation as do cruisers and fast craft generally to the battle-squadron. The aeroplanes would be sent out, either from a land base or from their mother ships, to search the enemy's coasts and harbours or to locate and keep touch with a blockading squadron, while the submarines lay handy for action when the aeroplanes had done their first duty of finding the enemy. Whether the clash would come in the shape of a combined attack from under water and the air is a matter that only the future can solve, but it is quite imaginable that this is what would happen. Again, whether such a combined attack would succeed is also a question for the future to decide, but there are at least inherent probabilities to be taken into account, and it is undoubtedly these which have set authorities like Sir Percy Scott thinking—and thinking very seriously.

Not the least interesting point that appeals to us, is that all these changes, and rumours of change, have come about as a direct result of the development of the internal combustion engine. It was the internal combustion engine which really made the submarine as it exists to-day possible. Without it, submarine craft would have been possible in a sense but they would have been slow, clumsy affairs, with so limited a range of action as not to have been worth while wasting money upon. They would have been next door to useless even for purposes of harbour defence. Therefore, it is not claiming too much to say that it is the internal combustion engine which has given us the modern submarine. Then, the reader of FLIGHT does not need reminding that without the internal combustion motor the aeroplane would be utterly impossible. So out of the invention of the oil motor has developed something which threatens to revolutionise the armaments of the whole civilised world. Indeed, a part of that revolution has, in fact, been already accomplished.

* * *

The Safety of Flight.

It has always been our policy to insist that flying is becoming—has become—almost as safe as motoring on land, given adequate skill of the pilot and safe construction and proper equipment of the machine. So far as concerns the skill of the individual, we are fairly satisfied that this is generally speaking of a very high order indeed, since the number of accidents which happen and which are attributable to the fault of the pilot are very few. In the matter of construction, too, there is nothing much of which to complain, so that we may pretty safely assume that (a) the skilled pilot, and (b) the new and tested machine makes a combination that is as safe as need be. But beyond that it is incontestable that far too many accidents, major and minor, have happened since the opening of the year, and that they show no signs of diminution. The question that must suggest itself to the observer is: Why is this? It is exceedingly difficult to find a satisfactory answer to this, for the reason that it is hard to get pilots and others to give their views. Where the man is flying "on his own," he obviously will not give himself away any further than is necessary and is thus not likely to talk. On the other hand, where he is an employee his bread-and-butter may depend upon his keeping his own counsel, and so it is vain to look to him for light on the subject.

Now, much of the future of the movement depends upon the absolute safety, humanly speaking, of flying, and it would thus seem quite clear that to fly a machine which is constructionally weak, or is ill-equipped, is really against the interests of these who are responsible for its use—apart from the more serious considerations of the risk to human life involved. We do know that machines are habitually flown which while they may not actually be suffering from constructional weakness are in none too good condition and are, moreover, quite deficient in the necessary instruments to make flight on them reasonably secure. It can scarcely be held that a machine which is without engine-revolution indicator, altimeter, or speed-recorder is properly equipped for safe flying, and yet there are many machines being flown every day which have none of these. It seems to us that those who own them, more than the pilots who risk their lives by flying them, are acting against their own interests by a policy of parsimony which invites accident.

* * *

The Question of Welding.

A report of the Advisory Committee for Aeronautics as to the cause of fracture of the rudder post of B.E. 204, upon which Capt. Allen and Mr. Burroughs were killed in March last, is now to hand, and is recorded elsewhere in this issue. The conclusion arrived at is "that some flaw existed before the machine left the ground," but no definite conclusion is arrived at as to its cause, although two alternatives are suggested. The first is that as the machine had been subjected to severe stresses during its life, it is possible that the action of these had been sufficient to set up a flaw in a portion of the tube which had been overheated by welding; and the second, that the rudder post had been slightly bent by accident or rough usage, and that a flaw had been started thus, or as the result of subsequent straightening. The latter is, however, discountenanced, and we are left with the former as the cause of the accident.

We might be prepared to accept this statement, bad as it is, without further comment were it not for two important points in the report (1) that "fracture took place across a section where the bending stresses were not far from a maximum *and where, owing to the fact that the steel had been raised to the temperature required for autogenous welding, and thus overheated, the tube was weakest*"; and (2) that the unwelded tube was found to be capable of bearing not less than three times the stress induced under the most severe conditions which, in the opinion of the Committee, would occur in flight. It is, to say the least, amazing that welding should have been permitted at this part without other means of support, in view of the known unreliability of welded joints under stress conditions and the effect of the operation on steel; and the fact is so well appreciated that its use is limited in other parts to merely "locating" their position. The statement that the factor of safety in an unwelded tube is three, is also far from satisfactory, even when it is remembered that the maximum possible loading in flight is referred to; because the tube which failed had been welded, and once a weld has been made, the strength of the part has become impaired. It would be more interesting and convincing to have seen figures quoted for the factor of safety in welded tube or tubes of similar dimensions; although, having regard to the possible variation in the resultant condition of the metal after treatment the matter might not carry us much further.

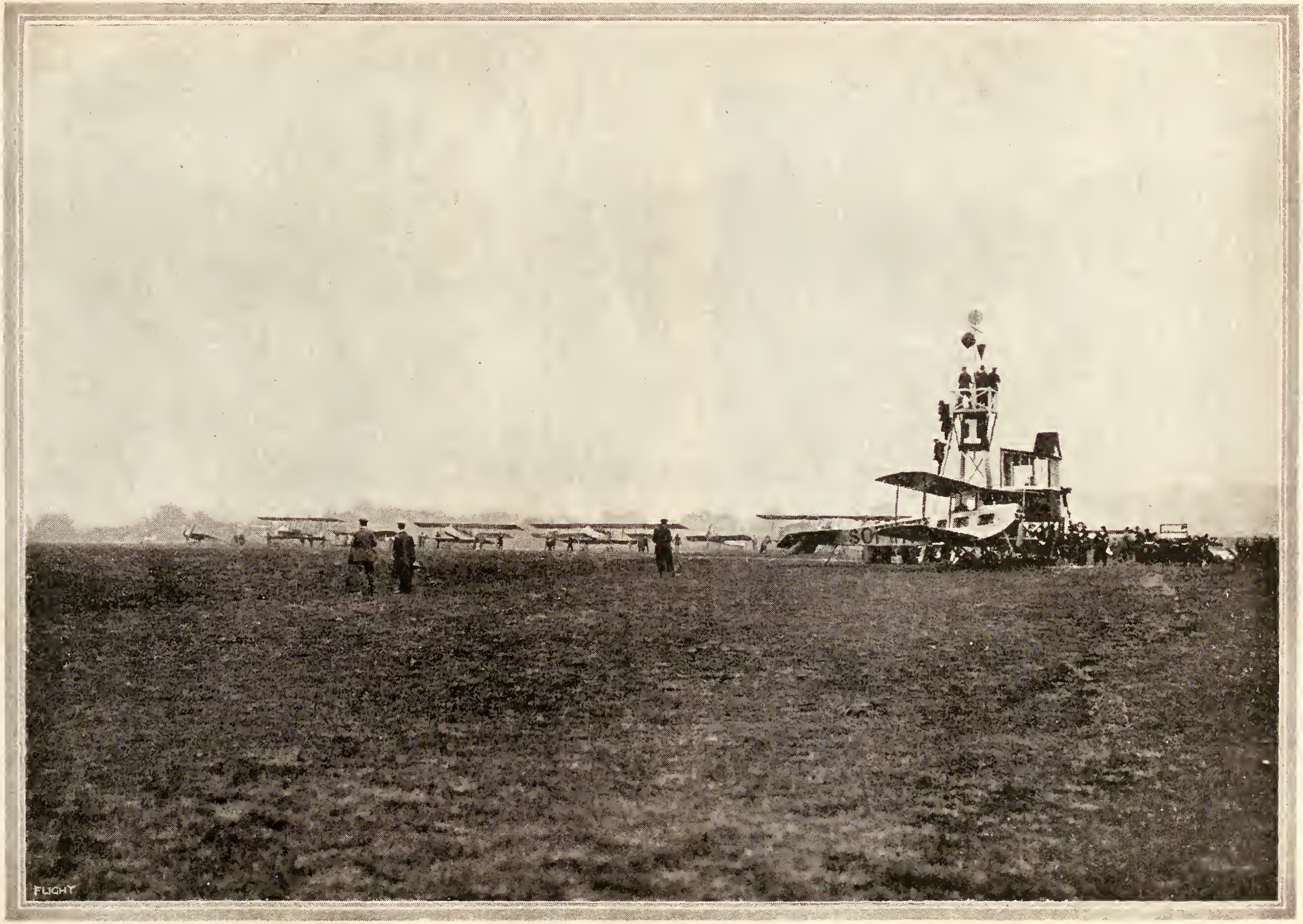
One fact stands out clearly—namely, that welding must be prohibited in any part of a machine where it will be subjected to stress under any conditions in flight. We are well aware that the method is employed in other machines, but wherever it is now adopted for the attachment of the principal parts of a machine it must be eliminated, or additional means of security provided without further delay.

* * *

Flying over Prohibited Areas.

M. SALMET appeared at the police-court at Torpoint, near Devonport, yesterday, on an adjourned summons issued by the Public Prosecuter alleging contravention of the Aerial Navigation Act of 1913, and a subsequent order of the Home Secretary by coming within the scheduled area at Penlee Point. He was bound over in £50 and ordered to pay the costs up to 10 guineas.

It is understood that another summons against Salmet for flying in the vicinity of the Admiralty oil tanks at Turnchapel, Plymouth, has been dropped by the Treasury.



THE AERIAL DERBY.—The lining up for the start at the Hendon Aerodrome.

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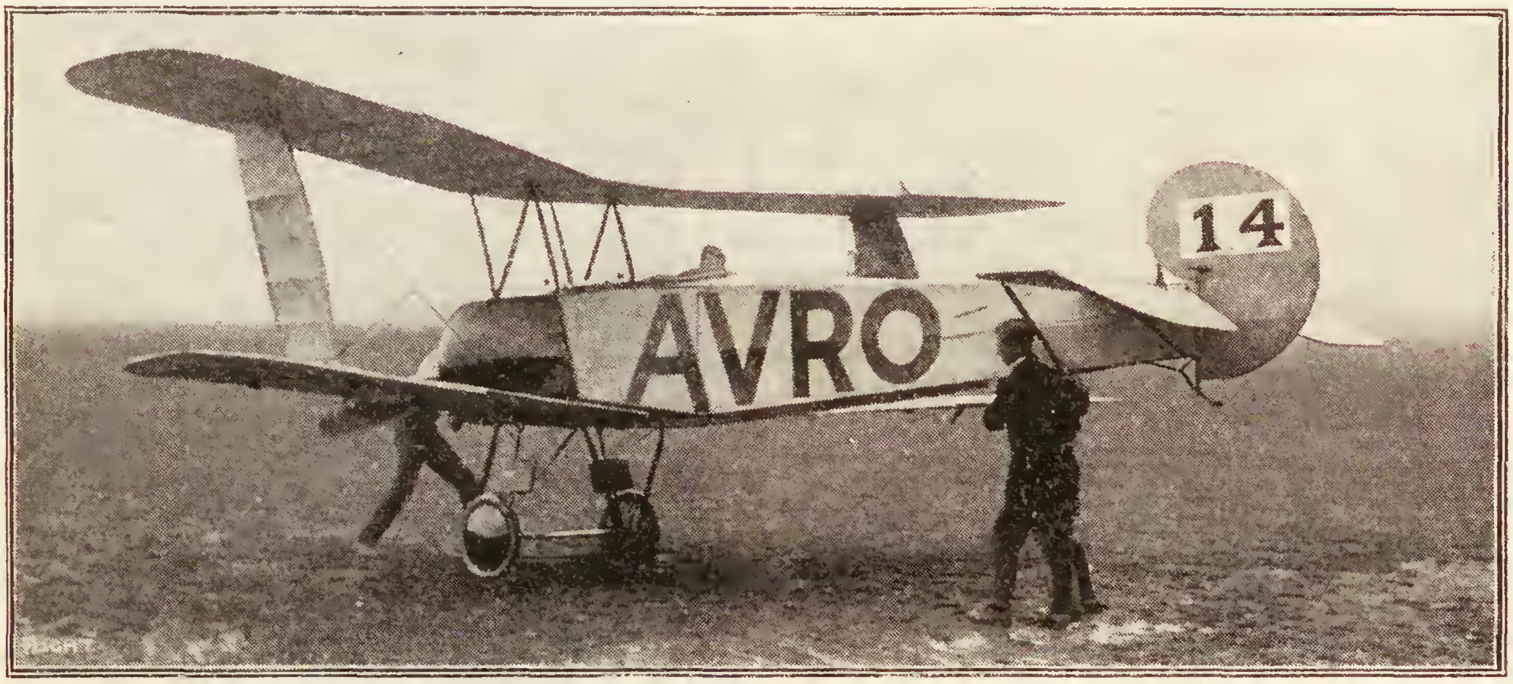
THE 80 H.P. AVRO SCOUT.

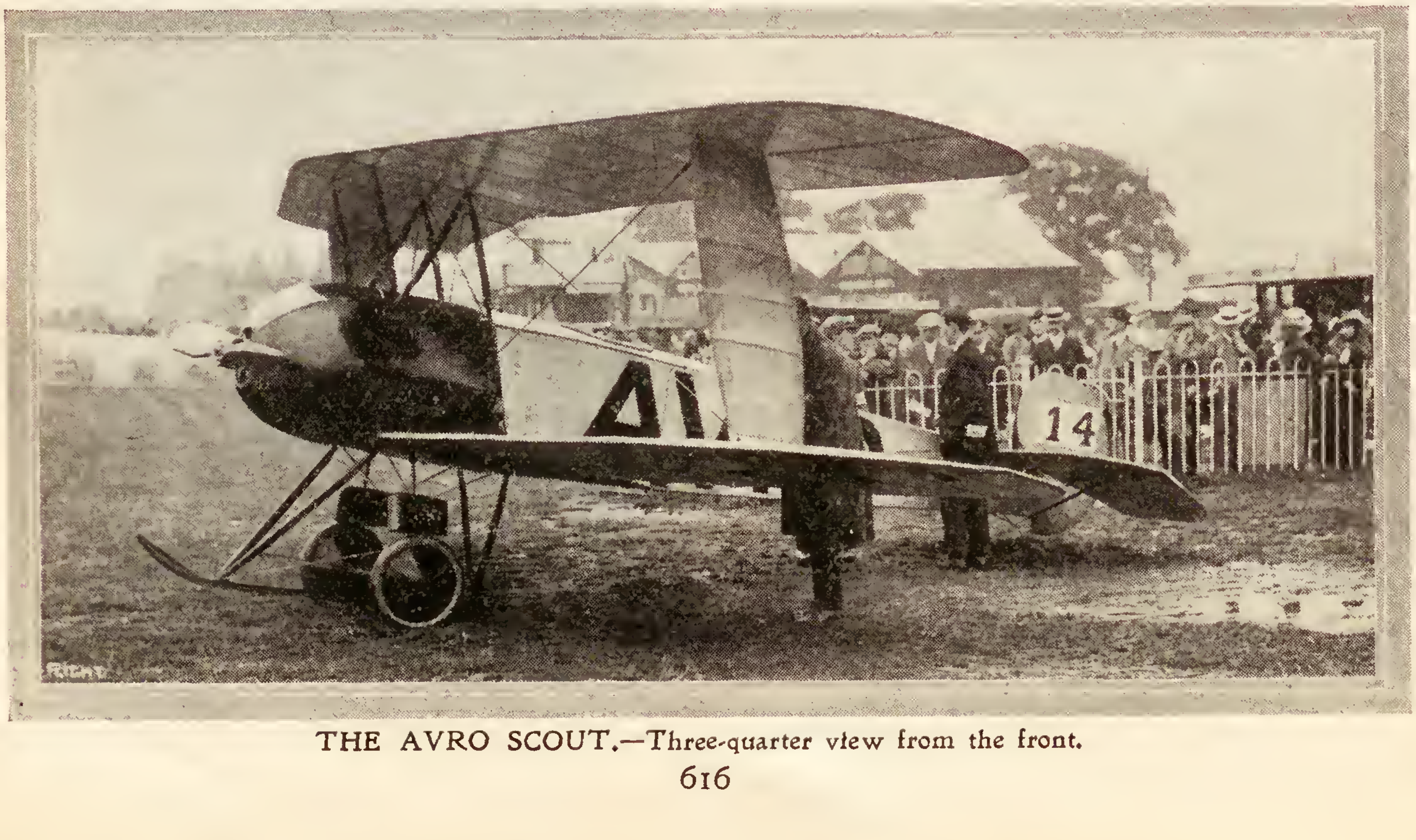
THE subject of our scale drawings this week—the 80 h.p. Avro Scout—made its first public appearance at Hendon on May 23rd last, piloted by Mr. F. P. Raynham. This machine had, we understand, only been tested on two short flights previously, so that, in view of the fact that she presents such considerable departures from standard design, her performances were very good indeed. From Mr. A. V. Roe we learn that the machine was not quite so fast as he had expected, but this was probably partly due to the fact that the engine was not running particularly well. As far as one was able to judge, the speed range was very considerable, and without knowing actual figures we should think that the maximum speed was over 90 m.p.h. The climbing capabilities also seemed very good indeed, Mr. Raynham taking the machine up at what looked like an alarmingly steep angle, but which was in reality probably about 30°.



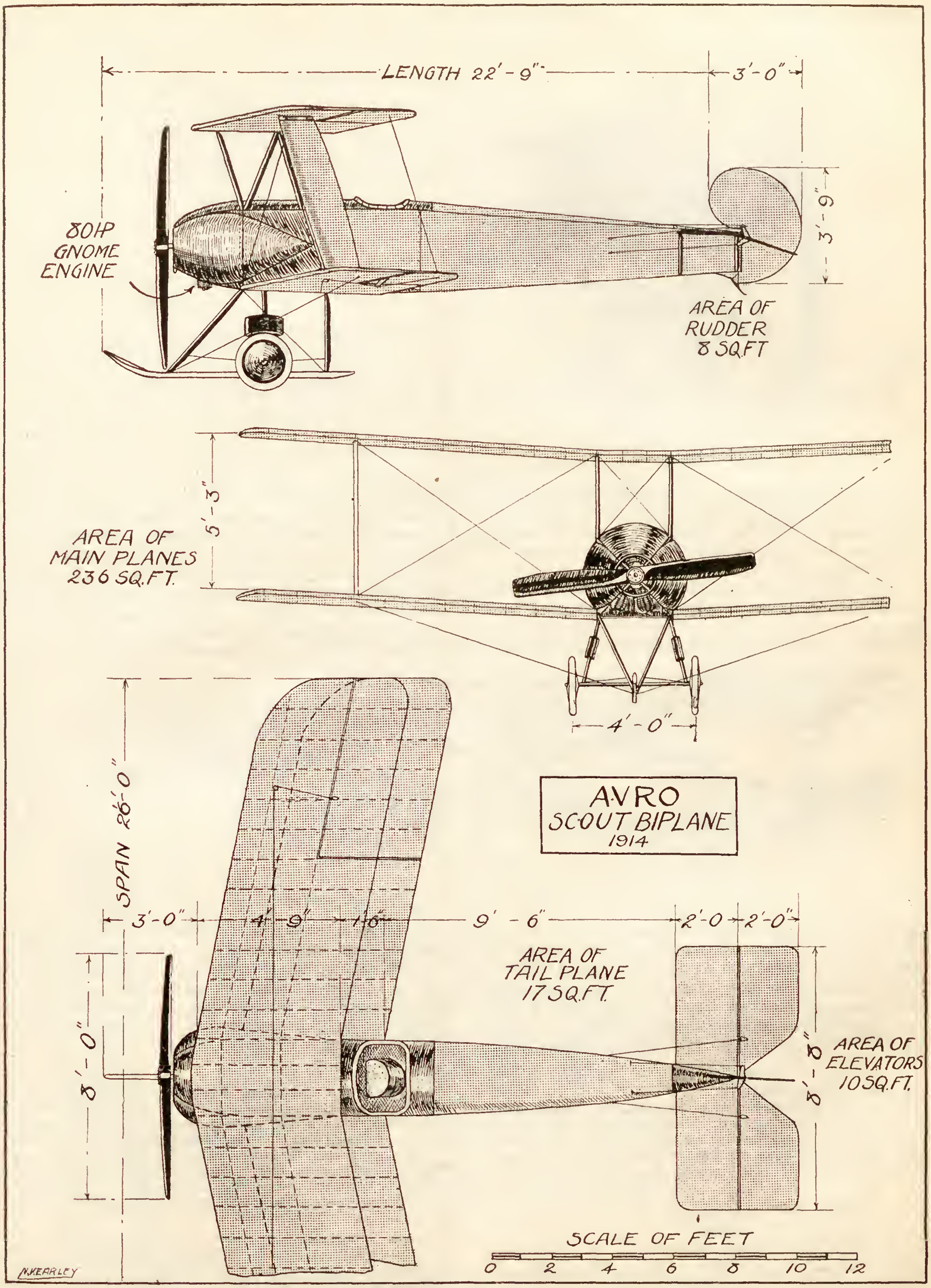
THE AVRO SCOUT.—Side view.

Constructionally, this machine differs little, at least as regards the *fuselage*, from standard Avro practice. It is mainly in the design and construction of the wings that innovations are to be found. Most noticeable among these is the way in which the main planes slope backwards so as to form a V as seen in plan. Only one pair of struts on each side separate the main planes, and these struts are cross-braced and covered in with fabric to form a unit, thereby reducing head resistance to that of a single strut. The wing bracing has been reduced to an absolute minimum since only one pair of cables on each side provide the necessary rigidity. At their outer ends these cables are attached, by means of a steel clip, to a steel tube of two inches diameter, built into the wing and joining the two spars. Thus, for any position of the centre of pressure the lift is always taken by both spars through the intermediary of the steel tube.

In section the wings are somewhat unusual in that they are perfectly flat on the under surface, whilst the top surface is cambered in the usual way. In addition to the backward slope of the wings, these are set at a very

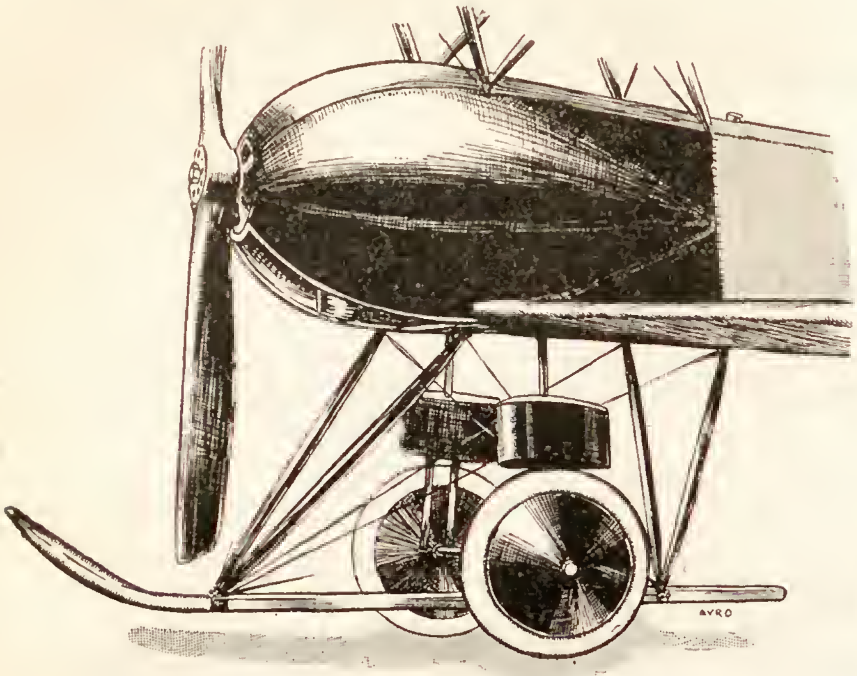


THE AVRO SCOUT.—Three-quarter view from the front.



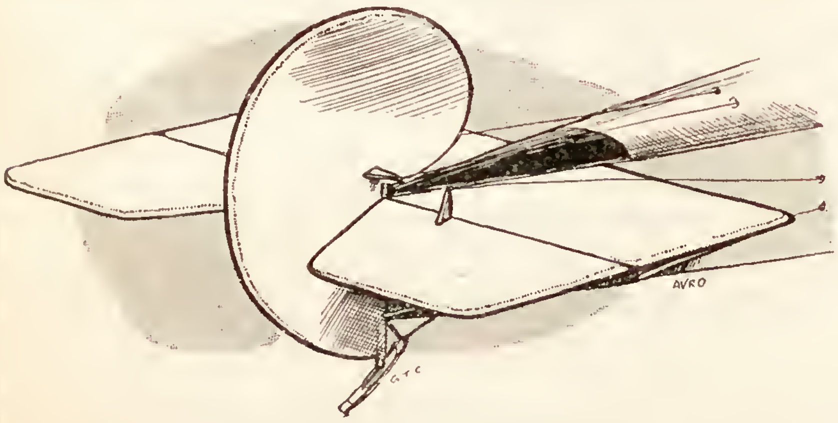
THE AVRO SCOUT BIPLANE.—Plan, side and front elevations to scale.

pronounced dihedral angle in order to increase lateral stability. *Ailerons* are fitted to both upper and lower planes, but the air brakes with which this machine was fitted at the Olympia Aero Show have been temporarily rendered immovable by securing them to the rear spar with an aluminium strip, probably owing to the fact that there has not yet been time for experiments with the action of these brakes.

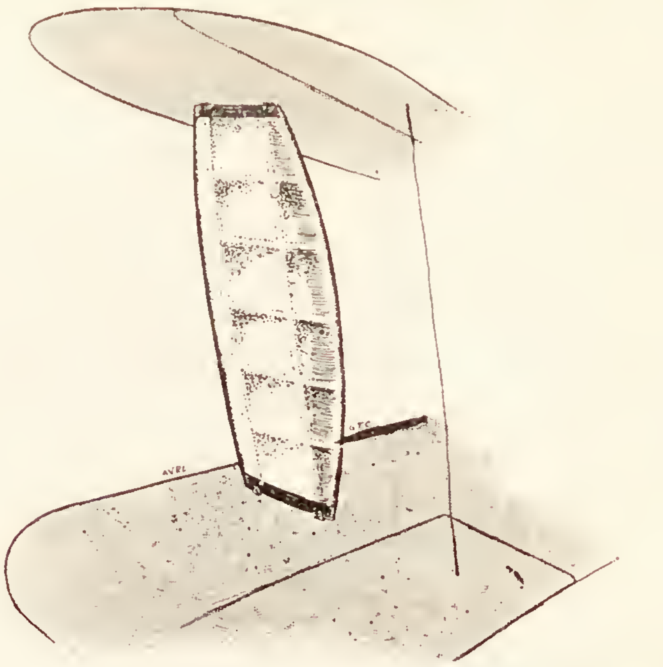


Chassis and engine housing on Avro scout.

The engine, an 80 h.p. Gnome, is mounted between double bearings, and is almost totally enclosed by an aluminium shield. Some trouble was experienced in keeping the engine cool so that it is possible that a few alterations will be effected in order to provide more efficient cooling. The chassis is of the usual Avro type, and appears to possess an enormous amount of flexibility. The *fuselage*, as has been already said, differs but little from those of the larger Avro biplanes. The four ash *longerons* are strengthened by triangular pieces of three-ply wood tacked on. The pilot is accommodated in a very comfortable bucket seat, and has in front of him a neat set of instruments mounted on an Avro instrument board. Control is by means of a single central column mounted on a transverse rocking shaft, which carries crank-levers for the elevator. The rudder is operated by a pivoted foot-bar in the usual fashion. Mounted on the rear-end of the *fuselage* are the tail planes, which are of the usual Avro type, consisting of a fixed tail plane, to the trailing edge of which is hinged a divided elevator, and a balanced rudder. A small laminated steel skid protects the tail planes against contact with the ground.



Tail planes on Avro scout.



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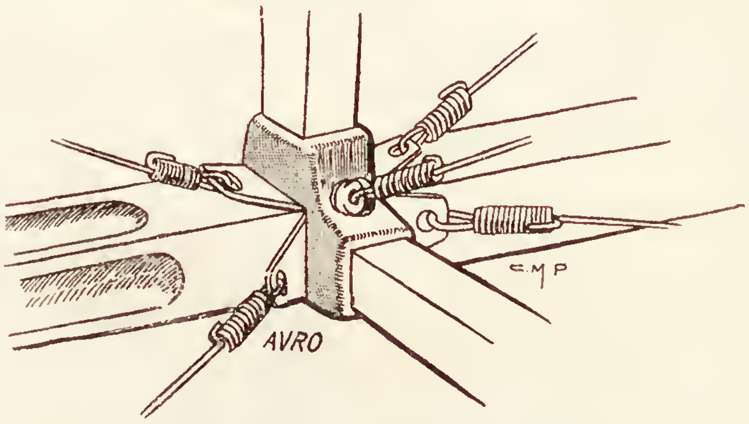
The streamline casing round the plane struts of the Avro scout.

It is difficult at the present juncture to express an opinion as to the merits or otherwise of this machine, but judging from her behaviour during her first flight in public, and considering the few tests that have been made with her up to now, she must be said to be very promising, and Messrs. A. V. Roe and Co. are to be heartily congratulated on their continued determination to introduce new departures in design.



A *fuselage* joint on the Avro biplane.

⊛ ⊛

Military Aviation Fatalities.

In the House of Commons on Tuesday, Mr. Tennant supplied Mr. Money with the following information as to the number of fatalities which have occurred amongst the military aviators of Britain, Germany, France, and Italy for each of the last two years :—

		1912.	1913.
Aeroplane Accidents.			
Great Britain	Pilots	3	3
	Passengers	3	6
Germany	Pilots	8	12
	Passengers	3	4
France	Pilots	14	16
	Passengers	1	4
Italy	Pilots	4	2
Airship Accidents.			
Germany		–	45

⊛ ⊛

Aeroplanes for Red Cross Work, &c.

Some novel flying should be seen at Brooklands on Saturday, June 20th, when a field day organised by the British Red Cross Society will take place. A rear guard action will be conducted on the aviation ground, the troops falling back on the portion of the River Wey near the fork. Gun-carrying and scout aeroplanes under the command of Capt. K. F. Wood will be employed, and after the action aeroplane search parties will assist in the work of the Red Cross Field Hospitals.

French Competition for Aeroplane Motors.

Some little progress is being made in connection with the competition for aerial motors to be organised by the French War Department, and which has been on the *tapis* for several months. The trials will probably be held at the beginning of next year, and the Automobile Club of France will be asked to assist. There will be classes for small, medium, and large-powered engines.

—: THE :—

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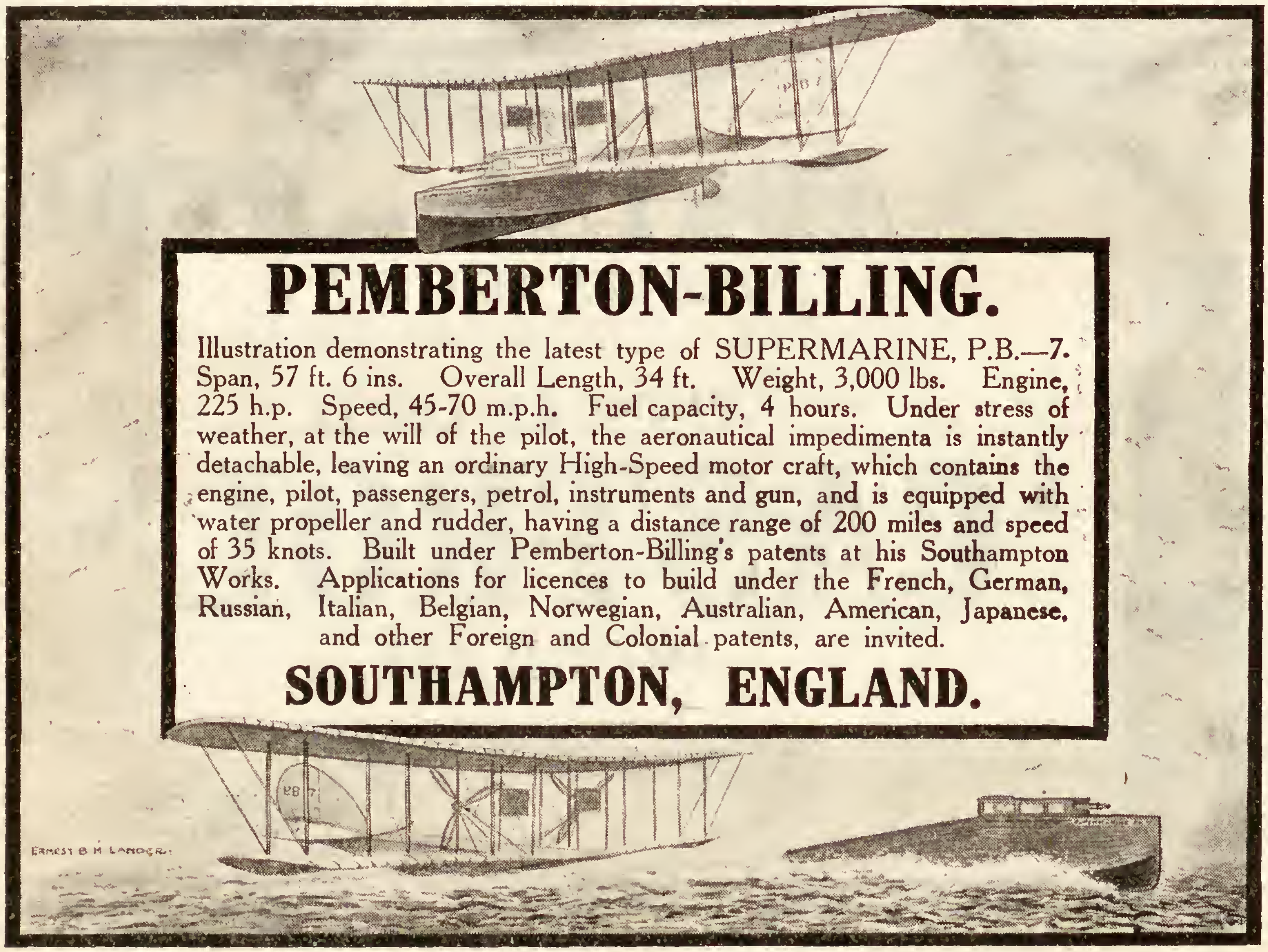


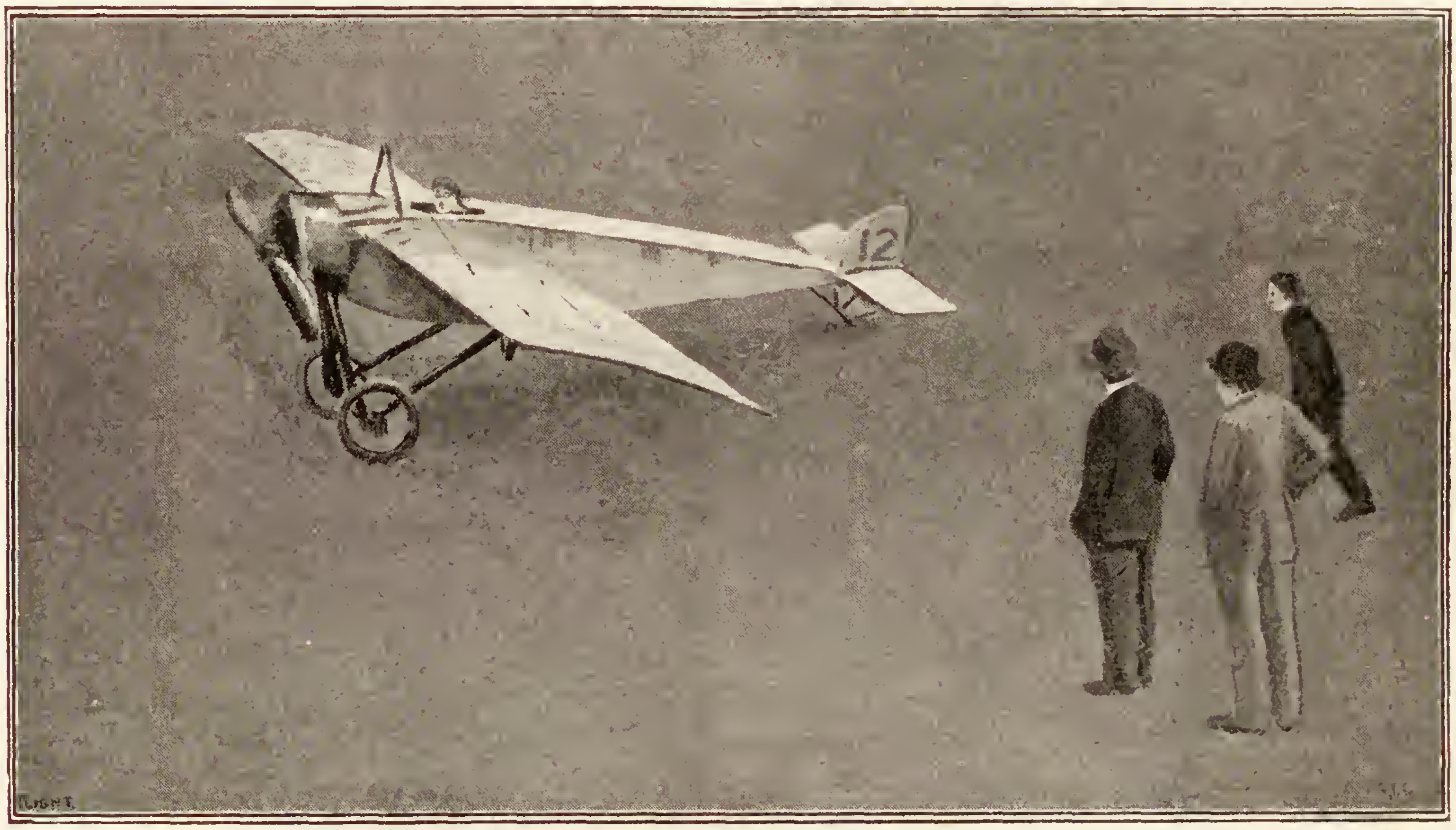
PEMBERTON-BILLING.

Illustration demonstrating the latest type of SUPERMARINE, P.B.—7. Span, 57 ft. 6 ins. Overall Length, 34 ft. Weight, 3,000 lbs. Engine, 225 h.p. Speed, 45-70 m.p.h. Fuel capacity, 4 hours. Under stress of weather, at the will of the pilot, the aeronautical impedimenta is instantly detachable, leaving an ordinary High-Speed motor craft, which contains the engine, pilot, passengers, petrol, instruments and gun, and is equipped with water propeller and rudder, having a distance range of 200 miles and speed of 35 knots. Built under Pemberton-Billing's patents at his Southampton Works. Applications for licences to build under the French, German, Russian, Italian, Belgian, Norwegian, Australian, American, Japanese, and other Foreign and Colonial patents, are invited.

SOUTHAMPTON, ENGLAND.

THE AERIAL DERBY, 1914.

If the Third Aerial Derby was not a success from a spectacular point of view, it was a magnificent triumph for the modern pilot, who got the better of about the only thing left for a pilot to fear—fog and mist. As was to be expected of the English climate, last Saturday turned out to be far from favourable for such an occasion as the Aerial Derby. It was, in fact, almost as bad as the Saturday



The winner of the Aerial Derby, W. L. Brock, just come to rest in the Hendon Aerodrome.

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THE AERIAL DERBY.—"Chairing" W. L. Brock, the winner, after his victory.

a fortnight previous, originally set apart for this event. Throughout the greater part of the day threatening clouds hung about low down, and a heavy mist enveloped the ground at almost every part of the course, especially at West Thurrock on the Thames. Under the circumstances, therefore, it is not surprising that out of the eleven starters only four completed the course; rather the other way about, the wonder is that any were able to finish at all. Of course, as soon as the race was over the weather cleared up, so had the start been delayed an hour or so, there might perhaps have been a more exciting finish.

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THE FINISH OF THE AERIAL DERBY AT HENDON.—Mr. W. L. Brock passing over the finishing line on his Morane.

Hendon was all agog in the morning, and many of the spectators turned up early. Shortly after noon, Howard Pixton arrived from Brooklands on the 80 h.p. Sopwith Tabloid, H. Barnwell following shortly after on the 100 h.p. "Schneider Cup" Sopwith. A little later on Jack Alcock arrived with a passenger on the 100 h.p. Sunbeam-Maurice Farman. Just before 2 o'clock R. J. Lillywhite gave an exhibition flight on the 50 h.p. G.-W. bi-rudder 'bus, whilst three of the Derby competitors made trial flights. These were Louis Noel on the 80 h.p. Morane-Saulnier, Verrier on an 80 h.p. Henry Farman, and Filip Bjorkland on his 50 h.p. Blériot monoplane. The latter is the identical machine flown by W. B. R. Moorhouse in the first Aerial Derby, when he obtained third place. Another machine was then seen approaching from Brooklands, which proved to be a standard 80 h.p. Sopwith, with Victor Mahl as pilot, and a passenger. Mahl reported the weather as being thick and bumpy. Verrier then took up a lady passenger on the Henry Farman, and executed some of his daring stunts. The next flight was made by J. L. Hall on his 50 h.p. Avro, N. Howarth following him on the bi-rudder 'bus. Alcock also made a test flight with a passenger on the Sunbeam-Maurice Farman. Further test flights were then made by R. H. Carr on an 80 h.p. Henry Farman, and L. A. Strange on the 80 h.p. Blériot; both carried passengers. Bjorkland and Hall each made another flight on the Blériot and Avro respectively, whilst W. Birchenough made a test on the 70 h.p. Maurice Farman, and Lillywhite took up a passenger on the bi-rudder 'bus. E. Baumann next made a short flight on a 50 h.p. Wright, and Hall ascended once more on his Avro. Lord Carbery then made a short test flight on his 80 h.p. Morane-Saulnier, and Lillywhite and Verrier ascended on the bi-rudder 'bus and a Maurice Farman respectively, after which the competing machines were lined up ready for the start of the great race round London. Only 11 machines out of the 21 entered took their place for the start, as there had been several scratchings at the last moment. Amongst these were F. P. Raynham, whose 80 h.p. Avro Scout was placed *hors de combat* during trials at Brooklands; W. R. Ding, with his 100 h.p. Handley Page biplane, who was unable to get back in time from Bath, where he has been giving exhibition flights; and F. W. Goodden. The Bristol and Martinsyde machines did not leave Brooklands owing to the bad weather. The Grahame-White tractor biplane, to be piloted by R. H. Carr, was withdrawn, and Carr took over Louis Noel's 80 h.p. Henry Farman, Noel taking No. 13, Morane-Saulnier, which was without a pilot. R. H. Barnwell, who was to have flown a Vickers biplane, took charge of Pixton's 100 h.p. Sopwith Tabloid, Pixton having instead the 80 h.p. Sopwith. The eleven competitors, therefore, started as under, the first man starting at 4.16 p.m., the others following at about one-minute intervals:—

1. Filip Bjorkland, 50 h.p. Blériot monoplane.

2. W. Birchenough and passenger, 70 h.p. M. Farman biplane.

5. R. H. Carr with A. E. Barrs, 80 h.p. H. Farman biplane.

6. P. Verrier with passenger, 80 h.p. H. Farman biplane.

8. L. A. Strange, 80 h.p. Blériot monoplane.

9. J. Alcock with H. Lane, 100 h.p. M. Farman biplane.

12. W. L. Brock 80 h.p. Morane-Saulnier monoplane.

13. Louis Noel, 80 h.p. Morane-Saulnier, monoplane.

14. Lord Carbery, 80 h.p. Morane-Saulnier monoplone.

18. H. Pixton, 80 h.p. Sopwith biplane.

21. R. H. Barnwell, 100 h.p. Sopwith biplane.

Each competitor made a complete circuit of the aerodrome before starting on his journey. All got away without incident, but it was not until the two Sopwiths started that the spectators showed their enthusiasm — and no wonder, too, for the way in which these little biplanes "hurtled" round the aerodrome was truly remarkable. They banked at the pylons almost vertically, and climbed sideways in doing so some considerable amount. The 100 h.p. Sopwith was fitted with a new chassis, consisting of two pairs of V struts, which looked much more business-like than the old one. So misty was the air that all the machines were soon lost to view, whereas last year most of the competing machines remained in view for some time. When all had got away the remaining Hendon pilots endeavoured to keep the spectators amused with numerous exhibition and passenger flights. Grahame-White took up two passengers on the

100 h.p. five-seater aerobus, Lillywhite was busy on the bi-rudder 'bus, whilst Baumann and Hall went up on the Wright and Avro biplanes respectively. A message was then received to the effect that with the exception of Birchenough and Lord Carbery all the competitors had passed the Epsom control. Excitement started when at about 5.15 p.m. a message was received from West Thurrock saying that Carr passed the control followed by Brock and Barnwell, but there was no news of any of the others, and many feared that some of the competitors must have come to grief. Presently, however, news was received of some of the missing airmen. Bjorkland had landed at Epsom racecourse owing to engine trouble, Birchenough had landed in Richmond Park, Strange had to descend at West Wickham, in Kent, Alcock flew on to Brooklands from Epsom, and Pixton also gave up, but had to descend at Addington, near Croydon, on returning to Brooklands. Shortly after 5.30 p.m. a machine was seen approaching from the direction of Golders Green. This turned out to be No. 13 Morane, piloted by Louis Noel, who after crossing the line put up a couple of circuits of the aerodrome before landing. He reported that he saw nothing at all owing to the mist, and was not sure that he had passed all the controls, but thought he had. After leaving Epsom he only saw one or two of the other competitors now and again. Some three minutes after his arrival another Morane was seen approaching, in the right direction this time, which proved to be Brock's. Brock said he also had trouble in finding his way, but managed to pass each control all right. The question was, therefore, who was the winner? Both got a grand reception — especially from photographers and "cine-men"—but it was doubtful as to whether Noel had passed all the controls correctly, so that there was nothing for it but to await the reports of the observers. In the meanwhile Brock was considered the winner by a number of enthusiasts, and was "chaired," until the approach of another competitor claimed all attention. The machine was obviously a Henry Farman, but it was not until it entered the aerodrome that we saw by the new steel chassis it was Carr's. Immediately after, Lord Carbery's Morane arrived on high from the direction of London, and when above the aerodrome he executed a turnover and then landed. He had had a most exciting time of it. He lost his way near West Thurrock and landed at Purfleet; from here he started off to return to Hendon, but once again lost his bearings. Eventually seeing a large open space he decided to land, and he did—on Hampstead Heath! Naturally, he was surrounded by a large crowd, but with the help of the police and a bystander who swung the propeller, he managed to get off safely and resume his journey to Hendon. Some four minutes after Carr came Verrier, who after crossing the line, executed some hair-raising stunts.

All were now home, for news had come to hand that Barnwell had given up after passing West Thurrock and had landed at Brooklands at 6.20 p.m.

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R. H. Barnwell, the scratch man and the last man to leave in the Aerial Derby, just off from Hendon Aerodrome on the Sopwith biplane on Saturday last.

The progress *en route*: *1st Control*, KEMPTON PARK.—The competitors passed this control in a bunch, Brock leading, followed by Carr, Pixton, Verrier, Barnwell, and Noel.

2nd Control, EPSOM.—Brock was still leading, Barnwell and Pixton being close behind. About two minutes later came Carr, Noel and Lord Carbery, followed a minute later by Verrier and Bjorkland, the latter landing on the race course. Alcock flew on to Brooklands.

3rd Control, WEST THURROCK.—It was very thick just here, and the observers had great difficulty in seeing the competitors. Some were heard, but not seen. Those observed were Carr, Brock and Barnwell.

4th Control, EPPING.—The machines flew very wide here also, one monoplane branching off in the wrong direction. Brock was leading with Noel close behind, Carr and Verrier following.

5th Control, HERTFORD. — Only Brock, Carr and Verrier were observed here, flying high.

Everyone will sympathise with Louis Noel on his bad luck, for except in missing the marks at West Thurrock and Hertford, he flew an excellent course neck and neck with Brock. Mr. D. Thorburn, the official observer at Hertford, says that he thinks that Noel must have mistaken the intersecting paths at Haileybury College, Broxbourne—which lies south-east of Hertford—for the official mark, and thus turned just inside the latter. This would also account for the direction from which he entered the aerodrome.

Immediately after the race, Lord Carbery ascended to some 1,000 ft. and executed three loops and some tail slides, whilst Noel took up a lady and gentleman on the Henry Farman, which is provided with two passenger seats. Verrier also went up on the Maurice Farman and flew with hands off, and Brock made a final flight on the Morane. At 6.37 p.m., Victor Mahl left for Brooklands accompanied by two passengers, and then the proceedings were brought to a close with flights by Lord Carbery on the Morane, Baumann with a passenger on the Wright, Noel with a passenger on the Henry Farman, and Howarth on the bi-rudder 'bus.

The attendance at the aerodrome was remarkably good considering the weather was somewhat threatening. Among the visitors in the paddock were the following notable personages:—Prince Alexander of Battenberg, the Grand Duke Michael, Countess Torby, Lady Idena Wallis, Lord and Lady Curzon, Sir Archibald Sinclair, Lord and Lady H. de Trafford, and Lady Carbery.

RESULT OF AERIAL DERBY.

1st Prize: *Daily Mail* Gold Cup and 200 Sovs. ("Shell").

		h.	m.	s.
1.	W. L. Brock (80 h.p. Morane monoplane) ...	1	18	54
2.	R. H. Carr (80 h.p. H. Farman biplane) ...	1	46	27
3.	P. Verrier (80 h.p. H. Farman biplane) ...	1	49	50
	Disqualified: Louis Noel (80 h.p. Morane)	1	15	9

Sealed Handicap for "Shell" Trophy and 100 Sovs.

2nd Prize: 75 Sovs. 3rd Prize: 25 Sovs.

Handicaps:

	m.	s.		m.	s.		m.	s.
Birchenough	48	21	Carr ...	33	34	Carbery ...	17	6
Bjorkland ...	40	51	Strange ...	29	46	Pixton ...	6	20
Verrier ...	36	51	Noel ...	20	54	Barnwell ...	scratch	
Alcock ...	34	51	Brock ...	20	24			

Result.	Handicap Time. h.	m.	s.
1. W. L. Brock	0	58	30
2. R. H. Carr	1	12	53
3. P. Verrier	1	12	59

* * *

The London-Manchester-London Race.

ARRANGEMENTS are now well in hand for this event, which is to take place on Saturday, 20th inst. The total distance to be flown is 324 miles, and there are compulsory stops amounting to two hours. The course is :—

Start.—Hendon Aerodrome.

1st Stop.—Birmingham, Castle Bromwich Playing Fields. 92 miles from start. 30 mins. stop.

2nd Stop.—Manchester, Trafford Park. 162 miles. 1 hour's stop.

3rd Stop.—Birmingham, Castle Bromwich Playing Fields. 232 miles. 30 mins. stop.

Finish.—Hendon Aerodrome. 324 miles.

The first competitor will start from Hendon Aerodrome at 8 a.m., and the winner is expected back about 5 p.m. The competitors are expected to be arriving at and departing from the Birmingham control between 9.30 a.m. and 4.30 p.m.; while at Manchester, where there will also be public enclosures, the pilots are expected to be arriving and departing between 11 a m. and 3.30 p.m. If no competitor has completed the course by 10 p.m. the promoters of the contest have the right to extend the period or to declare the race off.

The entries already received are: W. L. Brock (80 h.p. Gnome-Morane), R. H. Carr (80 h.p. Blériot or 80 h.p. H. Farman), P. Verrier (80 h.p. H. Farman), L. Noel (80 h.p. Gnome-Morane), Lord Carbery (80 h.p. Rhone-Morane), J. Lillywhite (50 h.p. Grahame-White).

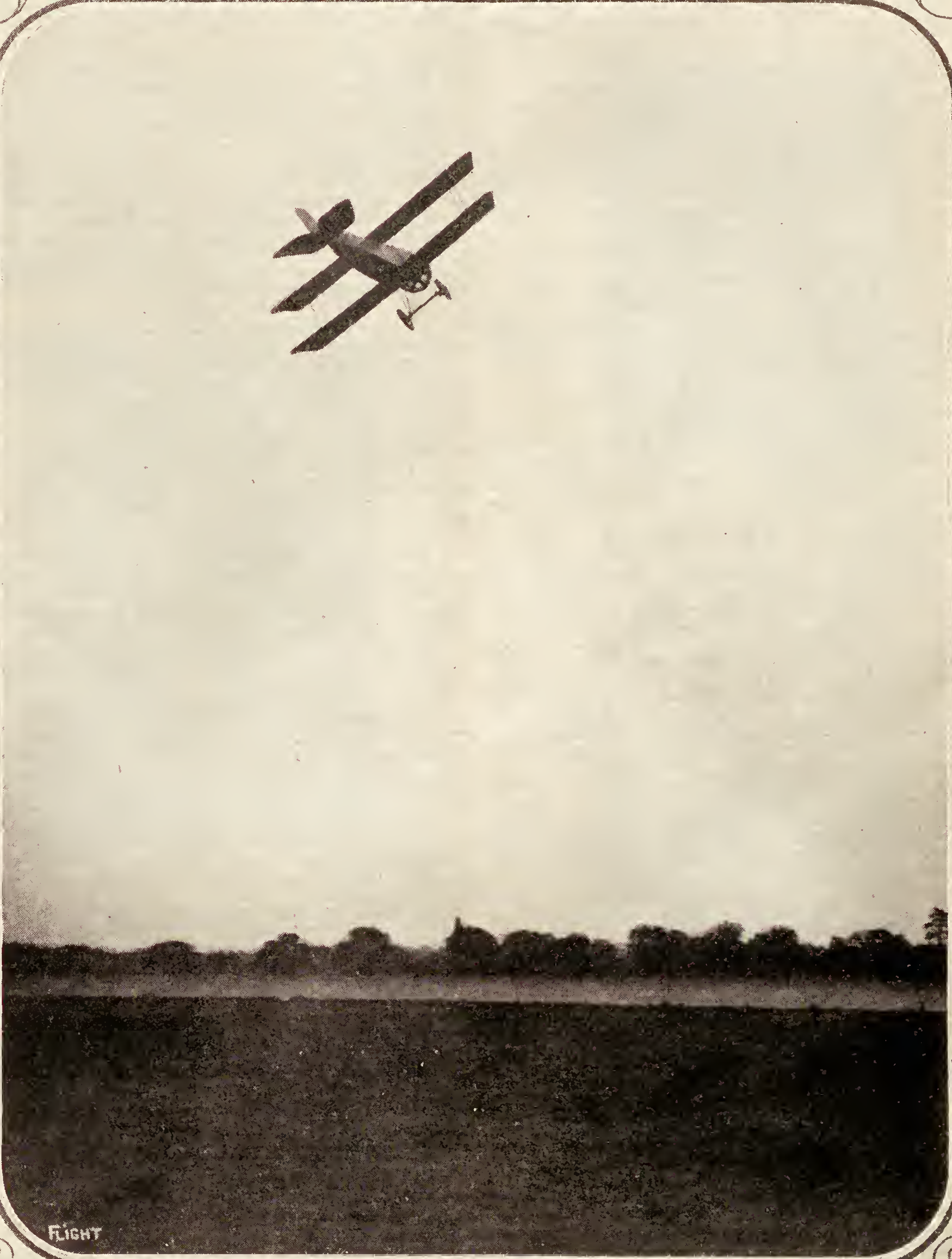
The pilot who completes the whole course in the fastest time will be awarded the *Daily Mail* gold trophy and £400. In addition there will be a first prize—"Pratt's" trophy and £250—and a second prize of £100 for a handicap in connection with the race. The cash prizes are presented by the Anglo-American Oil Company—the distributors of Pratt's Motor Spirit—in commemoration of the Anglo-American Peace Centenary.

Entries close at noon on Monday, and should be sent to the Secretary, Hendon Aerodrome, N.W.

The first man to return to Hendon Aerodrome in the Aerial Derby.—Louis Noel on his Morane.

"Flight" Copyright.

THE START FOR THE AERIAL DERBY AT HENDON AERODROME.—Filip Bjorkland running his engine on his Blériot just prior to getting away.



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Mr. S. V. Sippe on the Bristol Scout at Brooklands Aerodrome.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Diary of Events.

June 13 ...	Race for Manio Cup. Hendon Aerodrome.
June 20 ...	*Daily Mail* Air Race. London–Manchester–London. Hendon Aerodrome.
June 27 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
July 11 ...	International Correspondence Schools Race, London–Paris–London. Hendon Aerodrome.
July 11 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
Aug. 1–15	*Daily Mail* £5,000 Circuit of Britain Race. Starting from Southampton Water.
Aug. 22–29	Gordon-Bennett Eliminating Trials. Salisbury Plain.
Sept. 19–28	Gordon-Bennett Aviation Race. Buc, France.

HENDON AERODROME.

Members of the Royal Aero Club are admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards. The Membership Card admits the Member only—motor cars must be paid for.

Daily Mail £5,000 Circuit of Britain Race.

The following entries have been received :—

Messrs. White and Thompson—

1. Curtiss Biplane. Two 100 h.p. Curtiss engines. Pilot: Mr. A. Loftus Bryan.
2. Curtiss Biplane. 125 h.p. Anzani engine. Pilot: Capt. Ernest C. Bass.

Sopwith Aviation Co., Ltd.—

1. Sopwith Biplane. 150 h.p. Sunbeam engine. Pilot: Mr. C. Howard Pixton.
2. Sopwith Biplane. 100 h.p. English *monosoupape* Gnome engine. Pilot: Mr. H. G. Hawker.

Grahame-White Aviation Co., Ltd.—Grahame-White Biplane. 100 h.p. English *monosoupape* Gnome engine.

Messrs. A. V. Roe and Co., Ltd.—Roe Biplane. 150 h.p. Sunbeam engine. Pilot: Mr. F. P. Raynham.

Eastbourne Aviation Co., Ltd.—Tractor Biplane. 120 h.p. Green engine. Pilot: Mr. F. B. Fowler.

Blackburn Aeroplane Co., Ltd. — Blackburn Hydro-Biplane. 130 h.p. Salmson engine. Pilot: Mr. Sydney Pickles.

Late entries will be received up to 12 noon, June 30th, 1914, in which case the Entrance Fee will be £150.

Rule 4, "Qualification of Aircraft," has been revised and now reads as follows :—

The complete aircraft and all its parts, including the motor, must have been entirely constructed within the confines of the British Empire, but this provision shall not be held to apply to raw material, *or the magneto.*

International Correspondence Schools Race. London–Paris–London.

(*Under the Competition Rules of the Royal Aero Club.*)

Organised by the Royal Aero Club and the Aero-Club de France.

Starting and finishing at the Hendon Aerodrome,
Hendon, N.W.
SATURDAY, JULY 11TH, 1914.

PRIZES.

Fastest Time...	1st Prize: £500. Presented by the International Correspondence Schools.
Handicap ...	1st Prize: £300. Presented by the Royal Aero Club. 2nd Prize: £150. Presented by the International Correspondence Schools. 3rd Prize: £50. Presented by the International Correspondence Schools.

The Entrance Fee is £5 per aircraft, and entries will be received up till 12 noon, Saturday, June 27th, 1914. Late entries will be received up to 12 noon, Saturday, July 4th, 1914, in which case the Entrance Fee will be £10.

The Entrance Fee will be returned to each competitor who completes the course by 10 p.m. on Saturday, July 11th, 1914.

The Entry Form, which must be accompanied by the Entrance Fee, must be sent to the Secretary of the Royal Aero Club, 166, Piccadilly, London, W.

Full particulars and entry forms can be obtained from the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

The British Empire Michelin Cup No. 2, £800.

(*Under the Competition Rules of the Royal Aero Club.*)

The Michelin Tyre Company has presented to the Royal Aero Club of the United Kingdom for competition, the sum of £800, to which will be added a trophy to be retained by the winner.

The following are the regulations governing the competition :—

Regulations.

1. The winner shall be the entrant of the aeroplane which, on or before midnight, October 31st, 1914, shall have remained the longest time in the air in one flight without touching the ground. The flights may be made at any time and there is no restriction as to night flying but in this case a light must be carried to enable the flight to be observed. In order to qualify for the prize a continuous flight of at least ten hours must be made.

2. Any flying ground in the British Isles licensed by the Royal Aero Club may be used and all attempts must be made in the presence of the official or officials appointed by the Royal Aero Club.

3. The flights must be made in a closed circuit, and two barographs, set and sealed by the official prior to the start, must be carried. Competitors must supply the barographs.

4. The time will be reckoned from the moment of crossing over the starting line in actual flight to the moment of alighting. The alighting must be in sight of the official, failing which, the time will be taken up to the last moment when the aircraft was identified as being in flight by the official.

5. Both the entrant and pilot must be duly entered on the Competitor's Register of the Royal Aero Club. The pilot must be a British Subject, holding an Aviator's Certificate issued by the Royal Aero Club or other Club affiliated to the International Aeronautical Federation.

6. The complete aircraft, and all its parts, including the motor, must have been entirely constructed within the confines of the British Empire, but this provision shall not be held to apply to raw material or the magneto.

7. An entrance fee of £1 must accompany every notification of an attempt, and at least three clear days' notice must be given to the Secretary, Royal Aero Club, 166, Piccadilly, London, W. A competitor must further deposit a sum of £10 on account of expenses, if any, of officials. Any balance not so expended will be returned to the competitor.

8. Should any questions arise at any time after the date of entry as to whether a competitor has properly fulfilled the regulations, or should any other question arise in relation to them, the decision of the Royal Aero Club shall be final and without appeal.

9. A competitor by entering waives any right of action against the Royal Aero Club or the Michelin Tyre Co. for any damages sustained by him in consequence of any act or omission on the part of the officials of the Royal Aero Club or the Michelin Tyre Co., or their representatives or servants, or any fellow competitor.

10. The aircraft shall at all times be at the risk in all respects of the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself or his aircraft, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the Royal Aero Club and the Michelin Tyre Co. in respect thereof.

11. The Royal Aero Club reserves itself the right to add to, amend, or omit any of these regulations should it think fit.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

Prohibited Areas Opened.

AMENDING orders, dated May 25th, have been issued by the Home Secretary under the Aerial Navigation Acts which (1) substitute "Crayford Ness" and "Coal House Fort" for Purfleet Railway Station and Tilbury Fort respectively as centres of prohibited areas, thus affording a free passage of about three miles across the River Thames to the East of London at West Thurrock;

(2) Add "North Killingholme Haven" to the list of prohibited areas;

And (3) prescribe an additional area in the Folkestone neighbourhood, from a point along the coast one mile South-West of Dymchurch to a point along the coast one mile East of Folkestone, in which aircraft coming from abroad may land.

The wording of the regulation as to signalling has also been slightly altered and it now reads as follows :—

The Officer to cause the signals to be given and take the action mentioned in the said section shall be a commissioned officer in His Majesty's Naval or Military Forces.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—Whit-Monday, windy, fine. There was only one machine up, most of the Naval pilots being on leave—34 Short, Lieut. Finch-Noyes, to Farnborough.

Tuesday, fine. Nos. 49 B.E., 43 Bristol tractor, 64 Short, 2 Short, 45 Caudron were up.

Wednesday, fine. Nos. 188 Maurice Farman, 50 B.E., 31 Henry Farman, 43 Bristol tractor, 64 Short were flown. 154 D.F.W. Arrow biplane, with Lieut. Collet, arrived from Brooklands.

Thursday, fine, rather windy. Nos. 188 Maurice Farman and 154 D.F.W. to Isle of Grain; Nos. 64 Short, 1 Short, 43 Bristol tractor, 49 B.E., 31 Henry Farman, 45 Caudron. Lieut Collet looping the loop.

Friday, fine, rather windy. Nos. 188 Maurice Farman, 43 Bristol tractor, and 31 Henry Farman were the only machines up.

Saturday, fine, windy. Nos. 43 Bristol tractor, 150 Avro, 1 Short. The First Lord visited the aerodrome on Thursday, Friday and Saturday, and had flights with Com. Samson.

Civilian Flying.—Mr. Alec Ogilvie was out twice during the week on his 50 h.p. N.E.C. engined Wright, and on both machines, 25 and 50 h.p. on Sunday. Mr. Leo. Jezzi was out on Whit-Monday on his 35 h.p. Little Jap, also on Sunday, making a couple of fine flights.

Mr. T. S. Duncan, who took his *brevet* at the Vickers Flying School, Brooklands, on May 30th.

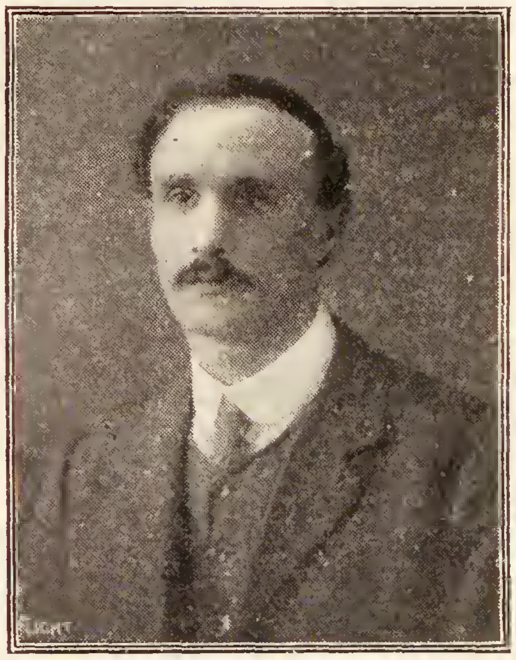
Brooklands Aerodrome.

ON Tuesday afternoon, last week, Mr. Dukinfield Jones was testing the engine of the D.F.W. Mr. Pixton flew to Farnborough on a Sopwith "Scout." Mr. Mahl with a passenger also flew to Farnborough on the two-seater Sopwith, bringing back two passengers with him. Mr. Sippe was out on the Bristol "Scout." Mr. Gower was flying a 50 h.p. Blériot, and Mr. Alcock the 100 h.p. Sunbeam. The Bristol, Blériot and Vickers pupils out. In the afternoon, Mr. Jones out on another D.F.W.

Lieut. Collet, R.N., flew to Eastchurch on the D.F.W., on Wednesday morning. Mr. Gower on a 50 Blériot and Mr. Alcock on the 100 Sunbeam both flew to Sunbury on Thames to be present at the first airmen's picnic held in this country. Mr. Sippe with a passenger on the Bristol tractor circled round the scene of the picnic, but had no time to land and join the picnickers. Mr. Mahl across country on the 80 Sopwith. Mr. Pixton on a Sopwith "Scout" to Farnborough. Mr. Waterfall for a couple of flights on the Martinsyde. Blériot, Vickers, and Bristol pupils out.

On Thursday morning, Bristol, Vickers, and Blériot pupils out. Monsieur Cuendet with a passenger flew to Farnborough and delivered two-seater Blériot to R.F.C. Mr. Alcock with passenger to Sunbury and Epsom. Mr. Sippe out on Bristol tractor in the afternoon. Monsieur Cuendet with passenger to Farnborough again to deliver another two-seater Blériot to R.F.C.

Vickers and Bristol pupils out on Friday morning. Monsieur Cuendet with passenger for three-quarters of an hour's flight on two-seater Blériot, which he afterwards delivered to R.F.C. at Farnborough. Arrival of Avro "Scout" and two standard 80 h.p. tractors. In the afternoon Mr. Mahl on 80 Sopwith, Mr. Pixton on Sopwith "Scout," Mr. Waterfall on Martinsyde, Mr. Alcock on 100 Sunbeam, and Mr. Wilberforce on 45 h.p. Anzani-Blériot; also Mr. Raynham on Avro "Scout" and Mr. Sippe on Bristol "Scout." Blériot, Bristol, and Vickers pupils out.



Mr. Reg. Max Murray, who this month took his *brevet* on the Vickers biplane at the Vickers School, Brooklands. His spiral descent was from 3,200 ft.

Saturday morning, Vickers and Bristol pupils out. Mr. Steinbach passed his *brevet* tests in good style on a Vickers biplane. Mr. Alcock on 100 h.p. Sunbeam, Mr. Pixton on Sopwith "Scout," and Mr. Barnwell on 100 h.p. Sopwith to Hendon for Aerial Derby. Mr. Waterfall on Martinsyde, and Mr. Sippe on Bristol "Scout." In the afternoon, Mr. Mahl to Hendon on 80 h.p. Sopwith, Mr. Sippe on Bristol "Scout," and Mr. Dukinfield Jones on D.F.W. Mr. Alcock and Mr. Barnwell abandoned race owing to fog and returned to Brooklands, Mr. Pixton having also given up and landed at Croydon.

Mr. J. R. Howett, who has just taken his Royal Aero Club *brevet* at the Grahame-White School, Hendon.

Mr. Hawker (who only arrived home from Australia on Saturday night) was first out Sunday afternoon on the two-seater Sopwith, afterwards going out on the 100 h.p. Sopwith, flying in quite his old style. Mr. Sippe was out on the Bristol "Scout" at the same time as Mr. Hawker on the 100 h.p. Sopwith, the two machines affording a fine spectacle under the skilful management of their respective pilots. Mr. Mahl took up a number of passengers, and ultimately left with two passengers for Lord Burnham's place—Hall Barn, near Beaconsfield.

Bristol School.—Monday, last week. Stutt and Sippe both entered for the Brooklands Handicap Race, the former securing the second prize.

Passenger tuition to Lieut. Nugent, Mr. Rutledge and Mr. Charlesworth, Tuesday. Solos by Lieut. Richard, Capt. Walcot, Mr. Eastwood and Mr. Gresley.

Wednesday, passenger tuition to Mr. Rutledge (4), Mr. Charlesworth (3), and Mr. Lucas (2), the weather being too bad for solo flying.

Pupils taken as passengers Thursday: Mr. Lucas, Mr. Charlesworth (2), and Mr. Rutledge. Too windy for further work.

Friday, Mr. Charlesworth received one passenger flight, but the rain then prevented further tuition.

Passenger tuition Saturday to Mr. Gresley and Mr. Chambers, but no further work was possible owing to the very bad weather.

Vickers School.—Tuesday last week, pilots at work: Barnwell, Knight, Elsdon, Webb. With pilot: Messrs. Klingenstein and Miller. Lieuts. Eberli and Tennant, and Messrs. Parker, Wilson and Steinbach solos.

Wednesday, with pilot: Lieut. Gillman and Messrs. Klingenstein and Miller. Lieuts. Eberli and Tennant and Messrs. Parker, Wilson and Steinbach solos.

Thursday, with pilot: Messrs. Miller and Klingenstein. Lieut. Gillman, Messrs. Wilson, Miller and Steinbach solos.

Friday, with pilot: Messrs. Klingenstein and Miller and Lieut. Gillman. Lieut. Tennant and Messrs. Parker and Wilson solos; also Mr. Steinbach.

Saturday, Mr. R. Steinbach for *brevet* on biplane, getting through in fine style.

Liverpool Aviation School, Waterloo.

J. CREAN has not been out since May 19th, when he did some short hops, after which he went off to play polo, where he managed to put out his shoulder. Osborne-Groves started on 3rd inst. rolling, but had to stop on account of wind. On the 8th, rolling again and getting good control of machine, when caught by a gust was lifted off the ground and finished with a *piqué* and complete somersault, but was unhurt owing to wearing a safety belt.

Wind has been consistently bad since beginning of May, and the two-seater has only been out for trial runs with the new Isaacson on May 22nd and 27th and June 3rd. The machine flies well with this engine, the chief trouble being with the plugs; the new mica plugs have so far given good results.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Tuesday last week, Mr. Shepherd and Major Peck straights with Instructor Howarth in passenger's seat. Messrs. Weber, Boyesen, Cowley, and Howett circuits, figures of 8, &c., afterwards Messrs. Cowley and Howett going in for *brevet* tests, Mr. Howett passing tests, Mr. Cowley to complete last part of tests.

Wednesday, Major Peck, Messrs. Liu, and Dunne straights with Instructors Howarth, Lillywhite and Barrs. Messrs. Palmer, Shepherd, Wyles and Gruning also straights with instructors. Messrs. Winter, Boyesen, Robinson, solo circuits, &c., Mr. Cowley going in for last part of *brevet* tests and gaining certificate.

Thursday, Major Peck, Messrs. Wyles, Liu and Dunne straights with Instrs. Birchenough and Howarth. Mr. Weber first and second parts of *brevet* tests.

Friday, Messrs. Liu, Dunne, Shepherd, and Palmer straights with Instrs. Howarth and Barrs. Mr. Boyesen circuits, figures of eight, &c. Mr. Lowe solo straights, Mr. Weber altitude tests for *brevet*, Mr. Winter solo circuits.

Beatty School.—Pupils on Wright dual-control biplane with M. Baumann, Instructor. Messrs. Ruffy 15 mins., Cheung 17, MacLachlan 15, Bentley 8, Elverson 12, Allen 12, Capt. Bass 32, Lieut. Maguire 52. Mr. Watts doing circuits by himself.

Hall School.—Sunday, last week, J. L. Hall on Avro at varying altitudes.

Whit-Monday, J. L. Hall, on Avro, flew over to Hanger Hill grounds at Acton with passenger, later returning to aerodrome at 2,000 ft. H. C. G. Allen straights on his 35 h.p. Blériot.

Too windy for pupils alone on Tuesday, J. L. Hall giving instruction on dual-control Avro. Miss D. Clifford half-hour at 2,000 ft. practising straight flights. J. H. Rose circuits at 1,000 ft., having the Avro in complete control.

Windy and bad *remous*, Wednesday. J. L. Hall on Avro passenger carrying.

Thursday and Friday, a gale. Saturday, windy in morning. In afternoon J. L. Hall out taking passengers on Avro. In evening wind dropped sufficiently for school practice. Henry Gearing essayed his first circuit, which he covered in excellent style. A. F. Arcier then took No. 1 Caudron up several hundred feet, doing circuits, then landing in graceful *vol plané*. J. Rose made two straight flights before darkness intervened; and H. C. G. Allen performed evolutions on the 35 Blériot.

Shoreham Aerodrome.

Pashley School.—The pupils of the Shoreham flying school have all made very rapid progress during the week, thanks to the greatly improved weather. Three pupils, Messrs. R. P. Cannon, P. Maskall and A. Maskall, passed their certificate tests in splendid style. Each did the eights at 600 ft. and *vol plané* from 500 ft. to 750 ft., the latter being done by R. P. Cannon.

Mr. Derick Aikman, another pupil, has done splendid flights at 800 ft., including figures of eight, and Messrs. Hayland-Wilson, Sievier and Purnell have done a number of circuits, being now ready for eights.

Mr. Sholto Douglas has advanced splendidly, doing very steady flights alone, and controlling long flights with the instructor, Mr. W. H. Elliott.

During the week Mr. Elliott, with Mr. England as passenger, flew to Horsham and back at a height of about 2,000 ft., making only a short stay at Horsham.

TO GUSTAV HAMEL.

Ave atque Vale!

Hast thou indeed flown, marvellous boy,
Wafted beyond our ken to the doom decreed,
Leaving our hearts forlorn?

Thy winged soul, a creature of air and flame,
Eager and swift, suckled at Freedom's breast,
Disdained to quaff, ere she stooped to her house of clay,
The wonted cup of oblivion.

Therefore, in exile, remembering bliss foregone,
She brooked ill the bonds of mortality,
Pined for the ampler scope of her native sphere.

Therefore she formed thee and fashioned thee after herself,
Gave thee a mien graciously alien, aloof,
Gave thee the eyes of a prisoner bent on escape,
Gave thee a dauntless heart, an invincible will.

So we beheld thee anon
Soaring and circling superbly aloft,
Easily triumphing over the hosts of the air,
Taking by storm the heaven of thy fame
And the hearts of thy breathless beholders.

But they, the wrathful and envious ones,
The vanquished hosts of the air,
Wayward, capricious, knowing nothing of love,
Knowing thee young and fearless, bided their time
And triumph now in their turn.

Therefore we mourn and thy fellows mourn thee, bereaved.
But thou, suddenly snatched from our sight,
Thy death like a trumpet-call, heard over-sea,
Surely thou heedest our answering cry—Farewell!
Surely thou findest new heights to essay.

Hail, then, and farewell, marvellous boy!

CHARLES J. WHITBY.

Long Test for Dorand Military Biplanes.

WITH the object of fully testing the armoured biplanes built by the French Army to the designs of Commandant Dorand, an escadrille composed of six of the machines set out from Villacoublay on Monday morning for a long tour of France. The programme comprises six stages with stops at Rheims, Verdun, Chalons Camp, Villacoublay, Dijon, and Villacoublay. The first stage from Villacoublay to Rheims, *via* Soissons, was accomplished by all the machines, the pilots of which are Capt. Leclerc (in command), Adjudant St. Andre, Sergt. Grasset, Corporals Labouchere, Brindejonc des Moulinais and Gastinger. All the machines are fitted with 85 h.p. Anzani motors.

EDDIES.

A FEW surprises were provided by the Aerial Derby on Saturday last, for which the weather was no doubt mainly responsible. It was a most extraordinary thing how, through some freak of fate, the machines seemed to group themselves together. Of the machines entered, two Martinsydes did not start, two Sopwiths, two Blériots and two M. Farmans did not return to the aerodrome, whilst of the five machines that did return two were H. Farmans and three Moranes. As reported elsewhere Brock was declared the winner not only of the Derby but also of the sealed handicap, a result which was hailed with satisfaction by his numerous friends. Congratulations Brock! Bully for you, as your compatriots would say.

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L. Noel is interested in the setting of a compass before the start of the Aerial Derby.

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It was hard luck for Raynham that he was unable to start in the race through damaging his machine in a trial flight the previous day. The little Avro scout had been fitted with straight wings, as her speed was found to be not quite up to expectation with the backswept wings with which she made her first appearance a fortnight ago. For last Saturday's Derby the standard type chassis had been replaced by a racing chassis of the very simplest type, so simple, in fact, that no provision had been made for springing the wheels in any way except by the pneumatic tyres, and so when Rayham took the machine out to test the new straight wings the chassis collapsed letting the machine down in a most undignified manner.

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In addition to the little Avro scout, two 80 h.p. Avro two-seaters have arrived at Brooklands whilst several more are expected shortly, all of which are to be tested there before being delivered at Farnborough. In addition to these land machines, which have been ordered by the War Office, two hydros are to be delivered to the Navy shortly. It is gratifying to see that Messrs. A. V. Roe and Co. are now reaping some benefit from their perseverance and pioneer work in the past.

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In these days of pilot-Princes and looping Peers it does not come as a very great surprise to learn of a Princess joining a flying school as a pupil. Princess Ludwig of Löwenstein-Wertheim has evidently been so impressed by her recent flight to France on Mr. Ding's Handley Page biplane, that she has decided to learn the gentle art herself. This I gather from Mr. Handley Page, since the Princess has joined the Beatty flying school at Hendon, her tuition beginning this week-end.

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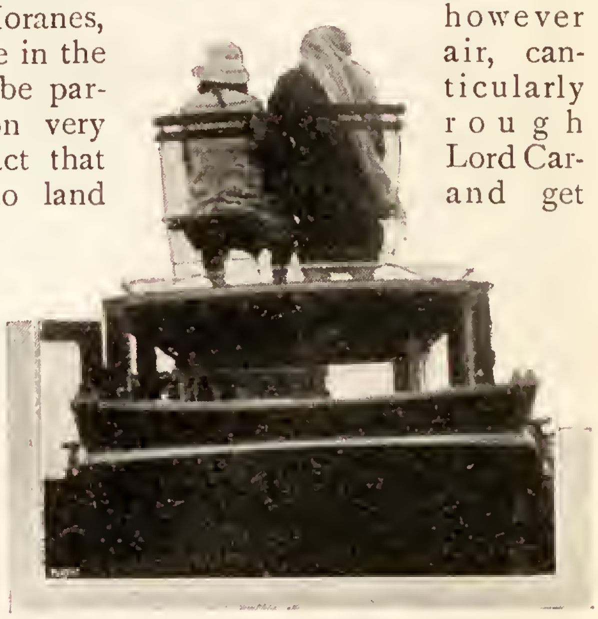
It is a bit of a mystery to me how Lord Carbery managed to land on Hampstead Heath and get away again last Saturday, when he lost his way flying in the Derby. The ground around that part is anything but level and the Moranes, however excellent they are in the air, cannot be said to be particularly easy to land on very rough ground. The fact that Lord Carbery managed to land and get off again without mishap speaks volumes for his skill in handling his machine.



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Back view of a private "grand stand" at the Hendon Aerial Derby.

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Mr. T. Elder Hearn had a narrow escape the other day when flying his two-seater Blériot at Childwall. Mr. Hearn had made a flight with a passenger and was returning to the Polo ground when his engine stopped. He was flying very low at the time as there was a mist, and the only suitable field within gliding distance was bordered by a hedge, behind which were a lot of people. Rather than risk running into the public, Mr. Hearn made a sharp turn close to the ground and landed in an adjoining field, smashing his machine; fortunately both he and his passenger escaping practically unhurt. The first question that the passenger asked after the smash was: "When will the machine be repaired, I should like another flight?" Not only so, but he also refused Mr. Hearn's offer to refund his "fare."

"Flight" Copyright.

Mr. Ridley Prentice off from Waterloo on a "flying" visit across the seas to South America and back.

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Mr. Ridley Prentice, whose various interests in the British Anzani Co., the British Emaillite Co., and the G.A.C., &c., have kept him very busy indeed, left Southampton on Friday last bound for Rio Janeiro on a recreation trip, as his health was beginning to feel the effects of overwork. I feel sure that his many friends will join me in wishing him *bon voyage!* Mr. Prentice, of course, received his *baptême de l'air* long ago, but unless he can prove that he has passed the Equator before, he will scarcely avoid quite a different sort of *baptême*, if customs on board ship continue as of old. May he return all the better for his trip!

Mr. Harry Hawker, whose excellent flying in last year's waterplane Circuit of Britain will still be remembered, was back again in this country from Australia on Saturday last. When Mr. Hawker went out to Australia last summer he took with him the first scouting biplane of the small fast type turned out by the Sopwith Aviation Co. On this he has been getting through a great amount of flying in his native land, and has thereby helped in no small measure to arouse interest in aviation among his compatriots. Mr. Hawker has, it will be remembered, been entered as the pilot of one of the Sopwith machines for this year's Circuit of Britain, which is down to take place between August 1st and 15th. Although, as I have already said, he only arrived on Saturday last, on Sunday he was flying at Brooklands. Place Hawker anywhere where he can get his hands on a machine and you simply can't keep him on the ground!

"ÆOLUS."

THE NETHERAVON DISASTER LAST MARCH.

A *communiqué* has been received from the War Office giving the result of the enquiry by the Advisory Committee for Aeronautics into the cause of the accident to aeroplane No. 204, which resulted in the deaths of Captain Allen and Lieutenant Burroughs of the Royal Flying Corps (Military Wing) on March 11th last at Netheravon. The following is a copy of the Committee's report, dated May 20th:—

"The Committee have had under consideration your letter of April 3rd, asking them to enquire into the cause of fracture of the rudder post of aeroplane No. 204. The fractured post has been carefully examined at the National Physical Laboratory, and the material of the post has been submitted to mechanical tests and to microscopic examination.

"The Committee have instructed me to reply as follows on the specific points referred to in your letter:—

"1. *Sufficiency of the original strength of the tube as designed.*—The maximum stress on the rudder post under the most severe conditions which, in the opinion of the Committee, could occur during flight, has been estimated, and the unwelded tube was found to be capable of bearing not less than three times this stress. The maximum stress thus estimated only falls on the rudder under exceptional conditions, and this figure implies, therefore, a much higher value than 3 for the factor of safety, as the term is at present ordinarily used in aeronautics.

"The Committee are of opinion that the tube, unless it were damaged by the method of attaching it to the rudder, was sufficiently strong.

"2. *Effect of filing.*—The Committee are of opinion that the effect of filing was negligible.

"3. *Effect of welding.*—The evidence afforded by the report showed that the tensile strength of the tube was considerably reduced by the welding process, but this reduction alone was insufficient to account for the accident. It is well known, however, that heating steel, even for a short time, to the temperature required for autogenous welding, in addition to seriously diminishing its strength and ductility, also reduces its power to resist alternating stress or shock.

"4. *Effect of possible bending and straightening, or vibration.*—Examination of the sound portions of the tube did not furnish evidence of an effect due to possible bending and straightening. Such effect would, however, be most likely to occur at the weakest part of the tube, and might be masked by the fracture. There was some slight corrugation on the compression side of the tube which might have existed prior to the fracture, indicating that bending had taken place or might have been caused at the time of the accident.

"Vibration of the rudder, if set up by some cause producing impulses synchronous with the natural oscillations of the rudder, might give rise to stresses of considerable magnitude. No evidence was before the Committee that this had occurred, but the necessary conditions might arise if the engine were run while the machine was on the ground.

"5. *Effect of absence of wood filling.*—The margin of safety referred to under (1) was calculated on the strength of the tube alone, without wood filling. The factor of safety would not be raised to any considerable extent by the presence of the wood filling.

"*General conclusions.*—So far as it is possible to judge from the available evidence, the stresses to which the rudder post was subject at the time of the accident were well within the margin of safety of the design, and the Committee are forced to the opinion that some flaw existed before the machine left the ground. It does not follow, however, that such flaw could have been detected by external examination.

"The fracture took place across [a section where the bending stresses were not far from a maximum, and where, owing to the fact that the steel had been raised to the temperature required for autogenous welding, and thus "overheated," the tube was weakest. The machine during its life, though not at the time of the accident, had been subject to severe stresses, and it is possible that the action of these had been sufficient to set up a flaw in the region of the tube, which had been "overheated" by the welding, and that this flaw had gradually developed so as to lead to the breakdown. Or again, it is possible that the rudder post had been slightly bent by accident or by rough usage, and that the flaw had been started thus, or as a result of subsequent straightening; though, from experiments which have been conducted, it seems unlikely that the flaw can have originated in this manner. If, however, this were the case, the bending must, as would be expected, have been confined to the neighbourhood of the fracture where the tube was weakened by the welding. The microscopic examination did not show signs of such ill-treatment, but near the fracture these may have been masked by the break itself.

"There is no reason to suppose that the slight filing noted, or the absence of the wood filling, contributed to any appreciable extent to the disaster, while, apart from its condition at the weld, the material of the post was good and amply strong enough for the stresses it had to bear in use.

"R. T. GLAZEBROOK, Chairman."

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending June 6th, 1914:—

Concentration Camp.—Headquarters, Headquarter Flight, Aircraft Park, Nos. 2, 3, 4, 5 and 6 Squadrons.—Work in camp opened on June 2nd. The commanding officer held a conference of all officers; he explained briefly the objects of the camp, viz., to test in various ways the degree of training of personnel both on the ground and in the air, the work and handling of aircraft and transport, and experiments of numerous sorts; also the study and co-ordination, by means of lectures, discussions, conferences, and specially detailed committees, of the innumerable problems such as mobilisation, technical and military training, observation, workshops, stores, meteorology, wireless telegraphy, photography, bomb dropping, and organisation of all sorts, which are essential to the rapid building up on an efficient basis of a flying corps. The work indicated was at once started on these lines and continued throughout the week. Interesting speed, climbing and other tests were effected. In the evenings inter-squadron competitions, cricket, football, cross-country running, boxing, sports, &c., are carried out. There is much keenness amongst the squadrons to win the challenge cups and prizes presented for these events. Nos. 1 and 7 Squadrons and the Recruit Depôt remain at Farnborough. The officers come to the camp as required to assist in various matters and to keep in touch with the progress of the work done.

ROYAL FLYING CORPS.

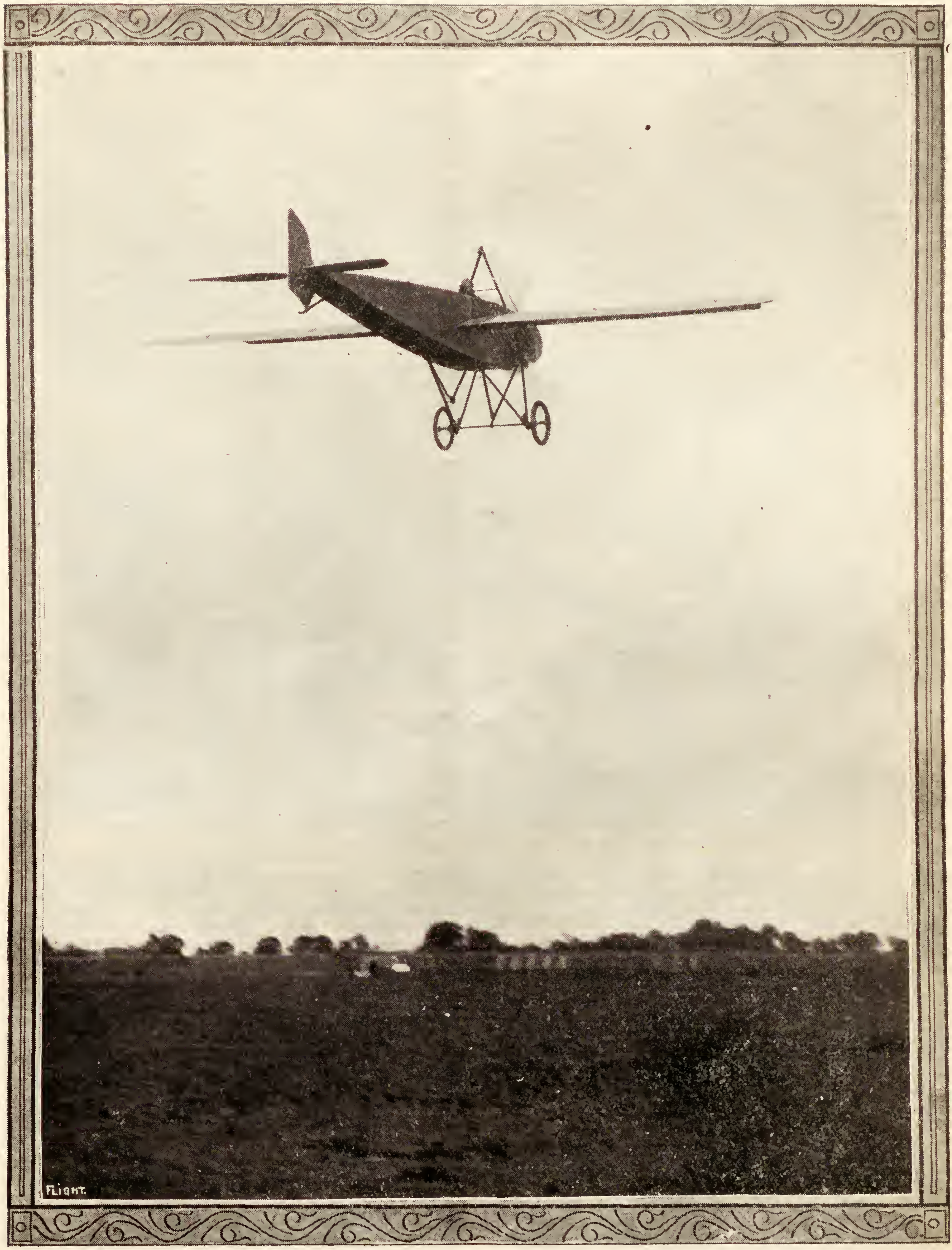
THE following announcements appeared in the *London Gazette* or the 5th inst.:—

R.F.C.—Military Wing.—Lieut. Reginald Cholmondeley, Rifle Brigade (Prince Consort's Own), a Flying Officer, to be advanced to Flight Commander, and to be granted the temporary rank of Capt. whilst so employed; May 1st, 1914. Second Lieut. Denys C. Ware, Special Reserve, to be appointed to the Reserve; April 28th, 1914.

R.F.C. Military Wing.—*Supplementary to Regular Corps.*—Second Lieut. (on probation) Denys C. Ware is confirmed in his rank.

The following appointment was announced by the Admiralty on the 10th inst.:—

H. L. Woodcock, to the "Pembroke," additional, as squadron commander, for command of Farnborough Airship Station and for naval airship No. 4, in command, temporary, to date June 9th.



Mr. Frank Goodden flying the Morane-Saulnier at Hendon Aerodrome.

TESTING THE LANGLEY "AERODROME."

As briefly announced in our issue of June 5th, the well-known American aeroplane constructor and aviator, Glenn H. Curtiss, succeeded, on May 28th last, in making a flight on the tandem monoplane built by Dr. S. P. Langley in 1903. Contrary to a common report, this was the original Langley machine, and not a copy, as, although originally refused by the Smithsonian Institution, they subsequently agreed to let the original structure be used. Some of the ribs, which had been broken, were replaced and the wings resurfaced, but the original engine and propellers were used, as well as all of the framework and most of the original cross-wiring. During the first test, the object of which was to determine if the balance of the machine had been adversely affected by the added weight and head resistance of the floats and other fittings, Mr. Curtiss was taxying along the surface of the water at a moderate speed when the machine quietly lifted into the air and sailed steadily along for some distance.

This performance is all the more remarkable in view of the fact that the machine lifted not only the load which Dr. Langley had designed it to carry, but in addition lifted an extra weight of 340 lbs., in the form of floats and other fittings attached to the machine in order to facilitate launching it from the water. In previous trials, eleven years ago, the "Aerodrome," as Dr. Langley called his machine, was launched from a catapult on top of a house-boat, and wrecked through the failure of this launching apparatus.

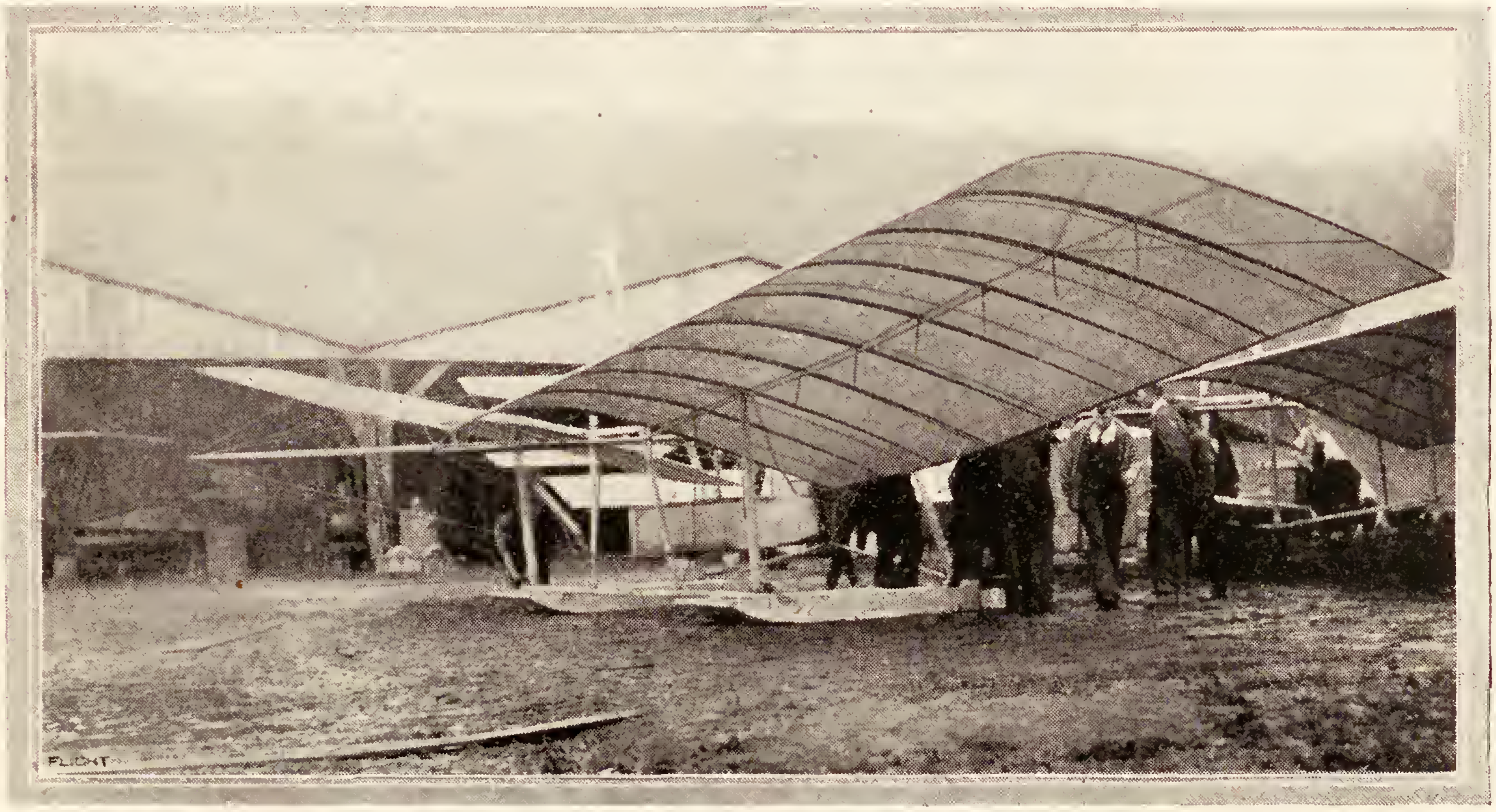
Among those who witnessed the tests were Dr. Charles D. Walcott, Secretary of the Smithsonian Institution, and Dr. A. F. Zahm, Recorder of the Langley Aerodynamical Laboratory, and a number of well-known aviators. In a statement for the press, Dr. Walcott said: "I was well pleased with the launching this morning. Although the machine and pilot weighed 340 pounds more than the machine and pilot of 1903, it rose gracefully from the water on the very first trial, and maintained remarkable stability both in the air and on the water. I assigned to Mr. Curtiss the task of rehabilitating the original machine and of testing it over the water, first, for the purpose of vindicating Dr. Langley's design, and, secondly, to ascertain the practical value of his design in the present state of aviation. It is my hope that succeeding trials will amply justify the good opinion which aeronautical engineers, both here and in Europe, have long entertained of Dr. Langley's design."

Below we publish the abbreviated history of Dr. Langley's study and experiments as communicated to us by Mr. Glenn H. Curtiss:—

"The story of Samuel Pierpont Langley's study and experiments in connection with aeronautics begins in 1887, some years before serious-minded people considered aerial navigation with machines heavier than the air practical, and extends over nearly sixteen years. During that time Mr. Langley established and successfully demonstrated many principles which have since proved invaluable to the science of aviation.

"Mr. Langley's main object was to establish by experiment the possibility of, and the conditions necessary for, transporting a body heavier than the air through that medium. He began with studies of toy aeroplanes propelled with rubber bands, which led to more elaborate experiments with planes, propellers, steam and gas engines, and other accessories, and to his final experiments with a man-carrying machine propelled by a gasoline engine which, although built eleven years ago, is nearly as efficient as those evolved by the engineers of to-day. In his early experiments he met with many discouragements, but his persistency led finally to those results which entitled him to be called 'The First Bird Man.'

"The results of his experiments were printed in popular form in several magazines and periodicals, while his technical scientific reports were issued by the Smithsonian Institution during his term as Secretary from 1887 to 1906. His first real contribution to the science of aeronautics was entitled 'Experiments in Aerodynamics,' published in 1891, which covered his early physical researches in relation to aerodynamics, and showed that the real problems of aviation were those of guiding and elevating a plane rather than of supporting it. Mr. Langley had already established the possibility of the latter by means of his suspended planes, the plane dropper, and other apparatus.



Front wings and main floats of the Langley tandem monoplane.

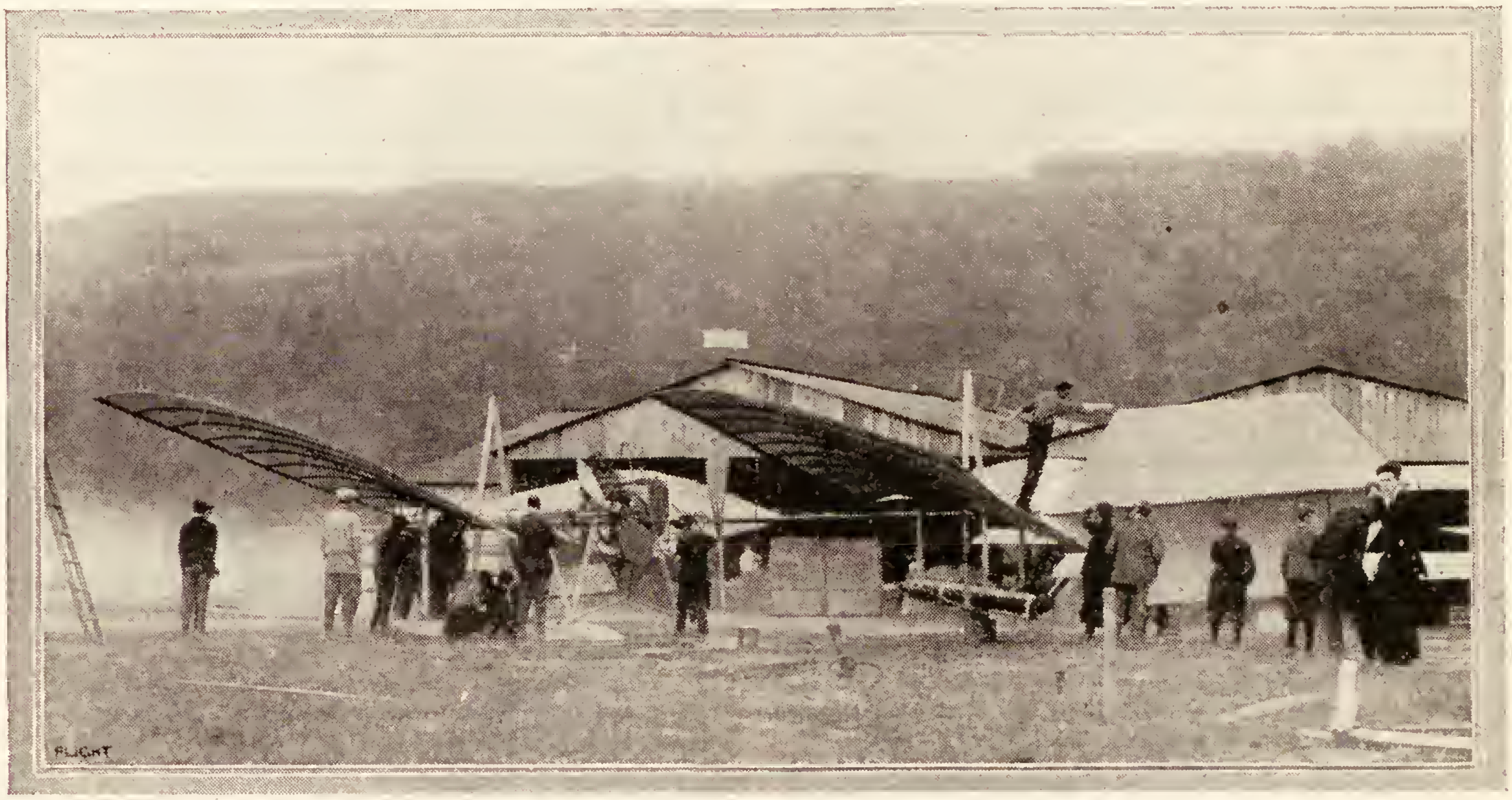
"The second aeronautical treatise of Mr. Langley was on the 'Internal Work of the Wind' published in 1893, in which he pointed out the various internal forces of the atmosphere upon which objects might rely for support apart from their own power.

"In 1911, a complete and detailed account of his investigations relative to the models and the large machine was issued under the title of the 'Langley Memoir on Mechanical Flight.'

"Having secured a grasp upon the fundamental principles of air resistances, and matters pertaining to aviation generally, Mr. Langley undertook the construction of the first heavier-than-air model machine in 1892. He felt that it would be impossible to conduct further investigations regarding flight without studying flight itself. The first model aeroplane, or 'aerodrome' as he termed it, was completed after four years of experimentation. It was a steam-driven machine, with two sets of monoplane wings arranged in tandem, and a tiny steam plant which weighed only 7 lbs. complete and yet developed 1¼ h.p. Many boilers, burners, and frames were built and discarded before the aerodrome was finished, and then the problem of launching it confronted him. This was finally accomplished by means of an overhead track from which the machine, when ready to fly, was shot into the air by a series of springs.

"The first successful flight was made on May 6th, 1896, at Quantico, on the Potomac River, by this tandem type plane, which had a wing spread of 13 ft. and a total weight of 30 lbs. The flight occupied 1 min. 20 secs., during which time the little machine covered a distance of 3,000 ft. It was immediately started again, and made a flight of over 2,300 ft. These were the first flights of a machine heavier than air and propelled by its own power ever made in the history of the world. Subsequent flights of this machine and others with both steam and gasoline power proved their efficiency, and also demonstrated the correctness of Mr. Langley's theory of the practicability of flight.

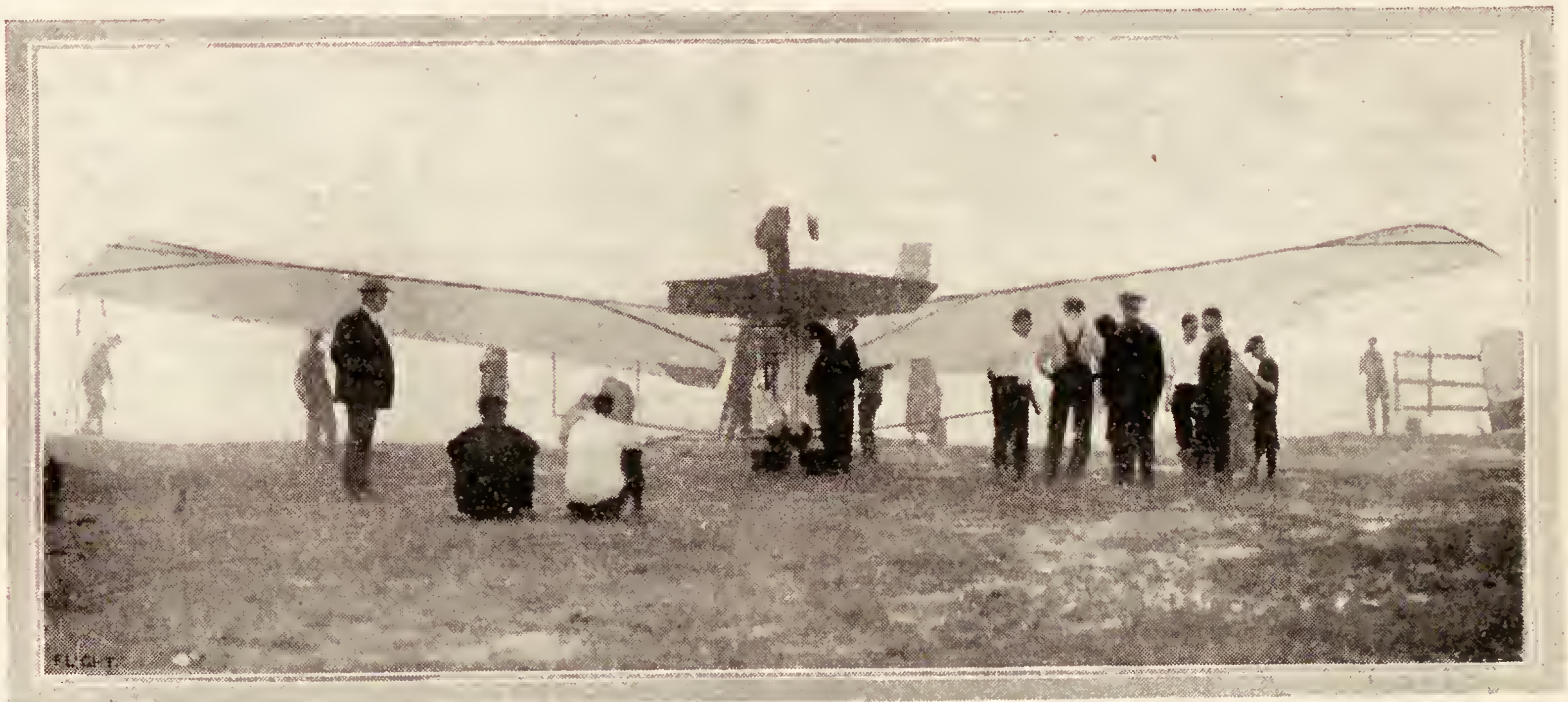
"Early in 1898, the Government became interested in the possibility of employing large flying machines in time of war, and the President, through the Board of Ordnance and Fortification of the War Department, requested Mr. Langley to build a man-carrying machine. This the inventor undertook, and finally in 1903 he had completed the construction of the full-sized steel machine, despite many handicaps and delays encountered in securing a suitable engine and other accessories.



Side view of Langley tandem monoplane.

"The large engine is a gasoline one, built in the Smithsonian shops under the direction of Mr. Charles M. Manly. It is a five-cylinder engine, developing a little over 52 actual horse-power, and weighing, with radiators, batteries, and 20 lbs. of cooling water, only 207 lbs., a little less than 4 lbs. per horse-power. The complete aerodrome ready for flight weighed about 850 lbs., including the aviator, and had a total supporting area of 1,040 sq. ft., or a total of 1·25 sq. ft. of surface to the pound.

"Before the completion and test of the large machine, however, a quarter-size gasoline model was constructed, and flown with success on August 8th, 1903.



Rear view showing cruciform tail planes and large dihedral angle on main planes of Langley tandem monoplane.

"Two attempted flights with the man-carrying machine were made on October 7th and December 8th, 1903, but owing to an inefficient launching apparatus the aerodrome was not successfully launched into the air, but fell into the water before it got free from the track and launching ways. It was immediately taken out of the water, carefully cleaned, and has since been stored in the Smithsonian Laboratory.

"The War Department did not make an additional allotment for further experiments, and Mr. Langley, owing to lack of funds, never undertook to fly the machine again. During recent years, progress in aviation has brought much to the attention of the world regarding flying machines which Mr. Langley not only knew but could have demonstrated had further support been accorded."

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Mr. Manton at Sheffield.

ON June 2nd, 3rd and 4th, Mr. Marcus D. Manton gave a very fine display of exhibition flying, looping the loop, &c., on his 50 h.p. Blériot, at Sheffield—his native city. Between the flights members of the Sheffield Aero Club demonstrated the capabilities of their model aeroplanes.

THE AEROPLANE IN WAR.

THE tenth of the series of special lectures arranged by the Military Education Committee under the authority of the Senate of the University of London was delivered by Major W. S. Brancker, R.A., entitled "The Aeroplane in War," of which the following is an abstract :—

The lecturer observed that owing to the extensive character of the subject, he would confine his remarks to the aeroplane which most nearly affects our expeditionary force at the moment—the land machine.

The aeroplane was, as yet, untried in war ; as although it had seen active service in Tripoli and in the Balkans, in neither of these countries were the conditions such as to afford much information concerning its possibilities. Hence their value in war and the methods of employment are only matters for conjecture. At the present time, however, armed airships and aeroplanes and weapons of offence and defence against aircraft were in existence, and therefore peace training would only lack the reality of war.

Of the many possible duties which can be performed by aeroplanes in war, the following were the most important :—(1) Reconnaissance. (2) The destruction of hostile aircraft—both airships and aeroplanes. (3) The attack of troops on the ground and of material, such as airship sheds, oil tanks, magazines, &c.

(1) *Reconnaissance.*—Reconnaissance was the principal duty of the aeroplane in war ; it had been possible for the last two years, and would be the most important factor if war broke out to-morrow. In this sphere, the aeroplane had come as an antidote to the growing difficulty of reconnaissance in modern warfare. Sound war plans were easily made if the enemy's forces and probable intentions were known, but the greater accuracy of long range rifle- and gun-fire, increased numbers and more extended formation of troops, and the use of smokeless powder had thickened the fog of war and made it most difficult and dangerous for cavalry to reconnoitre an enemy's position. But, given good conditions, a great deal of information could be gleaned of the enemy's dispositions, particularly during the earlier phases of a campaign, when the troops were in close formations ; and an aeroplane flying at 4,000 ft. should be able to bring in information ten times faster and more definite than that which a division of cavalry might normally obtain after a day's fighting.

There were, however, various adverse factors with which aerial services have to compete, and that tend to prevent any approach to infallibility in the results obtained. Among these were :—

(*a*) Imperfect observation and hostile subterfuges ; (*b*) Climatic conditions ; (*c*) Difficulties of maintenance ; (*d*) Anti-aircraft weapons on the ground ; and (*e*) Fighting in the air.

(*a*) *Imperfect observations.*—The art of accurate observation from an aeroplane is much more difficult, and requires far more training than does the art of flying. Both pilot and observer must be able to read and understand a map just as quickly and as easily as they can a book, and at any instant during a cross-country flight they should know exactly where they were. Beyond this, the observer (or in a single-seater, the pilot) must be able to pick up troops on the ground, estimate what they are, their numbers, and mark their precise position on the map. He may have to do this in a rough wind and in the midst of fleeting clouds ; and on landing, write a clear and intelligible report of what he has seen. It is not therefore surprising that the results of aerial reconnaissance are sometimes inaccurate and misleading, and this weakness will be intensified by subterfuges undertaken by the enemy for the express purpose of deceiving the observer—such as, by stringing out small columns along roads to represent large ones whilst the mass of the troops are kept hidden in woods and villages ; dummy trenches may be constructed while the real trenches are hidden ; guns may be made to look like bivouac shelters, bushes or country carts ; &c.

The best guarantee that aerial reconnaissance will overcome these difficulties lies in the careful training and wide experience of its observers ; and in the possession of sufficient numbers of aeroplanes to enable doubtful information to be checked and corrected without delay. Assistance to full and accurate observation may be obtained by the use of aeroplanes which can fly slowly and have a good field of view ; although these are somewhat handicapped in strong winds.

(*b*) *Climatic conditions.*—Nature is the greatest enemy against reconnaissance at the moment ; her weapons are—wind, rain, cloud and darkness. Wind is gradually being conquered, as aeroplanes, travelling at from 60 to 70 miles per hour, have actually been blown backwards by winds they have encountered. But the great drawback to the wind is the reduced radius of action of the aeroplane. As regards the progress made against the effects of rain, the impact of the drops of rain on the eyes of the pilot blind him ; but in the latest types of machine the seats were screened, so that this difficulty in flying had been largely overcome, and observation is practicable at low altitudes.

High clouds (that is those from 3,000 ft. high and upwards) do not hinder observation, but rather assist it, by affording a sheltering screen to the aeroplane, if necessary ; and at this altitude a pilot is comparatively safe from infantry fire ; but clouds at lower elevations force the observer to come within the effective range of rifle fire from the ground. This can be remedied by the development of the armoured aeroplane. Fog, however, will always presumably defeat aerial reconnaissance, just as it defeats reconnaissance on the ground. Flying in darkness is not much indulged in at present, because engines are not sufficiently reliable to eliminate the possibility of a forced landing ; and a forced landing on an unknown ground usually means a bad smash, but with the really reliable engine night-flying will become universally practised.

Hence to compete with climatic conditions there are two important requirements :—(II) reliable engines and (III) high speed. As regards speed, a machine that is fast in the air is always difficult to land, even though it can land slowly in the hands of a good pilot where the country is open. The antidote for this lies in the use of air brakes for coming down steeply, and of land brakes for pulling up quickly after touching the ground. Experiments in both are proceeding, and successful land brakes actually exist in some machines. High speed has, however, another disadvantage, namely, in still air it is much more difficult to observe accurately than from a comparatively slow aeroplane, and though it may be perfectly easy to see every detail of the country and the troops moving in it, the eye, the brain and the hand are not quick enough to gauge accurately where those troops are on the map, and to record the fact in a note-book before the aeroplane is miles further on and some, perhaps important, detail has been completely missed. Variable speed will get over this difficulty.

(*c*) *Difficulties of maintenance* are sometimes lost sight of. The aeroplane and its engine are both fragile and delicate. A good average pilot may fly, day after day, round an aerodrome and make many landings without even straining his machine ; but in war the pilot must fly in any weather to obtain information, and land on almost any ground to deliver it. The result will be numerous breakages and strains, all of which take time and skill to repair, and which demand the provision of large quantities of spare parts wherever required on the theatre of war. The difficulty of supply of spare parts will be increased in proportion to the number of different types of aeroplanes employed. Similar remarks apply to the engines, which in addition require thorough overhaul after a comparatively short period at work. Portable tents will also have to be carried for housing machines upon the ground to prevent serious deterioration in the flying qualities of the machines. All this points to the fact that only a small proportion of the aeroplanes in the field will be fit to take the air at any given moment.

The cures for this weakness are various, and can all be applied simultaneously. (1) Increased durability in construction. (2) Reduction in the number of types of aeroplanes and engines employed. (3) The introduction of folding aeroplanes which can be more readily housed than the prevailing type. (4) A really experienced personnel.

(*d*) *Anti-aircraft weapons on the ground.*—All nations are endeavouring to evolve anti-aircraft guns, both fixed and mobile ; but at the moment they do not exist for employment with a mobile army in the field, and for reconnaissance purposes an aeroplane is safe at 3,000 ft. from rifle fire and at 4,000 ft. from gun fire. There are great inherent difficulties in firing at aeroplanes, principally in regard to range, speed and direction of the machine ; while it is almost impossible to recognise whether it is friendly or hostile, although attempts were being made to help to differentiate between them.

(*e*) *Fighting in the air.*—It is obvious that if hostile aeroplanes are armed with a weapon which can be used against the purely reconnaissance machine, the information brought in by the latter will, very likely, be greatly depreciated in value and in volume, and may not come in at all ; and that to combat the armed aeroplane it is necessary to pit other armed aircraft against it.

Before leaving the duties of reconnaissance, the lecturer observed that aeroplanes would not entirely relieve the cavalry of this work, for cavalry reconnaissance succeeds where aeroplane reconnaissance fails, as cavalry can distinguish between friends and hostile troops, can discern the morale and physical condition of the enemy ; it can keep in touch with any particular body of the enemy, and can offer opposition to its advance. The leader of the future will employ his aeroplanes and his cavalry so that one supplements the other, and the employment of the aeroplane in the initial stages of a campaign will enable a commander-in-chief to hold his cavalry back and save them much long and fruitless work, thus keeping them fresh for fighting when the main armies begin to close. The aeroplane will also enable the effect of artillery fire to be observed, thereby solving a difficulty which has been growing more and more acute during recent times; while intercommunication between widely separated forces will also be readily possible with any aeroplane suitable for reconnaissance.

All that has been claimed so far has been actually accomplished in peace and could be accomplished in war, while the suggested improvements and developments are practical possibilities, and are actually under experiment at the present moment.

2. *The destruction of the enemy's aircraft.*—It has already been proved possible in this country to fire a rifle, a machine gun, and even a 1-pounder gun from an aeroplane with fair accuracy, and it therefore seems logical that if two rival forces are equipped with aircraft, these aircraft must fight in order to maintain for themselves the advantage of being able to reconnôitre. The aeroplane of the immediate future will be armed, but the additional weight and strength involved entails loss both of speed and climbing power; so that, at the present, the armed aeroplane must be somewhat inferior in performance to an unharmed one, other things being equal. From an offensive point of view, an aeroplane may attack hostile (*a*) airships, (*b*) aeroplanes, and (*c*) aircraft on the ground. The average aeroplane is faster than the average airship, and therefore fighting is sure to occur so long as aeroplane pilots are determined to attack the airship. The aeroplane can fly faster, climb higher, and is easier to manœuvre than the airship, while the latter can climb faster and provides a steadier platform for a heavier armament than the former. It seems probable that airships will try to keep aeroplanes at a distance by virtue of their power to deliver more accurate fire, while the aeroplane will endeavour to close in order to make use of their manœuvring power and to obviate the comparative inaccuracy of their fire. It may prove necessary to employ three or four aeroplanes, armed with machine guns, light guns, or bombs, for the attack of one airship. There is also the possibility of the fast aeroplane catching and ramming or driving through the airship. This would be desperate work, but the destruction of two or three airships in this way would have a very great moral effect on the remainder. The combat between two aeroplanes is more difficult to imagine. If each was determined to destroy the other, the pilots presumably would manœuvre so as to prevent the opponent using his weapon to the best advantage, whilst he gave his own companion the free use of his. If one aeroplane tries to avoid the other, then speed would be the determining factor as to whether they come to grips or not; but the pilot who decides to flee will, in doing so, present the best possible target to the pursuer. As has been stated, other things being equal, an armed aeroplane will always be less efficient in speed and climbing power than a similar machine not intended for the carriage of weapons, and therefore it will be difficult for the former to catch the latter, so it may be necessary to allot a definite area to an armed aeroplane, over which it would cruise and drive away any hostile scout that came into its zone. With such a scheme, encounters would be fairly frequent and it may prove necessary to obtain command of the air before aerial reconnaissance is resorted to.

Aeroplanes and airships on the ground and their shelters can be seen from a great distance, and offer a very fair and defenceless target for attack; and the sudden attack of three or four aeroplanes provided with bombs and flying low might cause great damage to both, against which anti-aircraft guns would probably have to be employed.

3. *The attack of troops, ships and important buildings.*—At present it is unlikely that many aeroplanes can be used for the attack of troops on the ground. Until fighting in the air had come to an end, and until all necessary reconnaissance had been completed, it would hardly be sound to devote much energy to such an object, while the damage done would probably be too small to justify the risk of venturing within decisive rifle range. On the other hand, at the end of a hard fought action, *if* any armed aeroplanes were still available, which is doubtful, they would certainly assist in completing the demoralisation of a beaten army. The attack of big guns, magazines and oil tanks will, however, be a part of an aeroplane's duties in the attack of a fortress.

It is impossible to include all the desirable qualities in one type of aeroplane and, at present, it is desired to confine the requirements of the Army to five types, which are as follow:—

(I) The high speed single-seater scout of exceptional climbing powers for long range reconnaissance in any wind, and of such an efficiency as to be able to escape from any type of fighting machine which it may be possible to produce at present.

(II) A speedy two-seater reconnaissance machine suitable for deliberate long range reconnaissance and capable of carrying an observer and a wireless installation. Such a type could also be used for bomb dropping.

(III) A two-seater reconnaissance aeroplane having an exceptionally good field of view and the ability to land anywhere—which will be especially suited for short range reconnaissance during the actual battle and for observation of artillery fire.

(IV and V) Finally, two fighting machines, one to carry a machine gun and the other a light gun, firing shell—both of them tentative, but both well within the range of possibility at the present moment.

The ideal would be to standardise in each of these types; but even this is impossible as every really promising design must be given a trial, and every promising constructor must be given work.

It seems that the use of the aeroplane for reconnaissance cannot fail to hasten the progress of operations, at all events between two determined opponents who understand the value of the offensive. Fighting in the air will probably demand a higher standard of morale throughout those engaged in it than any other feature in war; and an aerial service which is lacking in this respect will speedily vanish from the air in the face of opponents who have it.

Turning to what has been done in our own country, the quality of our machines is good, but the numbers are small. The disadvantage that we have laboured under is our very small military strength as compared with that of our neighbours. It must be remembered that so far, the development of aeroplane manufacture has depended directly upon the strength of the Army, so that whilst Germany and France have been providing for field armies totalling about a million men apiece, we have been catering for our expeditionary force of about 160,000 men; while the large peace strength of these two countries renders the problem of the provision of *personnel*, land and barracks far easier with them than for us. When our Territorial army, coast defences, and our Navy attains an aerial strength fitting to the size of our Fleet we shall be in a better position. Meanwhile we possess very good pilots; our designers have produced aeroplanes which in certain respects cannot be beaten anywhere; and we hope soon to rival any other nation in the production of engines.

The aeroplane has depended almost entirely on its warlike capabilities for its development, and all those who object to a large expenditure on so warlike a service should remember that every penny which is put into military aviation is not only providing an insurance against war, but is developing the luxurious flying machine of the future.

The geographical position of any nation will no longer offer the same advantages, or disadvantages, as it does to-day. From now onwards, the struggle for aerial supremacy, be it commercial or military, will go on irresistibly; new developments are following one another in hot haste, and a great nation like our own will only be able to keep her place in the race, by the unflinching expenditure of money and sacrifice of life.

MR. B. C. HUCKS' ACTIVITIES.

ON May 20th and 21st Mr. B.C. Hucks was the chief attraction of the Devon County Agricultural Show at Totnes, where he looped the loop and carried numerous passengers. On the second day there was a crowd of 16,000, a record for the show. On May 22nd and 23rd Mr. Hucks demonstrated at Wells, Somerset, which necessitated very smart work in conveying the two machines over night between the two points. The following week on May 28th Mr. Hucks flew at Ludford Park, Ludlow, before a huge crowd, which included the Mayor. On the following day at Stafford Mr. Hucks broke his own looping record by accomplishing thirteen consecutive loops. Whilst at Stafford Mr. Hucks on the Saturday was entertained by Col. and Mrs. Congreve at Chartley Castle. He gave another demonstration on the following day and carried five passengers. On Whit-Monday and Tuesday Birmingham was visited, the feature of the afternoon being a sweepstake for passenger flights, which created considerable interest. On the following Wednesday, Thursday and Friday looping flights were given at Nottingham under ideal conditions, but from a very awkward landing ground, which called for great skill when manœuvring on the ground. Mr. Hucks should also have flown at Nottingham on the Saturday, but as he had been engaged to loop the loop at Ranelagh, Mr. Manton, his under-study, flew in his stead in a 40-mile wind, creating much enthusiasm. At Ranelagh last Saturday Mr. Hucks made an attempt on the upside down flying record, but owing to fog and a tricky wind he was only able to remain upside down 1 min. 25 secs. At Nottingham on the first day of the meeting Mr. Hucks flew upside down for three miles, and one of his passengers was Sir J. T. McCraith. On Wednesday and Thursday of this week Mr. Hucks was at Waltham Abbey in connection with the Essex Agricultural Society's Show. This is a prohibited area, but Mr. Hucks obtained special exemption from the Home Office and the War Office.

THE FLYING MACHINE FROM AN ENGINEERING STANDPOINT.

By FREDERICK WILLIAM LANCHESTER, M.Inst.C.E.

(*Continued from page* 608.)

6. *Propulsion.*—We are now in a position to consider the question of propulsion. Whether we appeal to experience or theory it would appear that there is only one method of propulsion available, namely, the screw-propeller.* The problem of propulsion, whether aeronautical or submarine, is essentially the same; the laws of dynamic similarity with certain reservations are strictly applicable. Roughly speaking the conditions of usage of propellers in water and air may be compared by merely taking cognizance of the relative densities of the two media—approximately 800 to 1. The laws of dynamic similarity indicate that this relation is not exact, but any refinement of theory on this score is of academic rather than of practical importance. Apart from fine points of this kind there is a limitation that renders the air-propeller and the marine-propeller not strictly comparable; this limitation is due to the appearance of the phenomenon known to the naval engineer as cavitation. The law of the relation of pressure to velocity for least resistance applies to the blade of the screw-propeller precisely as it does to the aerofoil itself, so that if a propeller is being designed for least resistance the pressure per square foot at any point of the blade must bear its constant relation to the square of the velocity of the blade through the fluid at that point. In the case of the marine-propeller this results in a speed being reached (at about 20 or 25 knots speed of vessel) at which the velocity of the blade tips is such that the negative pressure (on the back of the blade), based on the law of least resistance, is greater than the hydrostatic (absolute) pressure. Under these conditions a vacuum is formed in the vicinity of the blade extremity, and the system of flow is impaired; this is the condition of incipient cavitation, and as the speed is progressively increased the vacuum invades more and more of the blade area until the greater part of the propeller becomes ineffective. From the critical speed upwards the design of the marine-propeller becomes a compromise. The extremity of the blade is first designed broader to avoid developing pressures sufficient to initiate cavitation, and then, owing to the additional skin friction thereby involved, it is found desirable to adopt higher pitch/diameter ratio to prevent the extremities cutting the water with excessive velocity. Eventually the propeller for high-speed craft becomes one of extremely coarse pitch with blades of short or saucer-like form. No such thing as cavitation is experienced in the aeronautical propeller; if we should require to deal with propeller-blade speeds approaching the velocity of sound we might find something analogous, due to the high rarefaction of air, but at present the aeronautical designer can afford to ignore all question of cavitation.

It is frequently stated that the theory of the screw-propeller is entirely empirical and quite unsatisfactory; this is not my opinion. The theory of the screw-propeller based on the theory of the aerofoil as laid down in my *Aerodynamics* (see *Aerial Flight*, vol. i, ch. ix), appears to fully meet the requirements of the aeronautical designer. According to this theory the propeller blade is treated as an aerofoil, its P/V^2 ratio at every point of the blade is fixed by the same law as that of the aerofoil as given; following this the gliding angle of the propeller blade is constant from root to tip. The section of the blade is at every point designed as an aerofoil in which the true helical surface corresponds to the horizontal plane in flight.† Under these circumstances it is shown in my work that each point of the propeller blade has efficiency proper to itself and is represented by a curve as plotted in Fig. 24, which corresponds to a gliding angle of 6°, or, approximately, 10 per cent. Under these conditions it will be seen that in the region of maximum efficiency is just over 81 per cent. Unfortunately we cannot use only the region of maximum efficiency; we have to employ the blade of considerable length, and consequently parts of the blade have an efficiency below the maximum. If we take a propeller of the usual proportions in which the pitch is about 1¼ times the diameter, that is such a blade as represented in Fig. 24, we see that the marine engineer declines to employ any portion of the blade with an efficiency of less than about .92 per cent. of the maximum, that is to say, the efficiency at different points of the blade varies from 77·5 to 81 per cent., or theoretically the limit of efficiency of such a propeller should be round about 77 per cent. Unfortunately, a propeller "in being" cannot consist of blades alone, it requires a boss and a connection between the boss and the blades, and in driving these functionally useless parts through the water a considerable further loss is inevitable. Probably it is for this reason that the actual efficiency of a marine propeller rarely exceeds 70 per cent. In my work a design is given of an aerial-propeller based on theory alone, in which a very conservative estimate is taken of the gliding angle. If in the light of present knowledge we assume the propeller blades being of the aspect ratio corresponding to that of my 1894 gliding model, the gliding angle or resistance coefficient will be about 5 or 6 per cent., and we might anticipate a theoretical limit to the propeller efficiency of 88 or 90 per cent. We have here, as in the marine propeller, to provide a boss and arms, and we require to take into account the fact that it never pays in practice to take the full diameter of the propeller that theory would indicate (it is better to sacrifice a few per cent. efficiency to save weight and clearance diameter). Everything considered, I am disposed to put a limit of efficiency of an aeronautical propeller at about 85 per cent.; this is higher than has been found possible in marine engineering.

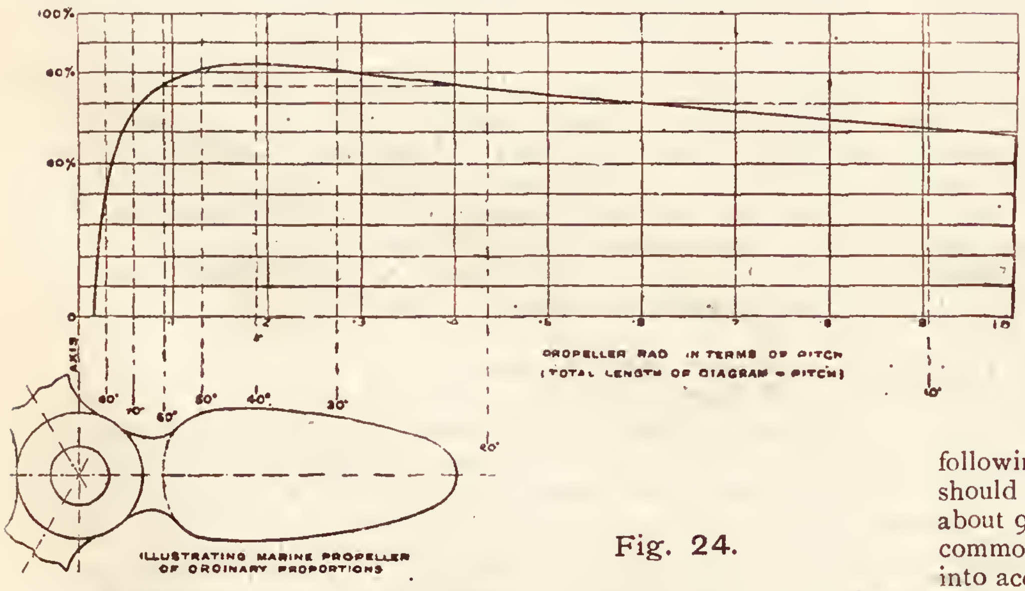

Fig. 24.

My method of propeller design has been adopted and employed for some years by the Superintendent and staff of the R.A.F. with very satisfactory results; at present there is but little available information on the question of efficiency owing to the fact that the arrangements at the disposal of the R.A.F. do not permit of the testing of full-sized propellers.

Working drawings of a propeller, designed at the R.A.F. by this method, are given in Figs. 25 and 26. For the full exposition of the system of "lay out," reference should be made to the work already referred to.

As an alternative and purely empirical basis of treatment, we may fall back on our experience in marine propulsion. There is a practical rule which appears to be commonly adhered to in the design of successful marine propellers for moderate speed sea-going craft. The area of the propeller disk is approximately 1 per cent. of the total wetted surface. This rule has been found by me to represent a rough average of the practice in various cases, but whether it is an accepted rule or not I do not know. Let us take the case of a flying machine involving, say, a thrust of 200 lbs. at 80 ft. per sec.; at this speed the frictional air-resistance will be approximately 0·035 lb. per sq. ft. of surface (0·07 lb. per sq. ft. of lamina, *i.e.*, double surface); thus the resistance of the machine is approximately represented by 6,000 sq. ft. "wetted" surface, and, following the rule given in the case of water, the propeller disk should be 60 sq. ft.; this corresponds to a propeller diameter of about 9 ft. In an actual machine of about this size the propeller is commonly of about 7 ft. to 8 ft. diameter, which, taking everything into account, is in substantial agreement. The propeller employed in flight is of necessity (from considerations of the engine revolution speed) of finer pitch than that of best efficiency. Under these conditions theory shows that the correct diameter is less than that of the propeller of best diameter pitch ratio, such as employed by the naval architect.

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*Nature's method of propulsion—wing-flapping—besides being very objectionable from a mechanical point of view, shows certainly no higher degree of mechanical efficiency than the screw-propeller (*Engineering*, February 26th, 1909).

† There is one factor which affects the analogy between the aerofoil and the propeller blade; the latter is not able to the same extent to hold or accumulate a *dead-water* wake, the propeller blade sheds its dead water continuously by centrifugal force. The extent to which this affects the problem has yet to be determined.

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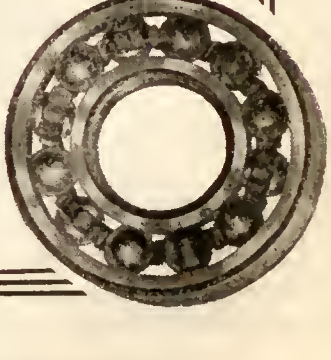

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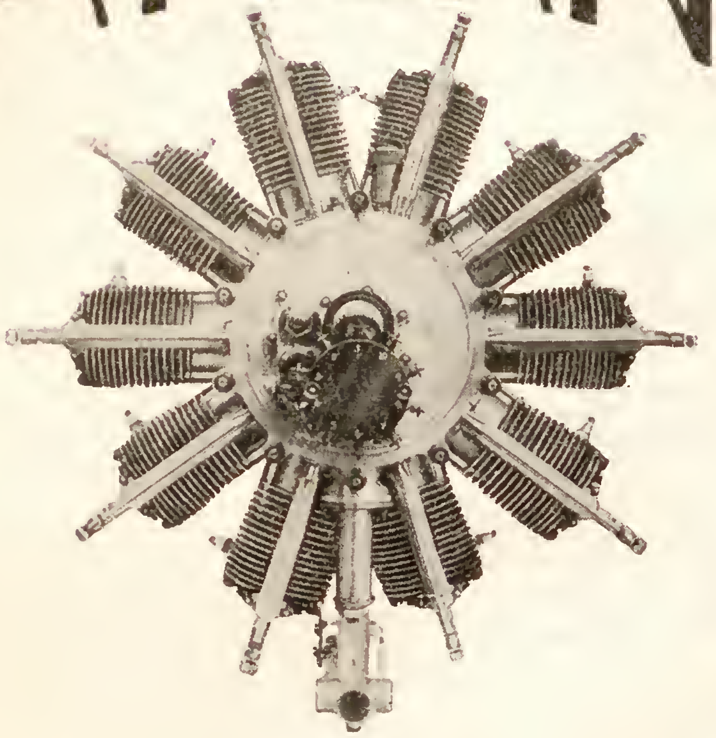

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There are (in the present state of the art) two prominent reasons for the adoption of a propeller for aeronautical machines of finer pitch than that of greatest efficiency; firstly there is the question of suiting the pitch of the propeller to the running speed of the engine. For the power necessary in a modern aeroplane (from 50 to 100 h.p.) a stroke of about 5 ins. is found to design well in proportioning the engine; now it is uneconomical both from the point of view of weight-saving, and of petrol-consumption to employ too low a piston speed; in fact, for any given dimensions of cylinder the power developed is within limits roughly proportional to the piston-speed. Taking a piston-speed of 1,000 ft. per minute and 5-in. stroke, we require 1,200 revolutions per minute = 20 revolutions per second. Assuming a velocity of flight of about 80 ft. per second the effective pitch of the screw requires to be 4 ft., or approximately equal to half the diameter of the screw, instead of at least equal to the diameter, as in a good marine propeller.

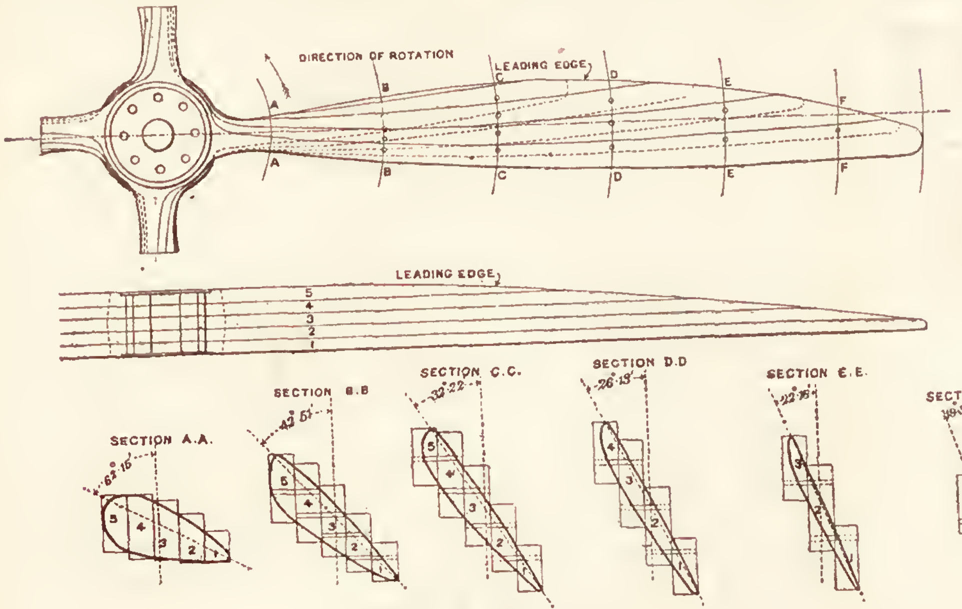


Fig. 25.

It is of course not difficult to gear down from the engine to the propeller, in fact this has been frequently done, but, since gearing involves a tax of approximately 5 per cent. of the horse-power, it is evidently better to drive direct and sacrifice something in the efficiency of the propeller, more especially as this course involves a far lower torque on the propeller shaft, and consequently a lower recoil torque on the framework of the machine.

7. *Motive Power Installation.*—We are now faced with the consideration of the motive-power installation. At the present time, the internal-combustion engine—more definitely the petrol-motor—holds the field. No other prime mover is able to compete either on the score of weight per horse-power or fuel weight economy; there is nothing in sight likely to oust the internal-combustion motor from its supreme position.

The relative importance of lightness and economy of fuel is determined by the class of service for which the motor is required. In Fig. 27 curves are given of weight/horse-power for various motors; ordinates represent weight of motor plus fuel, abscissæ the duration of the run at full load. It can be seen at a glance from this diagram that for brief periods the weight per horse-power of the engine is the all-important factor, whereas for long runs this becomes relatively less important, the weight of petrol and lubricating oil becoming the main item. On referring to Fig. 27 it will be noted, taking the extremes, that the Gnome engine starts with a very considerable advance over the motor-car engine given for comparison, but after a run of seventeen hours of full load, the motor-car engine (represented for the purpose of illustration by the Daimler) by its greater economy has taken the lead. This diagram was prepared by me, some three or four years ago (see Report of the Advisory Committee for 1909–10). Many of the aeronautical motors of the present day combine with a weight/horse-power factor of about 4, a degree of economy that compares well with the best automobile practice.

Out of a great multiplicity of types of aeronautical engine now on the market there are two types—namely, the rotating engine on the one hand and the light-weight multi-cylinder Vee-type on the other—which I consider likely to survive. The rotating type of engine gives the possibility of very complete balance with simplicity of working parts, and so provides the aeronautical constructor with an engine especially serviceable where small machines are concerned, and simplicity and upkeep are of importance. The rotating engine is, at the present day, reasonably economical in petrol, but is grossly extravagant in lubricating oil, and consequently is at a disadvantage for long-distance work; it will, however, probably hold its own for some time to come in machines for short-distance flying. The rotating engine also suffers from some disadvantages on the score of exhaust silencing. The multi-cylinder Vee-type, though ordinarily not so light, power for power, as the rotating engine, has many advantages, especially, for high power and where long distances have to be negotiated.

It is customary in the rotating engine to employ direct air-cooling; it is, in fact, difficult to arrange such an engine with water-cooling. The horse-power absorbed in the Gnome engine *incidental to* air-cooling is very great; in the original so-called 50 h.p. Gnome (which actually gives very little over 40 h.p. in flight), the power consumed in wind-resistance, even on the test stand, amounts to something nearly 6 h.p., and it may be materially greater under flying conditions.

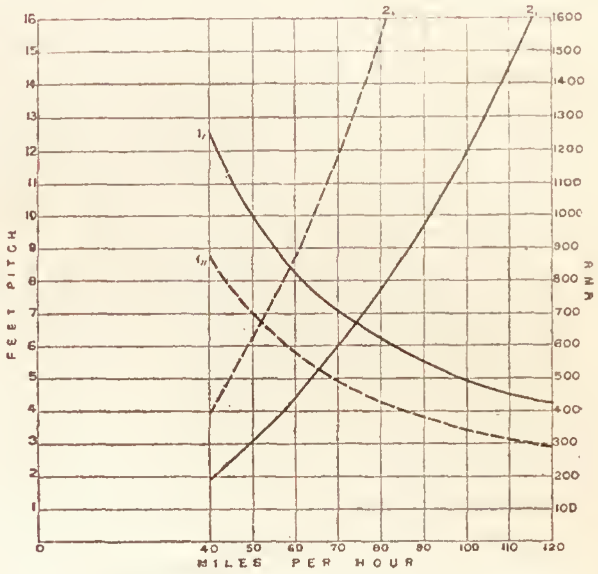


Fig. 26.

In engines of the Vee-type water-cooling is in greater favour; the Renault special aeronautical motor is an exception, being cooled by airblast generated by a centrifugal fan. The weight of the water-cooling system when fitted amounts at the best to 0·6 lb. per horse-power (with water nearly 1 lb. per horse-power), and thus constitutes a serious addition to the weight of the installation. Here again the class of service becomes important. It is evident that for short-distance flying, where engine weight is of paramount importance, it may be better to employ direct air-cooling; when, however, a long-distance service is required, it may arise that the weight of the water-cooling system is justified.

According to a recent investigation by me (see Report of the Advisory Committee, 1912-1913, p. 94), the minimum horse-power expended in cooling is a function of the area and temperature difference of the surface exposed, and there is some difficulty in providing an air-cooled engine cylinder with sufficient gill surface to keep the horse-power loss as low as desirable; when, on the other hand, water is used as a heat carrier, the rigid limitation as to available surface no longer applies, there is some disadvantage, however, as to temperature difference. In Fig. 28 a diagram is given showing the essential relations between horse-power equivalent of heat dissipated per square foot surface (abscissæ), tangential velocity of air (ordinates), temperature difference, and power absorbed in skin friction. It will be understood the graphs represent the minimum horse-power absorbed based on the assumption that the air is traversing the surface along a stream-line path, and that there is no additional loss of power in eddy making.

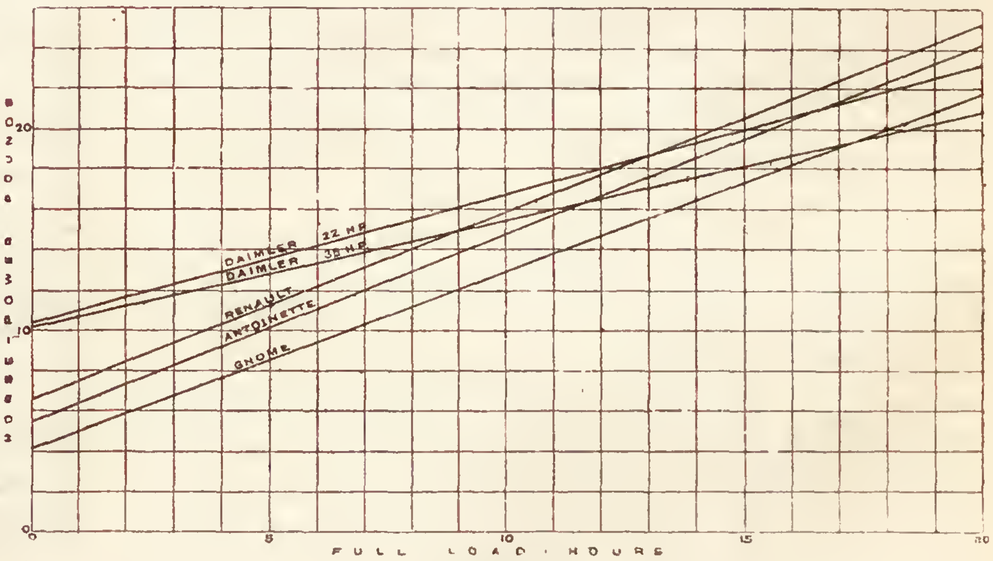


Fig. 27.

(*To be continued.*)

Foreign Aircraft News.

Gilbert Flies Round France in Two Days.

A REMARKABLE record flight for the Michelin Cup was made by Gilbert on Morane-Saulnier monoplane fitted with 80 h.p. Rhone motor and Chauvière propeller on Monday and Tuesday last. Starting from Villacoublay at 3.1 a.m. he flew *via* Peronne, Rheims, St. Dizier, Gray, Joigny, Beaune, Vienne and Nimes, and eventually landed on Monday night at Mirande on the way to Pau, owing to his petrol supply giving out. On Tuesday, he flew *via* Pau, St. André de Cubzac, Romorantin, Angers, Evreux and Calais back to Villacoublay, where he landed at 6.37 p.m., having covered a total distance of very nearly 3,000 kiloms. in 39½ hrs.

World's Records by Renaux.

ON a 100 h.p. M. Farman, Eugene Renaux, accompanied by his mechanic, at Etampes on Tuesday made new world's speed records for pilot and one passenger from 250 to 500 kiloms. The new records are:—250 kiloms., 2 h. 21 m. 56 s.; 300 kiloms., 2 h. 50 m. 28 s.; 350 kiloms., 3 h. 18 m. 44 s.; 400 kiloms., 3 h. 47 m. 17 s.; 450 kiloms., 4 h. 15 m. 29 s,; 500 kiloms., 4 h. 43 m. 16 s. The records from 250 to 400 kiloms. formerly were held by Guillaux, and the others are newly established.

A Belgian Height Record.

ON a Blériot-Gnome machine, Capt. Deschamp with Lieut. Noermann improved the Belgian altitude record for pilot and passenger by climbing to a height of 2,400 metres on the 3rd inst.

Etampes-Orleans with Two Passengers.

ACCOMPANIED by Lieuts. Lugrin and Montalvan, Gouguenheim on the 6th inst. flew on his 80 h.p. Gnome-H. Farman from Etampes to Orleans, and after a landing at Groves the party returned to Etampes.

Double Fatality in France.

AN escadrille of five monoplanes started from the military centre at Longvic-Ouges on the 5th inst. to fly to Mailly Camp, but owing to the wind four of the machines returned to the starting point. The fifth, piloted by Lieut. Gironne, with Private Riou as passenger, continued on its course, but when flying above the Lamarzelle Forest it suddenly dived to the ground, and both pilot and passenger were killed.

Testing a Stabiliser.

ON the 7th inst., Lieut. Remy, with Private Lorgnat as passenger, made a flight from Etampes to Fontainebleau on a machine fitted with the Lorgnat Stabiliser.

Testing Deps. for French Army.

AT Rheims, before a military commission, on the 5th inst., Prevost put five 80 h.p. Gnome-Deperdussins for the French Army through their official tests, two of the machines, fitted with *monosoupape* engines, attaining a speed of 120 k.p.h. and climbing 1,000 metres in 10 mins. Subsequently Prevost tested a two-seater machine fitted with 80 h.p. *monosoupape* Gnome, and carrying a quickfiring gun; 1,000 metres were climbed in 6½ mins., while the speed was given as 130 k.p.h.

Three More Blériot Loopers.

AT Buc, on the 2nd inst., Capt. Oswald Watt, the Australian sportsman, Mr. S. Pierce of the U.S.A., and Lieut. T. Gran of Norway, who took part in the Scott Expedition, succeeded in looping the loop on Blériots.

A Busy Day for Gilbert.

WITH Col. Estienne as passenger, Gilbert on the 3rd inst. flew from Vincennes to Sissonne Camp on his Rhone-Morane-Saulnier monoplane. He later took Lieut. Morel over to Rheims and back, and in the evening returned to Villacoublay.

Touring on a Farman.

M. BARBAROUX, who with his wife toured on his Maurice Farman from Buc to Tillieres on Saturday week, returned to Buc on the 3rd inst. with M. Seiniol as passenger.

Aeroplane Tries Conclusions with Sheep.

A FINE flight was made by Corporal Chapier with a passenger from Rheims to Villacoublay and Moulins on the 2nd inst. The next day the two aviators went on to Macon, but in landing the monoplane ran into a flock of sheep. The machine was damaged somewhat but the aviators escaped with only slight injuries.

Armoured Nieuports for French Army.

SOME tests have recently been made with two types of armoured Nieuport monoplanes built for the French Army. In these tests, which were carried out under the supervision of a military commission, the machines had to rise and afterwards alight in a square space of 450 ft., bounded by a hedge 6 ft. high. The results were as follows:—Single-seater Nieuport Scout (80 h.p. Gnome): Useful load, 355 lbs.; speed, 78 miles per hour; height, 1,640 ft. in 3 mins. 30 secs., starting from the ground after a run of 229 ft., alighting and stopping in 196 ft. Nieuport Destroyer with Quick-firer: Useful load, 850 lbs.; speed, 89 miles per hour; height, 1,640 ft. in 3 mins. 40 secs., starting from ground after a run of 393 ft., and alighting and stopping in 295 ft.

Italian Pilot Drowned.

WHILE testing a new hydro-aeroplane over Lake Maggiore on the 2nd inst., Cevasco, one of the foremost pilots in Italy, was drowned. The accident was apparently caused through the machine capsizing after an explosion of the motor.

Flying in Morocco, &c.

ON the 4th inst., three of the pilots, Lieuts. Battini and Menard and Sergt. Benoit, belonging to the escadrille of Farman biplanes which set out from Tunis on May 6th, completed the 260 kiloms. stage of their flight from Colomb-Bechar to Ain-Sefra, after having been held up at Beni-Ounif by the sirocco for 24 hours. The previous evening the two other pilots, Lieut. Cheutin and Sergt. Hurard, rejoined their comrades, by making a non-stop flight from Tendrara to Ain-Sefra, a distance of 350 kiloms. The total distance flown by the escadrille during the month amounted to 2,560 kiloms.

An American Fatality.

WHEN making a steep dive during an exhibition flight at Akron, O., on May 3rd, the left wing of a biplane piloted by H. P. Harris broke. The pilot jumped from the machine when about 40 ft. from the ground, and sustained injuries to which he succumbed as he was being taken to hospital.

Another Aerial Ferry in America.

ON May 15th a regular series of flying boat trips across San Francisco Bay from San Francisco to Oakland, a distance of nearly seven miles, was inaugurated, the first "fare" being Mayor James Rolph. The service is being maintained by Silas Christofferson and Weldon B. Cooke.

High Flying on a Farman in Australia.

A CABLE from Sydney, N.S.W., states that on the 5th inst., Guillaux, on his Farman waterplane, was flying at a height of 3,150 metres.

4½-Hour Trip by the "Conte."

ON the evening of the 3rd inst. the Astra military dirigible "Conte" made a cruise from Belfort, in the direction of Dijon, which lasted 4½ hours.

Night Cruises by Italian Dirigible.

LEAVING her hangar at Boscomantico at 11 p.m. on the 3rd inst., the Italian military dirigible, "P5," carried out a series of manœuvres above Verona, the operations being effected by the aid of powerful searchlights. On the previous Saturday the airship cruised above Verona at a height of 2,000 ft.

Mobilization by Airship.

A MOBILIZATION of the 20th corps of the French Army was effected at Nancy during the night of the 3rd inst., the requisite orders being taken from garrison to garrison by means of the dirigible, "Adjudant Vincenot."

⊛ ⊛ ⊛ ⊛

Savoia Co. Extensions.

IN a reference in our last issue to the Savoia Co., it was stated that it was a branch of the G.A.C. This is not strictly correct, as the Savoia Co. is a company formed to acquire from the General Aviation Contractors, Ltd., the Farman rights, and to manufacture the machines in Italy. The G.A.C. have the major interest in the firm, and Mr. D. Lawrence Santoni is managing director. The progress of the business is indicated by the fact that it has been found necessary to move into a larger factory about 10 miles from Milan. The new works include one shop, which is large enough to erect a dozen machines comfortably at a time.

More Wins for Emaillite.

EIGHT of the eleven competing machines, including the first three machines home, in the Aerial Derby on Saturday last, the 6th inst., were doped with British Emaillite. With regard to the winning Morane-Saulnier, flown by Mr. Brock, the Dope combination used was Grades 2, 3 and 4, resulting in a highly glossy and smooth surface. The winning machines of the last three Gordon-Bennett Cups were all doped in this way. After Prevost's remarkable performance in 1913, tests which were carried out at St. Cyr to ascertain the comparative air friction of fabric doped with Emaillite 2, 3 and 4 and a highly polished steel plate gave identical results.

THE GERMAN "TRIANGLE" RACE.

A THREE days' flying race of somewhat novel form, and one which might advantageously be imitated in this country, took place in Germany during Whitsuntide. The race in question was, as the name implies, flown over a triangular course round the three cities, Berlin, Leipzig, and Dresden. The stage for the first day was: Start from Johannisthal, near Berlin, fly to Dresden *via* Leipzig, where a stop had to be made. No less than 30 machines were waiting on the starting line at the Johannisthal aerodrome on the afternoon of May 30th. The first to get away was Oelerich, who left at 4.9, followed 20 secs. later by Friedrich. In just over half an hour all the competitors, with the exception of Janisch, Hennig and Hanuschke were out of sight. The three last mentioned pilots were somewhat delayed in getting off, but ultimately started an hour later. The names of the starters were: Oelerich, Schüler and Hoefig (D.F.W. biplanes), Friedrich and Linnekogel (Rumpler monoplanes), Stiefvater (Prince Friedrich-Sigismund monoplane), Kahnt and Rosenstein (Gotha monoplanes), Stagge (Pfeil biplane), Boehm, Freindt, Ballod, and Stiploschek (Jeannin Steel Taube), Kühne (Hirth monoplane), Langer (Hirth biplane), Schlüter (Hansa Taube), Schulz (A.F.G. Taube), Boehm and von Loeszl (Albatros biplane), Schumann, Kieszling, and Schweizer (Ago biplanes), Reiterer, Braumüller, and Steffen (Etrich Taube), Rupp (L.V.G. biplane), Janisch (L.V.G. monoplane), Höhndorf (Union-Pfeil biplane), Gasser (Mars biplane), Scherff (Krieger monoplane), Boutard (Beese Taube), Schmidt and Koenig (Court-Torpedo monoplane), Beck (Kondor monoplane), Hennig (Stahlherz biplane), Hanuschke (Hanuschke monoplane).

The first to arrive in Leipzig was Janisch, who covered the 96 miles in 1 hour. After a short rest he started off for Dresden. Thirty of the other competitors arrived with short intervals at Leipzig, most of them continuing their journey after short stops. A few were reported to have had to make forced landings *en route*. Amongst these were Friedrich, Schmidt and Koenig. The second stage, from Leipzig to Dresden, was completed by 15 competitors only, the others having either had to make forced landings, or were prevented by darkness from completing the course. These arrived in Dresden the next morning. First to arrive at Dresden was Schüler, who had covered the distance from Berlin *via* Leipzig in 1 hr. 39 mins. Ballod was second with a flying time of 1 hr. 59 mins., whilst Kühne completed the course in 2 hours.

The second stage of the "triangle" race took place on Whit-Monday. The competitors had to fly from Dresden to Leipzig *via* Berlin, where an intermediate landing had to be made. Thirty-six competitors started in a very strong wind at minute intervals. Several of these had smashes, but no serious accident occurred. Out of the 36 competitors who started from Dresden only 26 arrived at the Johannisthal aerodrome, Berlin, on Whit-Monday. The three first to arrive at Johannisthal were Langer, Koenig and Reiterer. After a short rest the majority of the pilots set out again for Leipzig. On this stage Langer also made the best time, and was the first to arrive in Leipzig, thereby winning the prize of the day for the first arrival. Second was Koenig, followed five minutes later by Reiterer. In all 24 competitors arrived at Leipzig before evening, whilst Steffen did not arrive till the following morning. Kühne had to make a forced landing near Logau, and could not get any further.

On the third day (June 3rd) the stage included start from Leipzig and flying to Berlin *via* Dresden. All the competitors, with the exception of two, succeeding in completing the course on that day. The fastest time between Leipzig and Dresden was made by Schüler on a D.F.W. biplane, who covered the distance of 65 miles in 34 mins. After a short stop at Dresden a start was made for Berlin, where again Schüler was the first to arrive, covering the distance of 105 miles in 1 hr. 15 mins. The best aggregate times on the third day were (1) Schüller, 1 hr. 49 mins.; (2) Schmidt, 2 hrs. 1 min.; (3) Janisch, 2 hrs. 5 mins. The landing of the last named was awaited with anxiety, as at the start from Dresden the right wheel came off his chassis without the pilot noticing it. No great damage was done, however, for the machine simply stood on its head while Janisch himself was quite uninjured. Linnekogel also had a smash, his machine turning over on its back, getting badly damaged, the pilot escaping without a scratch.

After a day's rest at Berlin twenty-seven of the competitors again were off on June 5th on the last stage, which included a complete circuit of the triangular course, starting from and returning to Johannisthal *via* Leipzig and Dresden. All those sent off arrived at the first control—Leipzig—in a very strong wind. The first to alight was Schüler, who covered the distance between Johannisthal and Leipzig in 1 hr. 6 mins. The other competitors got in practically together and were soon on their way to the next control—Dresden.

The number of competitors had been reduced by the time they reached Dresden to twenty-four, of whom twenty-two departed for the run back to Johannisthal. The best aggregate time for the complete course was made by Schüler, whose flying time was 3 hrs. 11 mins.; second was Janisch with a flying time of 3 hrs. 28 mins., and third was Boehm whose time was 3 hrs. 34 mins. In all nineteen competitors completed the course up to 8.30 p.m.

THE SEAPLANE DISASTER.

IT is with the greatest regret that we have to record the disaster to the Navy seaplane No. 128 near Calshot, on Thursday of last week, by which Lieut. T. S. Creswell and Commander A. Rice lost their lives.

In connection with the accident, an inquest on the body of Lieut. Creswell was held on Saturday at R.N. Hospital, Haslar, by Mr. L. Warner, coroner for S. Hants.

Staff-Surgeon E. D. Rutherford said the body when brought into the hospital was fully clothed, but the clothing was very much torn. There was extensive scalding of the shoulders, back, and both sides. There was a punctured wound on the left thigh, which might have been caused by a sharp piece of metal or wood. The cause of death was drowning, the scalding not being sufficient to cause death.

Lieut.-Commander Longmore, in command of Calshot air station, said that he had flown in the machine on the day of the accident, while Lieut. Creswell had made five short passenger flights previous to starting on the ill-fated one. The conditions for flying were good. Two hours after the accident, with the aid of derricks of the Trinity House steamer, the wreckage was hoisted sufficiently to allow of the removal of deceased's body. He was dead. Nothing was seen of the body of Commander Rice. The wreckage was towed ashore at Calshot. Practically the whole of the machine was there, but was much damaged.

Mr C. Gordon Bell, who was in a motor boat with Lieut. Spenser Grey, R.N., said he saw the seaplane rise, and as it passed over them at a height of 200 ft. or 250 ft., Lieut. Creswall waved his hand to them. The seaplane then went some half to three-quarters of a mile further on, and turned to come back. Witness took his attention off the machine to watch another seaplane, but turned back again to No. 128, and saw it at a height of 100 ft. She was then diving absolutely vertical, nose down. The left wing was beginning to break, starting from the outside bay, and in two seconds the whole frame had broken to pieces, that was a long time before reaching the water—about 60 ft. or so. At the height of 30 ft. witness noticed some black object fall out, and he felt sure it must have been the body of Commander Rice.

Mr. H. W. S. Chilcott said that he saw the machine rise slightly, as if to climb higher, for an instant, and then immediately commence a steady *vol plané*, which rapidly increased in steepness until it became a nose dive. The machine was then dropping towards the water vertically. At this moment, about 150 ft. from the water, approximately, the machine looked to be quite whole, but immediately after the left plane commenced to buckle up and quickly collapsed, but did not become detached from the remainder of the machine.

The inquest was then adjourned to Wednesday last, when Lieut.-Commander Longmore said that, owing to the extremely broken-up state of the wreckage, it was difficult to state when the damage to the seaplane was done. No signs whatever could be found on any part of the machine of either an explosion or a fire. The passenger and pilot seats were practically uninjured. The control wires, which would be in operation for an attempt to counteract the dive, were found to be intact. Of the two compressed-air bottles fitted to the machine for starting the engine one was intact with gauge glass unbroken, and the other was lost. The latter's stowed position was immediately under the pilot's seat, and as this was uninjured it showed that it could not have exploded. The breaking of the left wing was, he thought, due to excessive speed. Why the machine got into a vertical position could not absolutely be ascertained. It was thought that the pilot was counteracting the effect of a light gust, which threw the nose of the machine up slightly, by a downward movement of his elevator, and that before he regained his normal level of flight the speed of the machine had increased to such an extent on its downward glide that the angle quickly increased until the machine was vertically nose down.

They did not come across any fault in construction which would point to the initial cause of the accident.

The jury returned a verdict of accidental death from drowning, and they and the coroner expressed sympathy with the deceased's relatives and comrades.

Up to Wednesday evening the body of Commander Rice had not been recovered.

Models

Edited by V. E. JOHNSON, M.A.

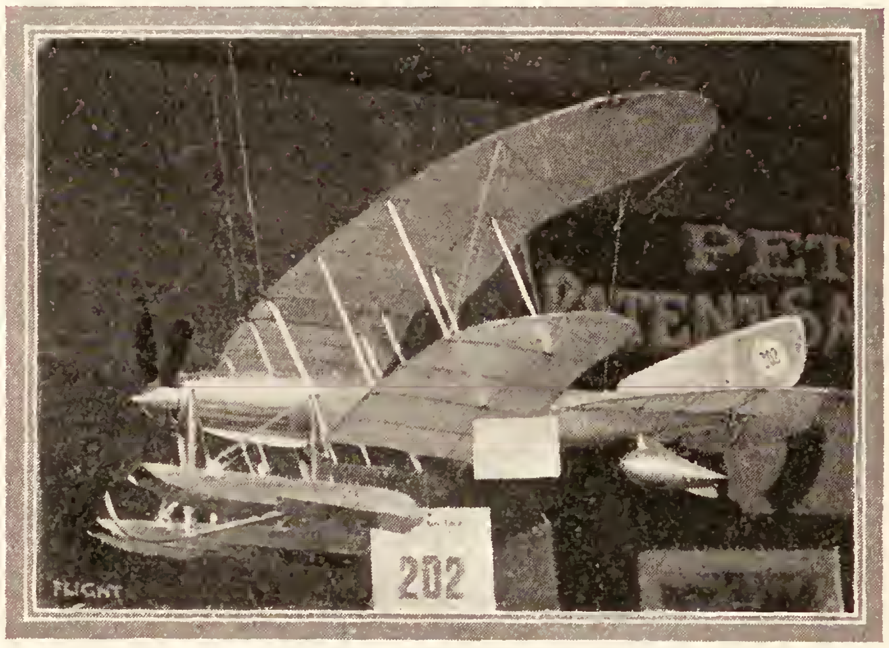
Aero-models at the Bristol International Exhibition.

We have received from Mr. R. V. Tivy, the Hon. Sec. of the Model Section of the Bristol and West of England Aero Club, some programmes and particulars of their Summer Model Aeroplane Exhibition and Competition to be held at the Bristol International Exhibition, Ashton Avenue, Bristol, subject to arrangements to continue the Bristol Exhibition being concluded. The flying events will be contested on July 18th, the models being on view from the 13th to 18th. Prizes to the value of £17 are to be competed for. There are to be four model flying competitions: (*a*) contest for single-screw machines, prizes £3, £2, and £1; (*b*) for multiple-screw models, prizes £3, £2 and £1—the marks in the above being awarded as follows:—Design, 25 per cent.; construction, 15 per cent.; longitudinal stability, 15 per cent.; lateral stability, 10 per cent.; directional control, 15 per cent.; rising, 10 per cent.; landing, 10 per cent. The two last named awarded of course to r.o.g. models only. (*c*) Target contest, prizes £1 and 10*s*., awarded to the models landing nearest the bull's eye. (*d*) Looping the loop contest, prizes £2, £1 and 10*s*., awarded to the models which complete the greatest number of loops in any one flight. Referring to the details given *re* A and B, Mr. Tivy says: "The percentage of marks awarded for the qualities of design, stability, &c., varies with the relative importance of the qualities. For instance, excellence of design is better than excellence of workmanship, lateral stability is easier to obtain than longitudinal stability and directional control. In respect of each quality the judges will place the machine in one of six grades: A, B, C, D, E, F. The percentages are all divisible. The marking corresponding to the grades will begin in the case of design 0, 5, 10, 15, 20, 25, and in the case of lateral stability 0, 2, 4, 6, 8, 10. This system will reduce the labour of judging to a minimum, and I am confident that the net result of the sub-division of marks will be even more satisfactory than that adopted at our competition in June, 1912. I shall be pleased to forward copies to anyone interested in the competition, and I hope that some of the clubs which have not previously competed will now co-operate with us by sending one or more representatives to Bristol." We note from the programme that the models are to be flown in an enclosure 500 ft. long, and the length of flight should not exceed 150 yds. No marks will be awarded in respect of landings *outside* the enclosure. Competitors need not fly their own models. Representatives of two or more absent competitors will be given local assistance.

Taking the programme in its entirety, and omitting one or two minor points which one might be inclined to criticise, we must certainly congratulate the Bristol Model Aero Club both on the amount of prize money offered and on the regulations under which the meeting will be held, which put the absolutely useless factor of duration at a minimum, and lay maximum stress on some of the factors which are really useful.

Just one word with respect to D, looping the loop contest.

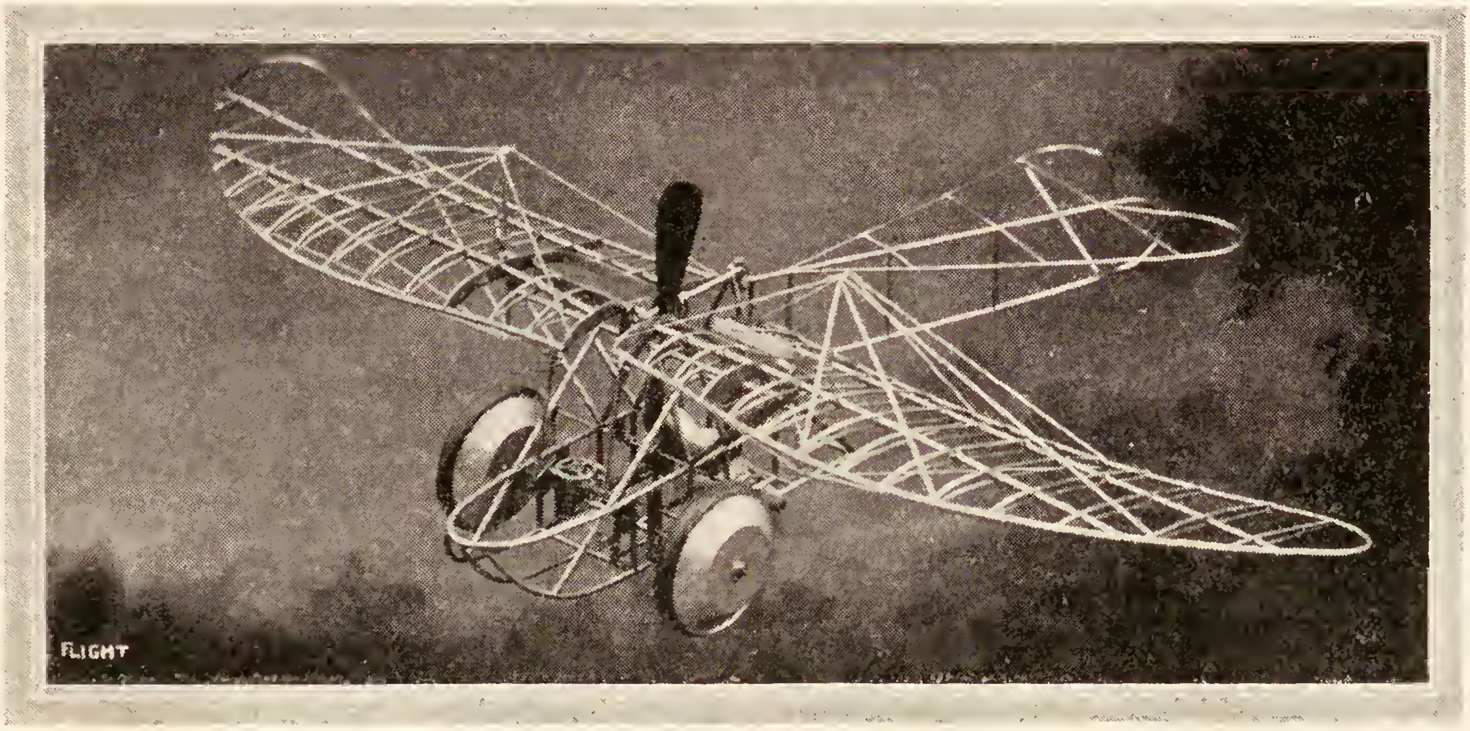
We think a mistake has been made in stating the prize will be awarded to the model making the most loops in any one flight. When such a contest was proposed by the writer (for the K. and M.A.A.) his idea was the value which such a contest might have with respect to the question of stability. The best model would be (in his opinion) a model (fitted with some automatic mechanical contrivance) which should rise from the ground, of its own accord, in a normal manner, and when up in the air make one complete loop, flatten out or fly normally, and then at the end of its flight glide normally to earth. The mere making of as many loops as possible appears to the writer to be a mere spectacular display and devoid of any scientific interest. We certainly think that other provincial model clubs would do well to follow the example of Bristol, and push themselves forward into any local exhibitions that may be held whenever possible. It is absolutely useless hiding your "flights" in some out-of-the-way field because it is large and offers the best facilities for sticking on 10 secs. more to your duration. People will never take any interest in something which they never see.



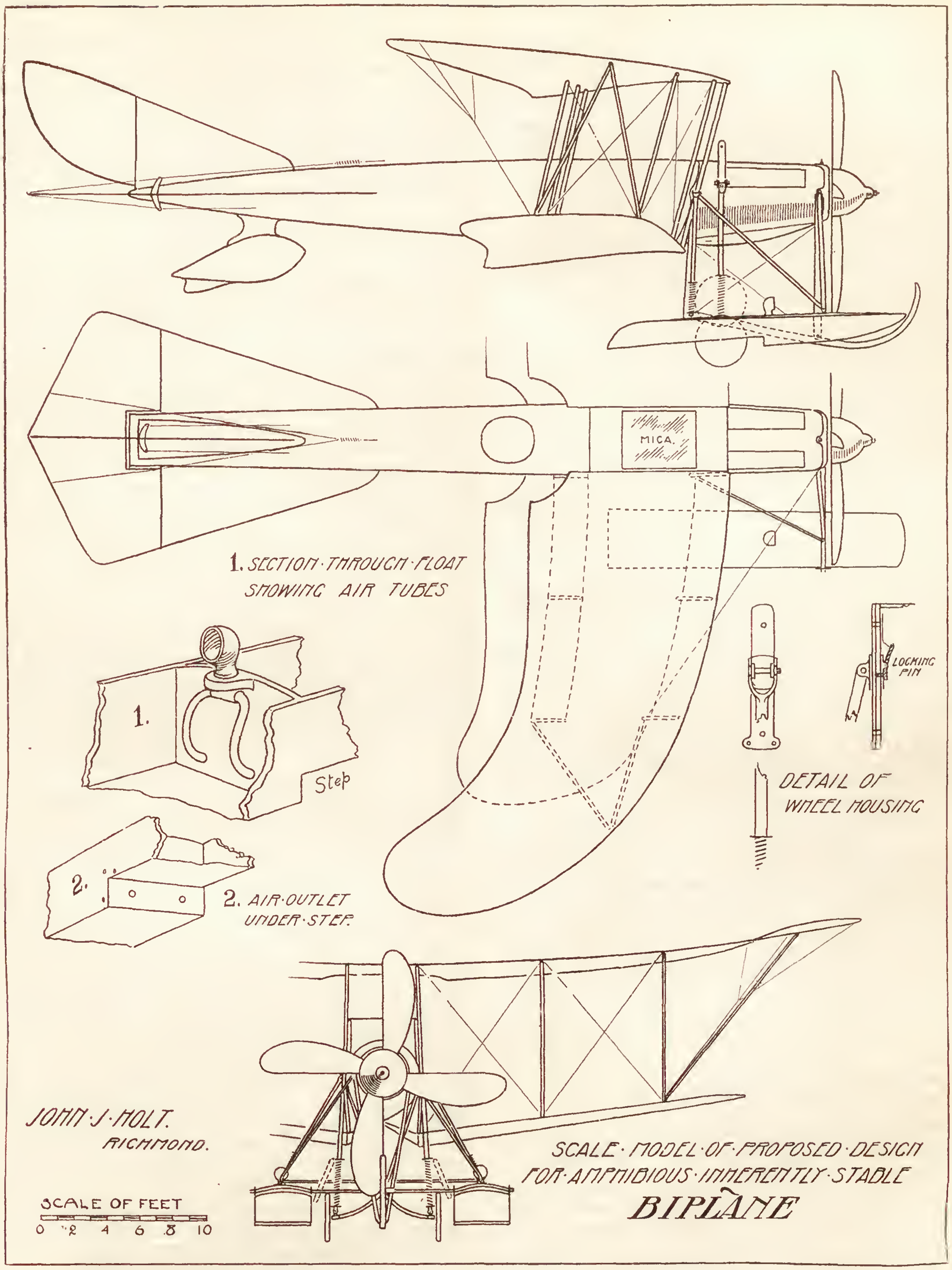
Mr. Holt's model water biplane.

Mr. J. J. Holt's Olympia Model.

We give this week some extremely interesting scale drawings kindly supplied us (as shown) by Mr. Holt of his Olympia model.



Mr. W. H. Nosworthy's prize-winning Olympia model, described in FLIGHT on May 2nd.


MICA.
1. SECTION·THROUGH·FLOAT SHOWING AIR TUBES
1.
Step
2.
2. AIR·OUTLET UNDER·STEP.
LOCKING PIN
DETAIL OF WHEEL HOUSING
JOHN·J·HOLT. RICHMOND.
SCALE OF FEET
0 2 4 6 8 10
SCALE·MODEL·OF·PROPOSED·DESIGN FOR·AMPHIBIOUS·INHERENTLY·STABLE
BIPLANE

It is a type of model which we should like to have seen far more in evidence at the Show. To such a type of machine the term "model" can really be applied with some proper sense of proportion.

"The machine," says Mr. Holt, "was designed to incorporate fore and aft as well as lateral stability. It is an amphibious machine, the wheels when not required being raised on a slide, operated from the pilot's seat by a wheel. A locking pin fixes the head of the compression tubes either up or down. This, owing to illness, was not, unfortunately, completed at the time of the Show. The floats are single stepped, the steps being air fed by suitable ventilators as shown. The front supports are hinged to allow the telescopic tubes and compression springs of the rear sprung arrangement to act.

"The body of the machine is streamlined, and has a circular section in front, and would most suitably accommodate a radial engine. The scale is $\frac{3}{8}$ of an inch to the foot, and the model is rubber-driven, two skeins being used. The propeller is geared 2 to 1."

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration ..	D. Driver...	... 85 secs.
Twin screw, do.	Distance ...	R. Lucas ...	... 590 yards.
	Duration ...	G. Hayden	... 137 secs.
Single screw, rise off ground	Distance ...	W. E. Evans	... 290 yards.
	Duration ...	W. E. Evans	... 64 secs.
Twin screw, do.	Distance ...	L. H. Slatter	... 365 yards.
	Duration ...	J. E. Loucb	... 2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance ...	C. C. Dutton	... 266 yards
	Duration ...	J. E. Louch	... 91 secs.
Do., off-ground	Distance ...	C. C. Dutton	... 190 yards.
	Duration ...	J. E. Louch	... 94 secs.
Single screw bydro., off-water	Duration ...	L. H. Slatter	... 35 secs.
Single-tractor, do., do. ...	Duration ...	C. C. Dutton	... 29 secs.
Twin screw, do., do. ...	Duration ...	L. H. Slatter	... 60 secs.
Engine driven off grass ...	Duration ...	D. Stanger	... 51 secs.

Affiliation.—It is with pleasure that the Council announce the affiliation of La Ligue Française du Cerf-Volant. This league has twenty-seven kite associations affiliated to it, and it has become affiliated for the purpose of the proposed International Kite and Model Meeting.

French Competitions.—Messrs. L. Ingram and A. W. Howkins officially represented the Association at the kite meeting on May 30th, 31st, and June 1st at Boulogne. Although they did not compete they were thanked for the assistance they gave to several of the competitors (with the approval of the judges).

Kite Flying Competition.—Wimbledon Common, on Saturday, June 20th, at 3.30. Entries close June 17th. Open kite competition for prizes by Messrs. Brooke and Westborp. Prizes: 1st, BrooKite, value 30*s.*; 2nd, BrooKite, value 25*s.*: third, BrooKite, value 15*s.* (the same as Mr. G. Marconi has been using for wireless telegraphy). Additional rules governing this competition: 1. Competitors may use any kind of kite, with minimum measurement of 20 ft. computed by Rule 2. 2. Competitors must be at the judges' flag at 3 p.m. sharp, any not then present will be disqualified. 3. Total length of line or wire to be 300 yards, but not exceed 310 yards. 4. Each competitor is allowed one assistant, who must wear the competitor's number. Any other person assisting will render the competitor liable to disqualification. 5. Marks will be awarded as follows: Angle, one mark for each degree attained, plus 3 extra for each degree above 50. Stability, 125; strength of construction, 75; portability, 50.

Model Competition.—Wanstead Flats, Leytonstone. Station, Forest Gate, G.E.Ry. Saturday, June 27th, at 3 o'clock. Entries close June 20th. Longest flight competition for models, rising off ground under their own power (open to the world). Prizes presented by Mr. A. W. Gamage: 1st, challenge cup and gold medal; 2nd, silver medal; 3rd, bronze medal. Additional rules governing this competition: 1. Competitors must be at the judges' flag at 3 p.m. sharp. Those not present at that time will be disqualified. 2. This competiton will be decided on the longest flight and not on the average.

Official Trials.—All entries for the official trials, to be held on Wimbledon Common on the 20th, must be sent in by Saturday, the 13th, to Mr. H. A. Lyche. Special forms can be had for trials from the gen. hon. secretary.

Programme.—The official programme is now published, and any members or readers who have not received a copy should send to the gen. hon. sec. at once for same, enclosing stamp for postage.

Badges.—The official badge for year 1914-15 is now ready, and all members will have one forwarded on receipt of their subscription. The wearing of the badge shows the judges that their subscription for current year has been paid. Those members who have only sent 5*s.* should forward the extra 1*s.* (as the subscription for year was raised at the general meeting), and their badge will then be forwarded.

27, Victory Road, Wimbledon. W. H. AKEHURST, Gen. Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, Leyspring Road).

June 14th, flying Wanstead Flats, 6.30 and 10.30 a.m. June 27th, afternoon, Gamage Cup competition. Route to Wanstead Flats will be published next week.

UNAFFILIATED CLUBS.

Finsbury Park and District (66, Elfort Road, Highbury, N.).

June 13th, flying at Finsbury Park, 3 p m.; r.o.g. distance contest for tractor machines at 5 p.m.

S. Eastern Model Ae.C. (1, Railway Approach, Brockley).

Flying meetings at week-end on Woolwich Common and Blackheath, at the usual times.

* * * *

CORRESPONDENCE.

Brakes for Aeroplanes.

[1868] With reference to the recent letters on "Brakes for Aeroplanes" that have appeared in your paper, I should be pleased if you would publish the following.

I entirely agree with Messrs. Brook and Mair, that brakes would be of great value to aeroplanes, but I do not find it so easy to agree with their arrangement of applying brakes to the wheels of the landing chassis.

With this arrangement, it seems that one or two alternative disasters is likely to occur, dependent on the position of the wheels, relative to the centre of gravity of the machine.

(i) If the wheels of the landing chassis are not very far ahead of the c.g. of the machine, which is travelling at a considerable speed on alighting, it is highly probable that the aeroplane will make a sudden nose dive, on applying brakes to the wheels of the chassis, and disaster will follow.

(ii) If the wheels are very far forward, and so at a considerable distance from the c.g., the application of brakes to the wheels will have very much the same effect as in the case of the front wheel of a bicycle, and there is great possibility of severe shocks being sustained by the machine and its occupants.

Would it not be better if air brakes could be applied more nearly in a horizontal plane with the c.g., by suddenly turning surfaces into the vertical position, perpendicular to the direction of motion, and so exposing them to the full decelerating effect of the incident wind? In this way I think a very effective brake could be produced.

Would it not be advantageous also to arrange a drag which could be operated by a control?

During flight, it could be attached beneath the tail boom, and immediately on alighting could be released by the pilot, and a brake analogous to the rear brake of a bicycle thereby obtained.

HERMAN SHAW.

Royal College of Science, South Kensington.

Oscillating Wings.

[1869] Respecting my article on oscillating wings, one of your correspondents suggests that this phenomenon of increased reaction may explain the superiority of tractor screws. I am not clear whether experience shows a clear advantage with tractor screws over and above that due to the direct incidence of the slip stream, but would point out that it is by no means certain that the slip stream is subject to a periodic variation corresponding to the position of the propeller such as he suggests. If the projected area of the propeller is a sufficiently large fraction of the "disc area," the reaction is almost continuous, being carried on from blade to blade with little or no intermission, the gaps between the blades serving to allow adequate feed. It is true that some of the theories of propeller action have considered a spiral stream commencing from each blade, but I am of opinion that the stream becomes almost uniform throughout the whole circle at a distance behind the propeller which is quite a small part of the diameter. It is, however, a matter for experiment.

HERBERT CHATLEY.

Chinese Government Engineering College,
Tangshan, North China.
May 20th, 1914.

* * * *

IMPORTS AND EXPORTS, 1913–1914.

Aeroplanes, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see Flight, January 25th, 1912, and for 1912 and 1913, see Flight for January 17th, 1914:—

	Imports.		Exports.		Re-Exportation.	
	1913.	1914.	1913.	1914.	1913.	1914.
	£	£	£	£	£	£
January	12,097	5,945	4,005	210	1,510	879
February	17,361	28,132	3,447	106	690	441
March ...	20,425	27,731	1,924	1,934	1,042	1,440
April ...	15,593	11,384	5,524	1,175	1,413	1,473
May ...	31,241	17,062	3,726	4,059	830	9,484
	116,717	90,254	18,626	7,484	5,485	13,717

* * * *

Aeronautical Patents Published.

Applied for in 1913.

Published June 4th, 1914.

14,731. F. Filiasi. Longitudinal stability and landing device.
15,031. D. E. Shaw and J. J. Brownridge. Control of aeroplanes.
16,367. L. Clément. Aeroplane wings.
16,732. S. B. W. H. Voss. Flying machines.
19,681. M. E. Young. Aerial machines.
20,479. A. Sprater. Stabilizers.

Applied for in 1914.

Published June 4th, 1914.

6,764. A. Clement-Bayard. Frameworks for dirigible balloons.
7,987. F. R. Pio. Aeroplanes combined with parachutes.
8,594. A. Clement-Bayard. Car-suspensions for dirigible balloons.
8,758. W. H. Nosworthy and S. J. Prescott. Flying machines.

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CONTENTS.

Editorial Comment: PAGE
- Airships for Somaliland ... 641
- A New and Wonderful Record ... 641
- The Ownership of the air ... 642

The Burgess-Dunne Hydro-Biplane (with scale drawings) ... 644
Royal Aero Club Official Notices ... 648
From the British Flying Grounds ... 650
How to Read a Graph ... 652
Gyroscopic Action of Rotary Engines ... 654
The Action of the Control Organs of an Aeroplane in Critical Attitudes ... 656
Gilbert's Flight Round France ... 658
Eddies. By "Æolus" ... 659
Correspondence... ... 660
Foreign Aircraft News ... 661
The Flying Machine from an Engineering Standpoint. By F. W. Lanchester ... 662
Models. Edited by V. E. Johnson, M.A. ... 664

EDITORIAL COMMENT.

Airships for Somaliland.

It is no longer a secret that the military and naval authorities have practically decided to employ aircraft in connection with the expedition which it was known in inside circles would be directed against the Somaliland Mullah in the autumn of the present year. Two officers of the Naval Wing, Lieut.-Commander Boothby and Lieut. R. H. Davies, have been at Berbera studying the country and conditions with a view to reporting upon the possibilities of using aircraft, and particularly airships in the interior.

Contrary to a good deal that has been written regarding the possibilities, it will be somewhat surprising if the report of the two officers named does not turn out to be in favour of the enterprise. A great point has been made of the exceedingly high temperatures which rule during the day—as high as 120 F. in the shade has been mentioned—which, in combination with a heavy fall at night would, for reasons thoroughly well understood by our readers, render the use of craft of the "gas-bag" type exceedingly difficult, if not altogether out of the question. True, the summer temperatures sometimes range high, but in the winter it seldom goes above 90 F. in the shade, which is well inside those at which the Italians found it perfectly practicable to use airships in Tripoli. The main difficulties to be encountered are those connected with the transport of supplies of hydrogen into the interior where the Mullah has his base. These are matters on which it is impossible for us to express an opinion—they are questions for the authorities to decide on the merits of the report that will be rendered to them by the two officers charged with their investigation.

Whatever may eventually happen and whether it is after all decided to send aircraft to co-operate with the projected expedition, the fact that Commander Boothby and Lieut. Davies have been sent out at all is sufficiently interesting, for the reason that it marks the first occasion on which it has been seriously proposed to use airships and aeroplanes to co-operate with a British field force.

From many points of view it is to be hoped that the report will be in favour of their use. At present, it cannot be said that aircraft have proved conspicuously successful in actual war. For one thing, their use is something altogether too new for there to have been time to get a true line through their capabilities. For another, no nation is anxious to give away the fruits of its experience for the benefit of possible enemies, so that the only reliable methods of obtaining information are those of a first hand nature. For that reason, if for no other, the experience which would be gained by our flying officers in Somaliland would undoubtedly prove of the utmost value to the Services.

◆ ◆ ◆

A New and Wonderful Record.

Almost day by day new records in aviation are created, and so accustomed does one become to hearing of them that they almost pass unnoticed — even unrecorded. That recently set up by Gilbert, in flying round France in two days, during which he covered the trifling distance of a couple of thousand miles falls within a different category to those of which we have spoken and which create nothing more than a passing interest. It is a performance of such outstanding merit as almost to form a landmark in the history of aviation, not only because of the distance actually covered during the flight, but because it affords such a remarkable demonstration of the utility of the aeroplane for purposes of travel. Our readers will grasp our meaning if they refer to the map which is printed on another page of this issue, showing Gilbert's itinerary for the two days' flight.

The actual distance flown has previously been approximated, though not equalled, but the singular merit of Gilbert's flight lies in the fact that it was not confined to circling round a closed circuit, but was a true cross-country journey, such as will have to be taken in the stride, as it were, of the commercial machine of the future. It was a truly utilitarian journey—one of the kind that is calculated to do incalculable good for the cause of flight, because of the wonderful reliability displayed by his machine, in combination with other qualities of speed and regularity. It was one of the best—the best, in fact, of answers to the oft-repeated argument that the aeroplane can never be anything more than a vehicle of sport and war. It well foreshadows the time when it will be a commonplace incident of our daily life to take our journeys by air, as being the most direct as well as the swiftest of all ways of getting from place to place.

We do not forget the proverb which tells us that one swallow does not make a summer, and admittedly this flight of Gilbert's does not necessarily mean that we can get ready at once to scrap the more ancient means of locomotion. But it certainly does seem to bring nearer the time when travel by air will be as usual as on the more stable mediums, for what the expert can do to-day will undoubtedly be done by the less skilled to-morrow.

The Ownership of the Air.

Although it has nothing to do with the position here, the recent judgment of the Civil Tribunal of the Seine regarding the ownership of the air is interesting as being one of the first definite pronouncements regarding this very indefinite question of the ownership of the air. According to this judgment, although the owner of the land possesses rights in the air, these only extend to the height of trees and buildings. Above these, it was held, the air is free to all. By way of seeming paradox, however, the Court held that certain airmen had, as a matter of fact, flown too low over land, which was the subject of an action for aerial trespass, and condemned them to pay damages to the landowner.

It is a doctrine of English law that the rights of the landowner extend *usque ad cœlum*, and so far there are no decisions limiting this right, but then it must be remembered that the evolution of the doctrine developed during a time when the air was not used for locomotive purposes. The strong probability is that if the right of circulation were seriously challenged, the English courts would decide practically along the lines of the French decision under notice. The main point of it all seems to be that aerial law is still in the making and that it is practically impossible to settle a workable code out of hand. Like all other laws and codes of laws, it will have to undergo a process of more or less gradual evolution.

* * * *

Their Majesties' Sympathy with Dr. Hamel.

IN his great bereavement it must have been some consolation to Dr. Gustav Hamel, M.D., M.V.O., the father of the late Mr. Gustav Hamel, to receive the following message of sympathy from their Majesties, the King and Queen :—

"Buckingham Palace, May 27th, 1914.

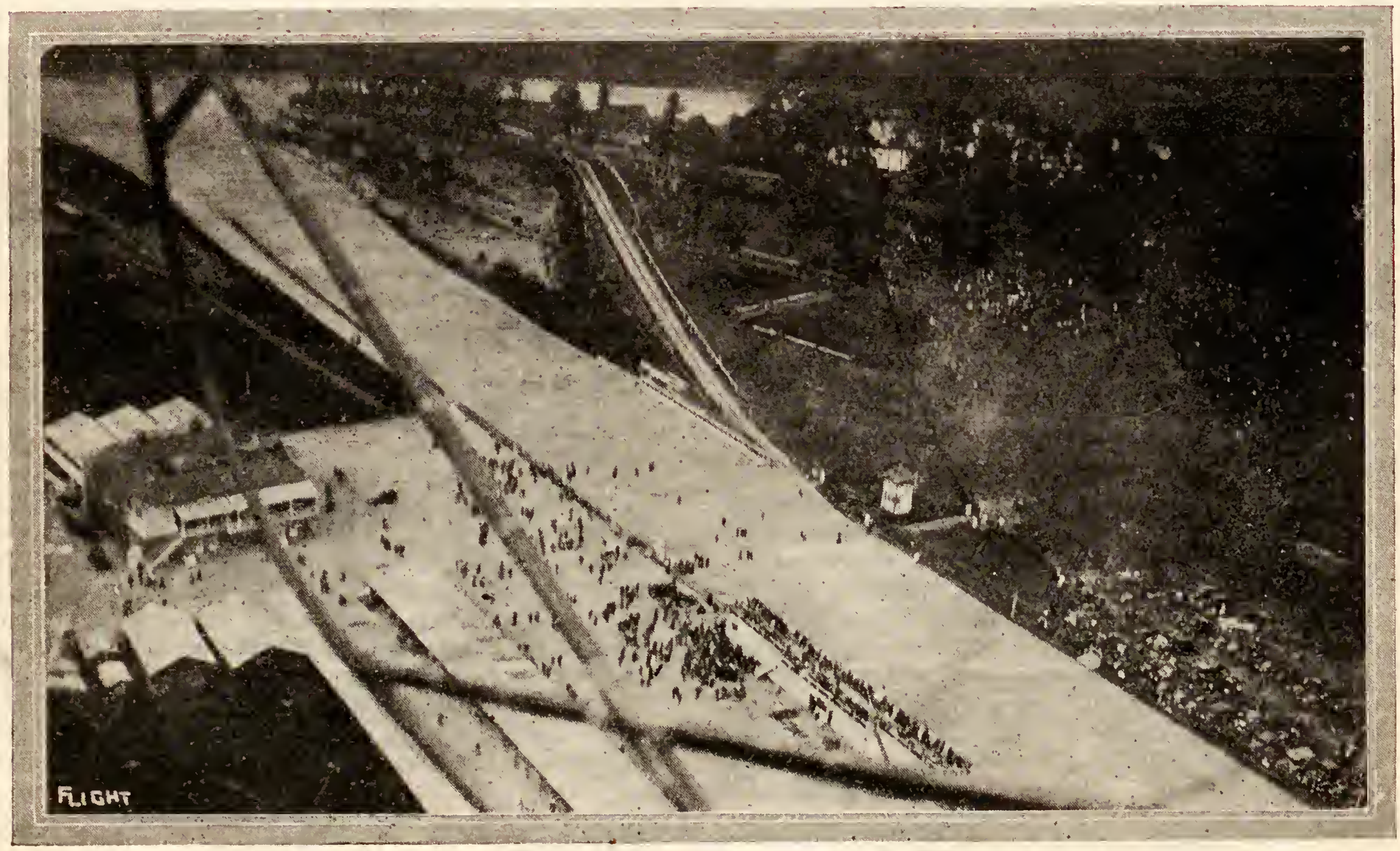
"Dear Sir,—The King and Queen, fearing that the worst must now be realised as to the fate of your son, desire me to assure you how deeply they feel for you in your sudden and grievous sorrow.

"Their Majesties knew your son personally. They had seen him fly on two occasions at Windsor this year, and were struck by the skill, courage and mastery with which he controlled the aeroplane, no less than by his modest and unassuming bearing.

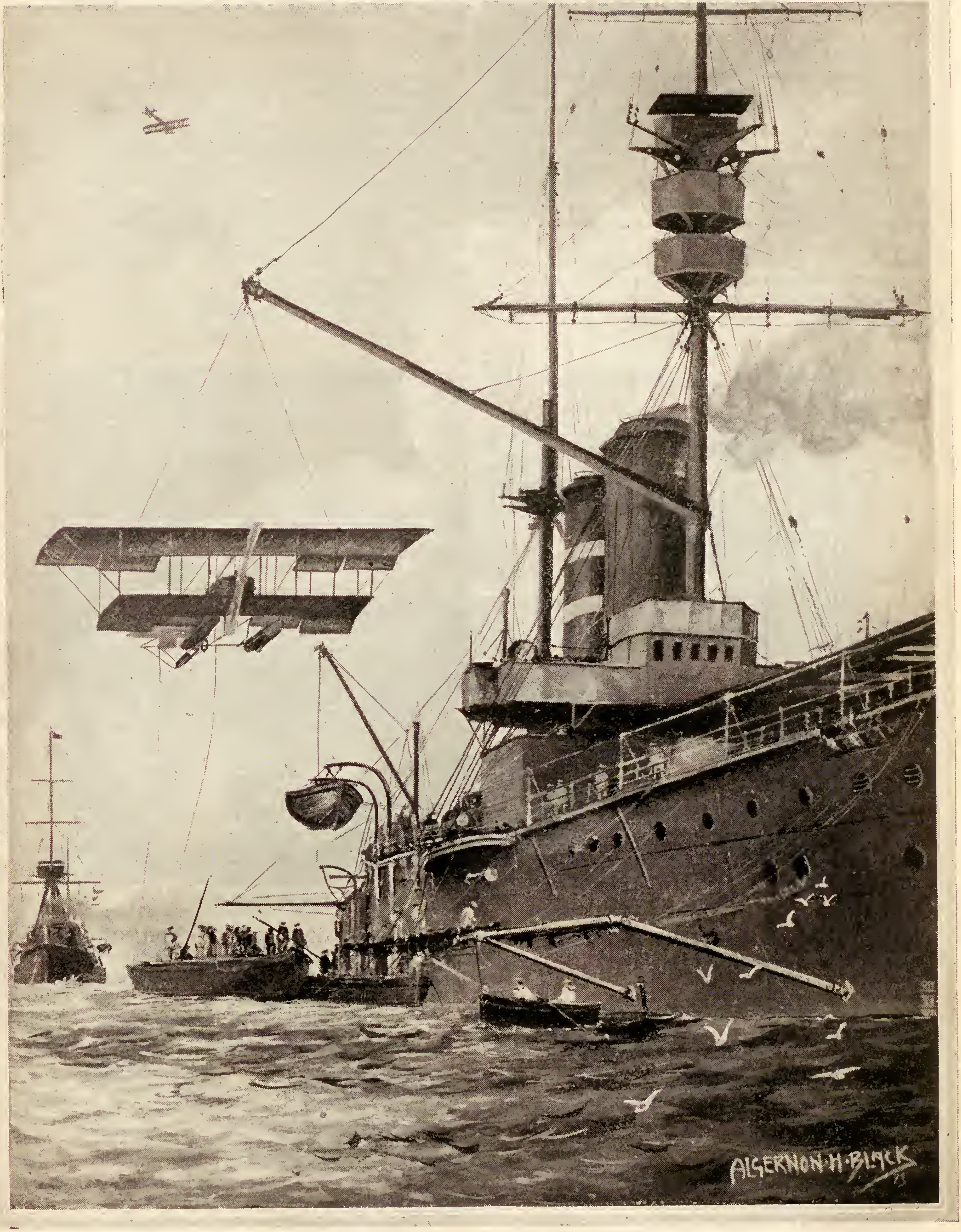
"In offering you their heartfelt sympathy their Majesties recognise that in this young, useful life the country loses its most accomplished and experienced aviator.—Believe me, dear sir, yours very truly.

"STAMFORDHAM.

Dr. Hamel has delayed publication of the letter, hoping for the return of his son, but he now feels that the public and the many friends of his son are entitled to know of their Majesties' letter.



A snap of the Whitsun Motor Race Meeting at Brooklands from Mr. Jack Alcock's Sunbeam-engined biplane.



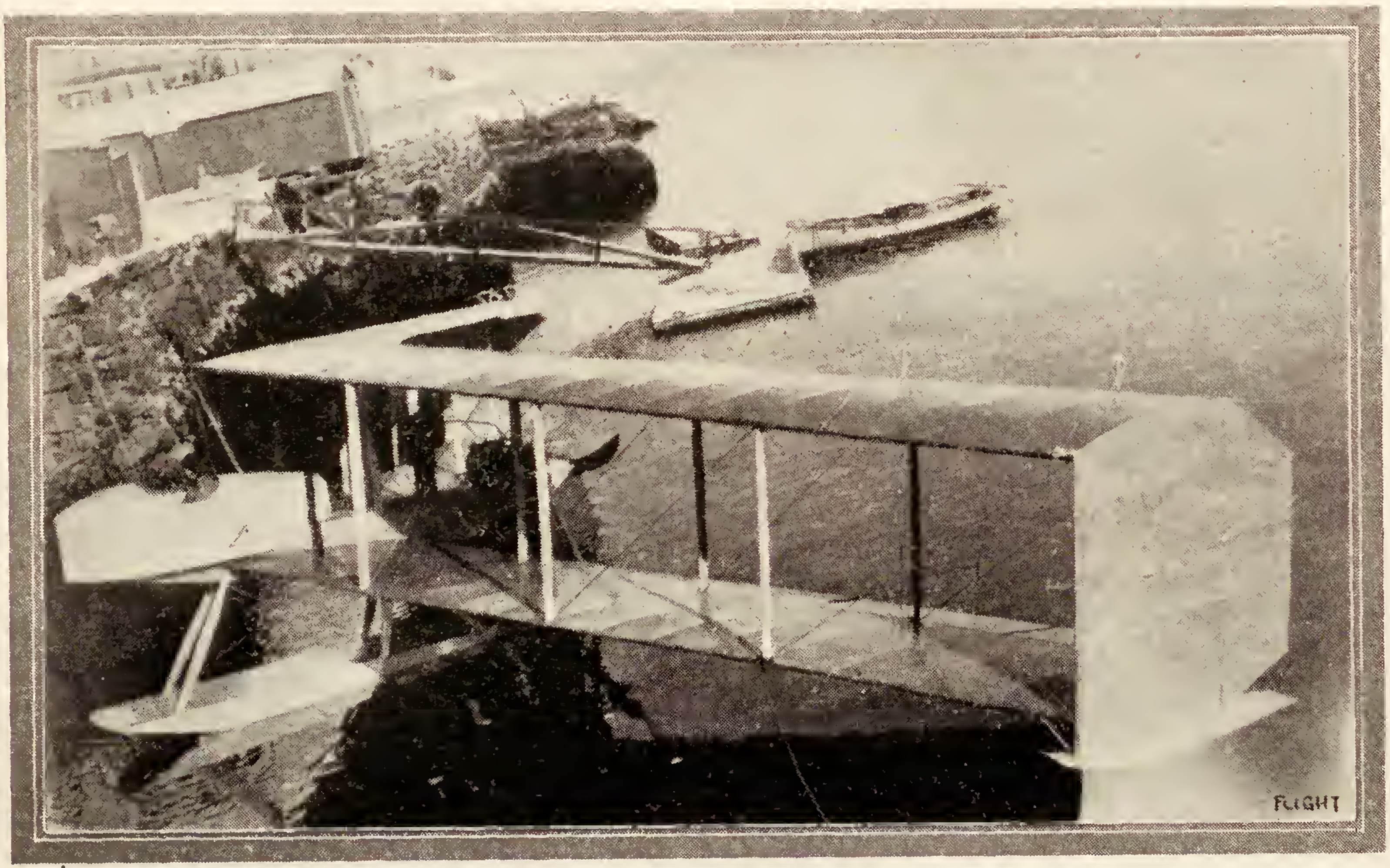
Hoisting a seaplane aboard H.M.S. " Hibernia."

THE BURGESS-DUNNE HYDRO-BIPLANE.

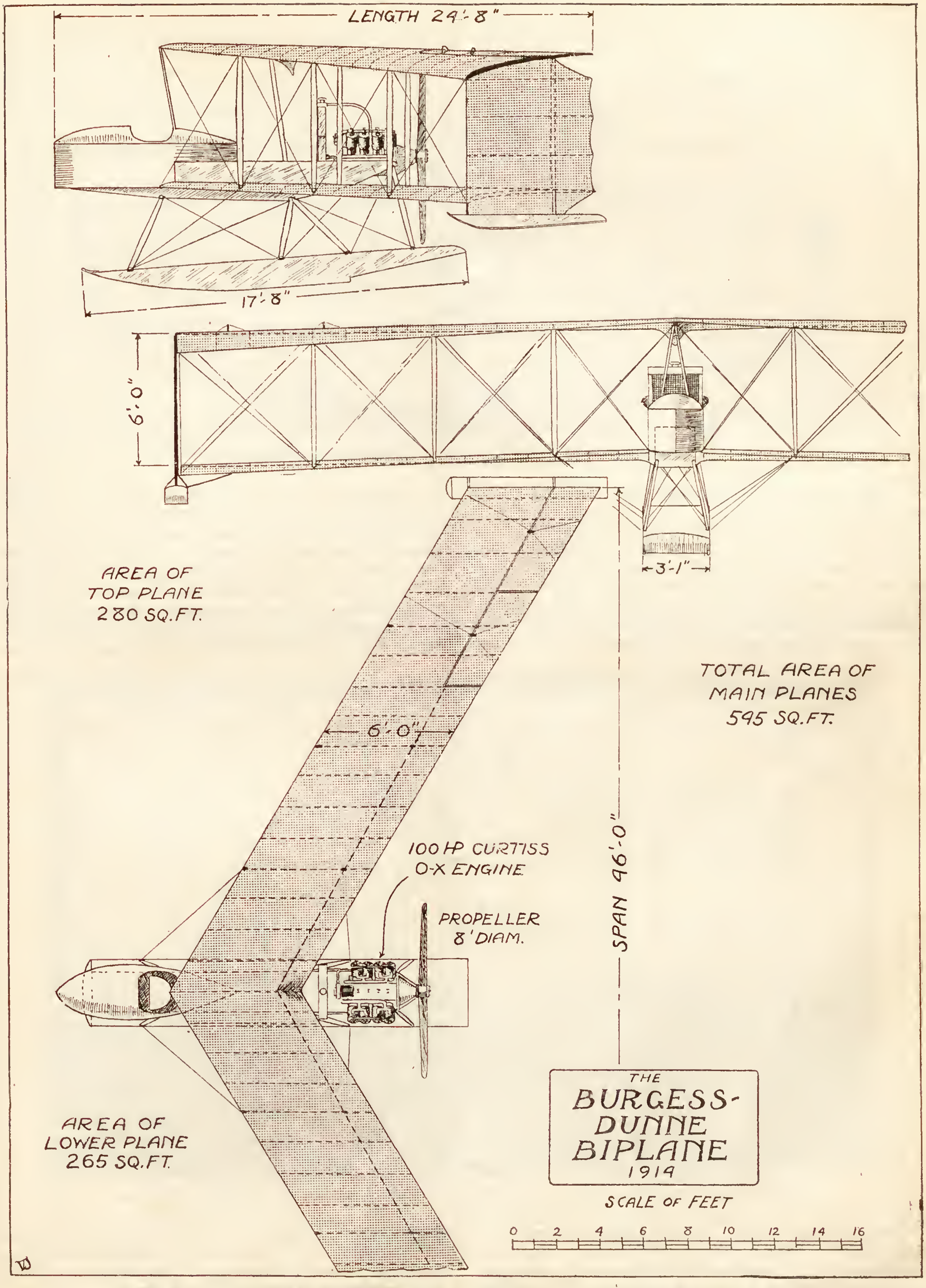
DURING the last four months some very successful trials have been carried out in the United States with a Dunne hydro-biplane manufactured by the Burgess Company and Curtiss of Marblehead, Mass., U.S.A., who have acquired the sole rights to manufacture the Dunne machines in America. The production of a hydro-aeroplane on the Dunne principle presented numerous technical difficulties, in fact Lieut. J. W. Dunne himself considered that the inherent stability and the balance, both in the air and on the water, would be seriously affected by the fitting of a float in place of the chassis, the former being considerably heavier and offering much more resistance than the latter. Mr. Burgess, however, set to work and went thoroughly into the matter of the Dunne principle, and after making exhaustive calculations as regards head resistance, weight, and centre of pressure under various conditions, he produced the first Dunne hydro-biplane, which balanced perfectly both on the water and in the air at the first time of asking. A comparison of the accompanying scale drawings of this machine with those of the land model published in FLIGHT for November 15th last, will show that except for the float, *nacelle*, and a few minor details, one does not differ from the other. In fact the principal dimensions and most of the constructional details are identical. It will, therefore, only be necessary for us to dwell briefly on the latter, so that we may confine our remarks to the modifications and actual performances. The swept-back planes are of the usual Dunne formation with the leading edge set at an inverted dihedral angle producing a negative angle of incidence at the tips, and are built up on two main spars of spruce, the front one forming the leading edge. The camber increases from practically *nil* at the centre to a maximum at the tips. It is to this peculiar formation that the Dunne machine owes its natural inherent stability, as has been described at length in the columns of FLIGHT.

At the centre of the lower plane is a short *fuselage*, rectangular in section and tapering fore and aft to a horizontal knife-edge. Mounted on the forward portion of this *fuselage* is a coracle-like *nacelle*, in which the pilot sits, whilst the rear portion carries the power plant. The latter consists of a 90--100 h.p. 8 cyl. Curtiss model O-X water-cooled engine driving direct an 8 ft. propeller. A single radiator is mounted immediately in front of the engine. The fuel and oil tanks, the former having a capacity of 22 gallons and the latter 4 gallons, are mounted on the upper *longerons* of the *fuselage*, two service tanks being placed within the latter just in front of the radiator.

The machine is supported on the water by a main central pontoon float 17 ft. 8 ins. in length and 3 ft. 1 in. beam, with a maximum depth of 15 ins. The float tapers to a horizontal knife-edge forward, and has a single hydroplane step at a point about one-third the length from the stern. It is divided into five transverse water-tight bulkheads. Four pairs of spruce struts of steam-line section connect the float with the *fuselage*, the whole " chassis " being strongly cross-braced with wire. An auxiliary float is mounted at the bottom of each side curtain at the wing tips in order to support the latter when the machine rolls sideways. These auxiliary floats are similar in shape to the main float, but have no step. The Burgess Dunne is controlled in exactly the same manner as the land machine is. This control consists of *ailerons* only, operated by two separate levers, the right-hand lever operating those on the right side and *vice versa*. To ascend both levers are pulled back, causing the *ailerons* on each side to move up, and thus force the wing tips—which virtually form the tail of the machine, being



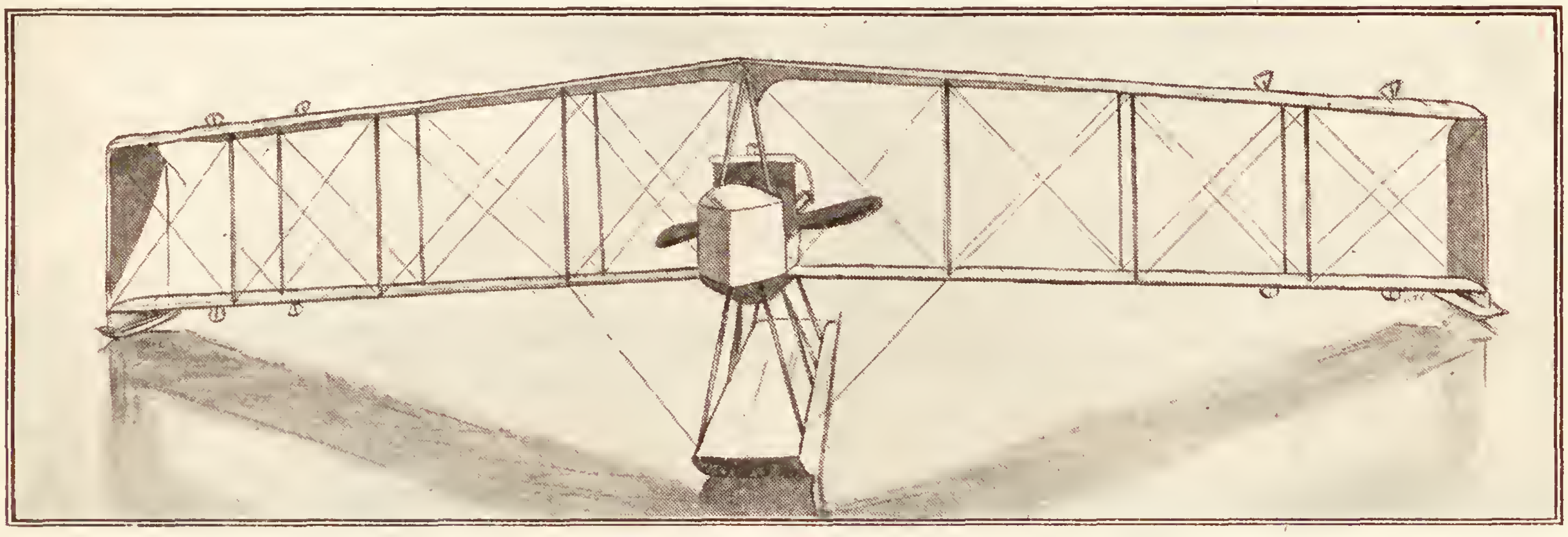
General view of the Burgess-Dunne hydro-biplane floating on the water.

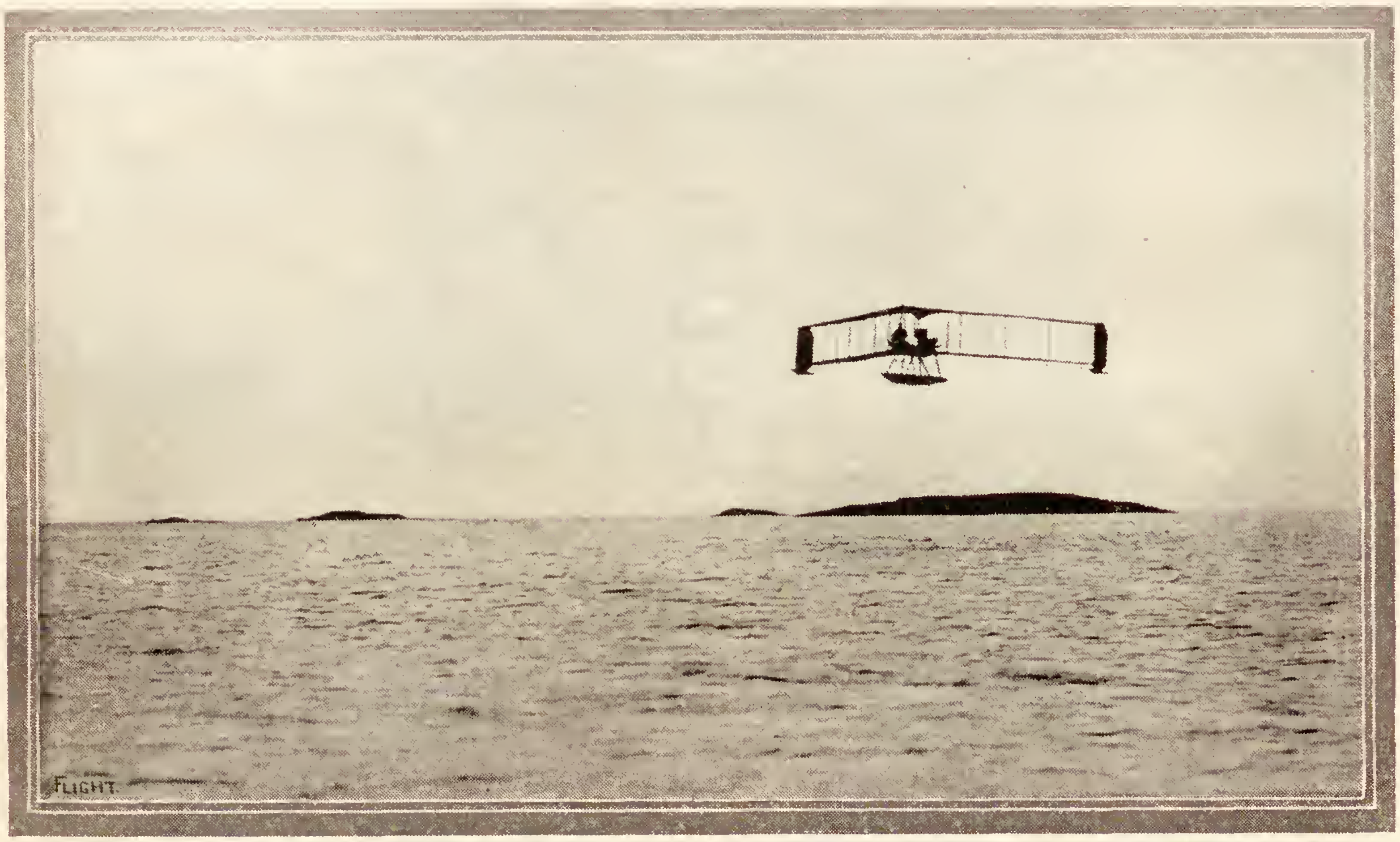

LENGTH 24'-8"
17'-8"
6'-0"
3'-1"
AREA OF TOP PLANE 280 SQ.FT.
TOTAL AREA OF MAIN PLANES 595 SQ.FT.
6'-0"
100 HP CURTISS O-X ENGINE
PROPELLER 8' DIAM.
SPAN 46'-0"
AREA OF LOWER PLANE 265 SQ.FT.
THE BURGESS-DUNNE BIPLANE 1914
SCALE OF FEET
0 2 4 6 8 10 12 14 16

THE BURGESS-DUNNE HYDRO-BIPLANE.—Plan, side and front elevations to scale.

located at the rear of the centre of gravity—down, a movement equivalent to that of the ordinary tail-elevator. To descend, the levers are pushed forward, with the reverse effect. When it is desired to direct the machine to starboard, the left-hand lever is pushed forward and the right-hand one pulled back, and the reverse for steering to port.

As regards the actual performances of this machine, Mr. Burgess made a few hops shortly after it was launched the latter part of February, but owing to exceptionally bad weather it was not until a few weeks later that the first successful flights were made at Salem Harbour, with Clifford L. Webster in the pilot's seat. Even then the weather was all but favourable, except as a severe test for the machine. However, the trials proved to be entirely successful, the machine rising easily from the water at a gentle angle. During one of his flights he locked the control levers and let the machine fly by itself. On May 2nd Webster put the second Burgess-Dunne through its tests before a number of members of the Aero Club of America. The second machine possesses several modifications calculated to increase its efficiency, otherwise it is similar to the other model. The radiator in front of the engine has been removed and a passenger's seat put in its place, whilst two radiators have been mounted on the rear float-struts. The demonstration with the second machine was made in a stiff N.W. wind with a choppy sea. After flying about two miles out to sea towards the observers with his hands off the controls, Webster made four circuits at 200 feet, taking his hands off the controls during the last circuit when the machine rose to a height of 500 feet. He then cut off the motor, and, with his hands still above his head, descended in a spiral to about 100 feet, when he resumed control and made another circular flight. Rising to a height of 500 feet, Webster once again took his hands off the controls, and glided in a straight line towards the observers. When 50 feet from the water, he resumed


View from the front of the Burgess-Dunne hydro-biplane, showing how it is equally supported on the water by all three floats.



The Burgess-Dunne hydro-biplane in flight at Marblehead, piloted by Clifford L. Webster.

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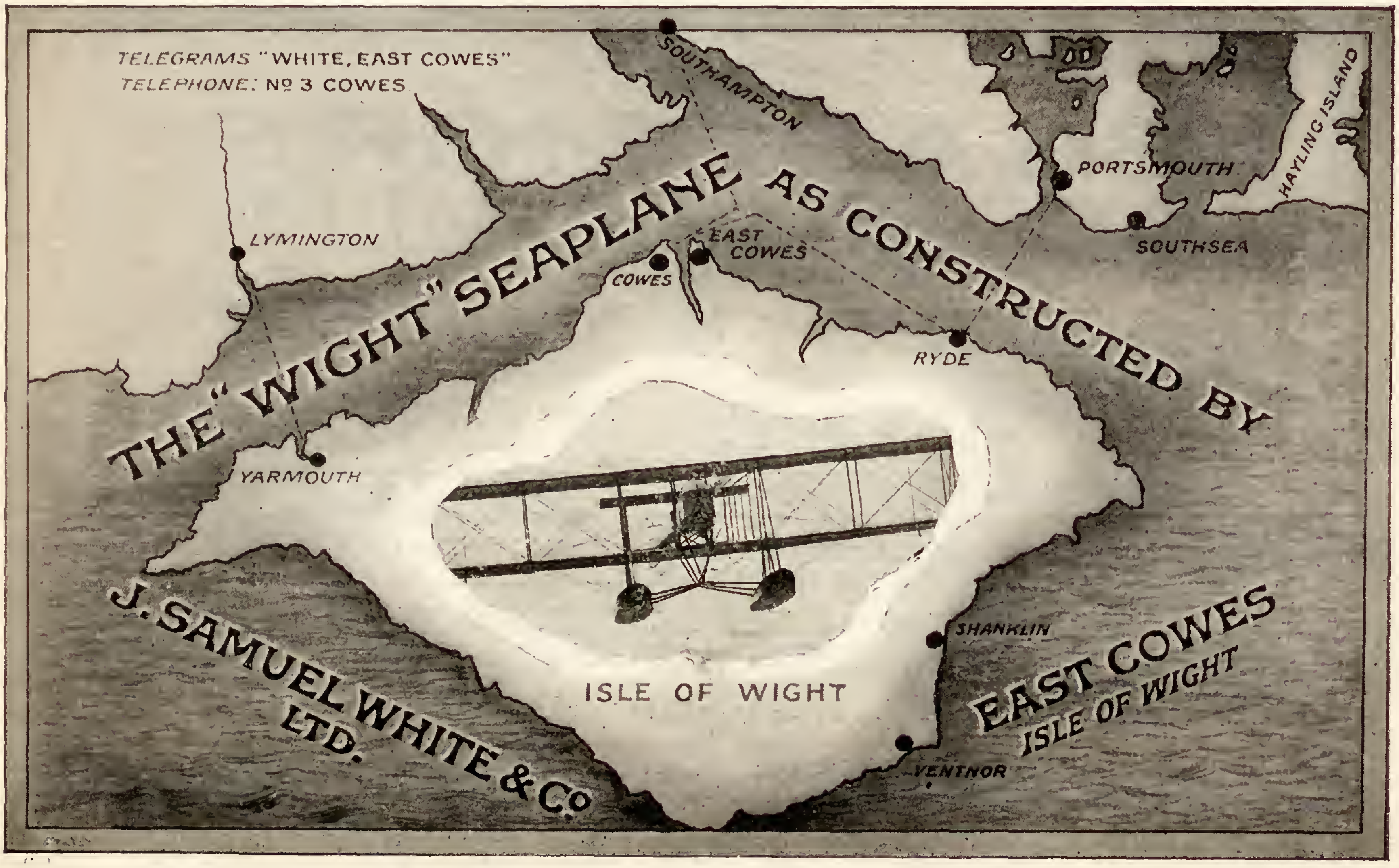


control, and, diving, alighted gently on the water and taxied to the observers' boat, to which the machine was moored for some time, withstanding the choppy sea exceptionally well. Another demonstration was made later on, in which Webster taxied some 200 yards away, and facing the observers he opened the throttle and raised his hands above his head. After hydroplaning for about 250 feet, the machine left the water and climbed gently to a height of 40 feet, when the pilot resumed control. Speed tests were also carried out, consisting of a run with and against the wind over a measured course of 1·2 miles. In one test the times taken were 59 secs. and 2 mins. $34\frac{3}{5}$ secs., whilst in another the times taken were $38\frac{3}{4}$ secs. and 2 mins. $38\frac{4}{5}$ secs. The average speed over a triangular course in a 10 m.p.h. wind was 58·75 m.p.h. Numerous passenger flights were also made.

The principal dimensions of the Burgess-Dunne hydro-biplane are as follows:—Overall length, 24 ft. 8 ins.; span, 46 ft.; chord, 6 ft.; supporting area of main planes, 545 sq. ft.; weight of machine empty, 1,450 lbs.; useful load, 250 lbs.

* * * *

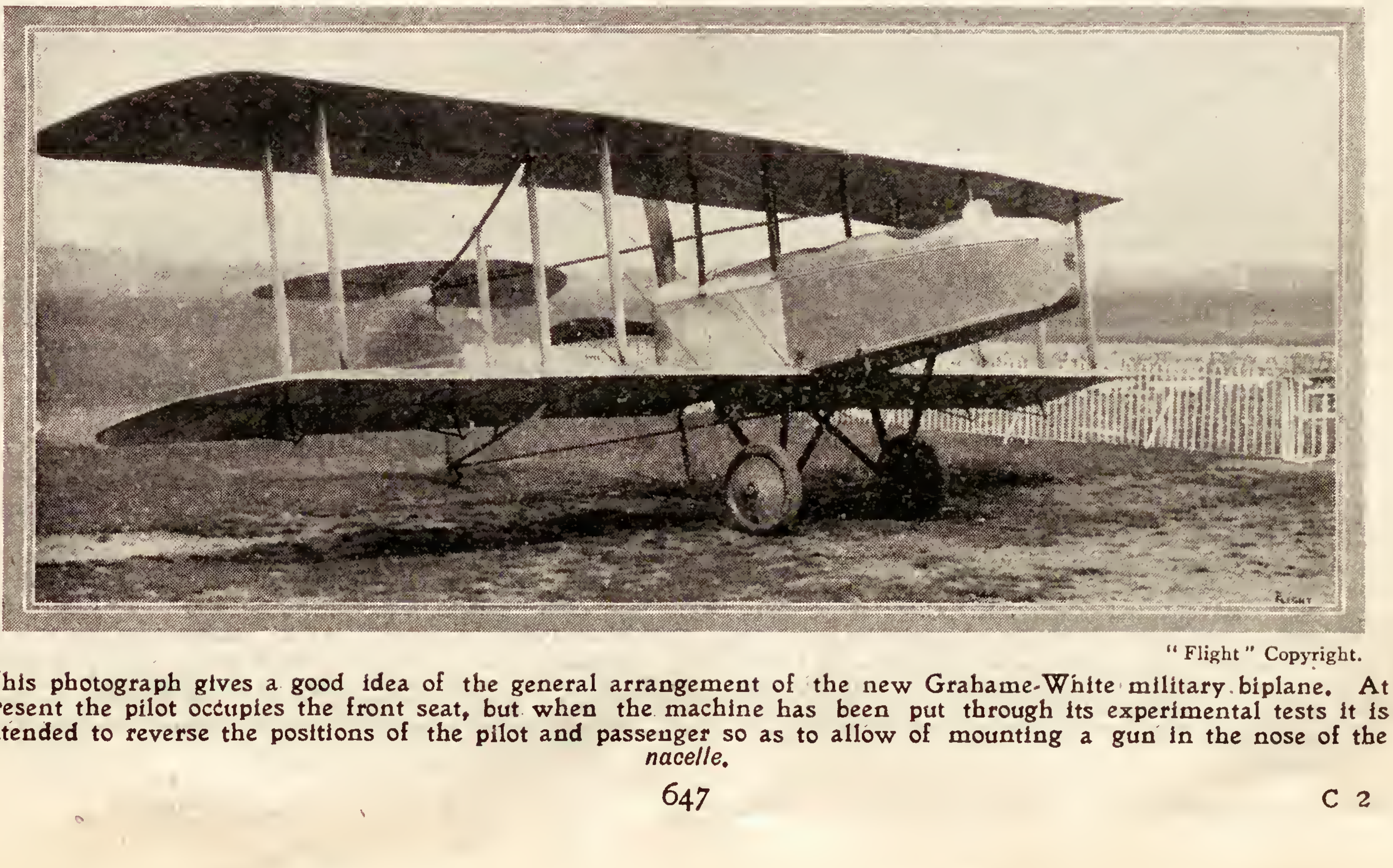
FLYING AT HENDON.

The second June Meeting at Hendon, last Saturday, provided an excellent demonstration of man's mastery of the air, for a cross-country race was flown successfully under weather conditions that but a short time ago would have kept most machines in their hangars. The wind was blowing from the north-east in violent gusts of from 30 to 40 m.p.h., whilst to make matters worse—from the aviator's point of view—the heat from the sun, which shone brilliantly throughout the afternoon, gave rise to innumerable eddies of a very unpleasant character. Four o'clock was the time down on the programme for the start of the 30-mile cross-country handicap for the 100-guinea Cup presented by Mrs. J. B. Manio, but it was not until 5.30 p.m., after waiting in vain for the wind to lessen, that a start was made, the number of laps of the Bittacy Hill course being reduced from six to four. Mrs. Manio is the widow of the Italian aviator who met with a fatal accident in Lisbon a year ago, and who will be remembered in this country for his involuntary descent on a housetop at Palmer's Green, London, in December, 1912. Although the start of the race was delayed, several exhibition and passenger flights were made by the various Hendon pilots from 3.30 p.m., the first to ascend being Louis Noel, who put up a magnificent ten-minute fight with the wind on the 70 h.p. Maurice Farman. R. H. Carr went up next on the 50 h.p. G.-W. tractor biplane "Lizzie," climbing to an altitude of about 1,500 ft. and then executing a loop—a wonderful performance considering the strength of the wind. In descending he made a number of very sharp spirals. P. Verrier then took up a passenger on the 70 h.p. Aircraft-Maurice Farman, W. L. Brock following on the 80 h.p. Blériot with a lump of lead on the tail as passenger. After this there was a short interval and then Brock took up a passenger on the Blériot, and Verrier made two passenger flights on the Maurice Farman. At 5 o'clock, Carr gave another looping demonstration on "Lizzie." He made his first loop at about 1,000 ft., the wind catching the machine when at the top of the loop and tossing it about rather roughly before allowing it to regain its normal position. Climbing once again to the same height, Carr made a similar loop, after which he made a spiral descent. A start was then made for the cross-country race, there being four competitors as follows: Louis Noel on the 70 h.p. Maurice Farman (4 mins. 12 secs.); P. Verrier on a similar machine (2 mins. 52 secs.); R. H. Carr on "Lizzie" (1 min. 32 secs.); and W. L. Brock on the 80 h.p. Blériot (scratch). Brock's engine went on strike at the last moment and refused to start, and it looked as if he would be put out of the race, but eventually the engine repented and he got away after a delay of about a minute and a half. It was an evenly matched race, the machines going along fairly close together, and on rounding Bittacy Hill for the last time the first three were all in a bunch. Noel was leading first of all, then Verrier overtook him only to drop behind again shortly after, and for the rest of the race these two flew side by side, with Carr rapidly coming up behind. At the last moment Verrier once again shot ahead of Noel and looked as if he would cross the line first, but Carr, by diving, got in front and obtained first place by one second, Verrier being next, 13 secs. in front of Noel, whilst Brock came in a good fourth, 25 secs. behind, in spite of his delay in starting. Immediately after the race Mrs. Manio presented Carr with the Cup, Louis Noel being presented with a miniature cup as a consolation prize. As it was getting late only a few passenger flights were made after the race by Noel and Brock on the Maurice Farman and Blériot respectively.

Result of Cross-Country Handicap for Manio Cup.

(Bittacy Hill and back four times.)

		Handicap.		Handicap Time.	
		m.	s.	m.	s.
1.	R. H. Carr (50 h.p. G.-W. tractor biplane)	1	32	25	20
2.	P. Verrier (70 h.p. Maurice Farman biplane)	2	52	25	21
3.	Louis Noel (70 h.p. Maurice Farman biplane)	4	12	25	34
4.	W. L. Brock (80 h.p. Blériot monoplane)...	scratch		25	59



"Flight" Copyright.

This photograph gives a good idea of the general arrangement of the new Grahame-White military biplane. At present the pilot occupies the front seat, but when the machine has been put through its experimental tests it is intended to reverse the positions of the pilot and passenger so as to allow of mounting a gun in the nose of the *nacelle*.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Diary of Events.

June 20 ...	*Daily Mail* Air Race. London–Manchester–London. Hendon Aerodrome.
June 27 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
July 11 ...	International Correspondence Schools Race, London–Paris–London. Hendon Aerodrome.
July 11 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
Aug. 1–15	*Daily Mail* £5,000 Circuit of Britain Race. Starting from Southampton Water.
Aug. 22–29	Gordon-Bennett Eliminating Trials. Upavon, Salisbury Plain.
Sept. 19–28	Gordon-Bennett Aviation Race. Buc, France.

HENDON AERODROME.

Members of the Royal Aero Club are admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards. The Membership Card admits the Member only—motor cars must be paid for.

Daily Mail £5,000 Circuit of Britain Race.

The following entries have been received:—

Messrs. White and Thompson—

1. Curtiss Biplane. Two 100 h.p. Curtiss engines. Pilot: Mr. A. Loftus Bryan.
2. Curtiss Biplane. 125 h.p. Anzani engine. Pilot: Capt. Ernest C. Bass.

Sopwith Aviation Co., Ltd.—

1. Sopwith Biplane. 150 h.p. Sunbeam engine. Pilot: Mr. C. Howard Pixton.
2. Sopwith Biplane. 100 h.p. English *monosoupape* Gnome engine. Pilot: Mr. H. G. Hawker.

Grahame-White Aviation Co., Ltd.—Grahame-White Biplane. 100 h.p. English *monosoupape* Gnome engine.

Messrs. A. V. Roe and Co., Ltd.—Roe Biplane. 150 h.p. Sunbeam engine. Pilot: Mr. F. P. Raynham.

Eastbourne Aviation Co., Ltd.—Tractor Biplane. 120 h.p. Green engine. Pilot: Mr. F. B. Fowler.

Blackburn Aeroplane Co., Ltd. — Blackburn Hydro-Biplane. 130 h.p. Salmson engine. Pilot: Mr. Sydney Pickles.

Late entries will be received up to 12 noon, June 30th, 1914, in which case the Entrance Fee will be £150.

COMMITTEE MEETING.

A Meeting of the Committee was held on Tuesday last, June 16th, 1914, when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Prof. A. K. Huntington, Major F. Lindsay Lloyd, Mr. F. K. McClean, Mr. Alec Ogilvie, Mr. Mervyn O'Gorman, C.B., Mr. C. F. Pollock, Mr. T. O. M. Sopwith, and the Secretary.

The late Mr. Gustav Hamel.—On the motion of the Chairman, the following Resolution was unanimously passed:—

"The Committee of the Royal Aero Club desires to place on record its deep regret at the untimely death of the late Mr. Gustav Hamel, and at the same time to express its high appreciation of his personal skill, and the signal services he rendered to aviation. The Committee further desires to tender its sincere sympathy to the members of his family upon the bereavement they have sustained."

The Aero-Club de France, in a message of sympathy sent to the Club, referred to Mr. Hamel's many friends amongst French aviators.

A message of sympathy has also been received from the Aero Club of Russia.

New Members.—The following new members were elected:—William Henry Charlesworth, A. B. Ford, the Hon. Frederick Edward Guest, M.P., Leonard Hubert Jagenberg, Frits Koolhoven, Capt. Saunders, Lieut. T. R. Wells, and Lieut. Norman Wood-Smith, R.I.M.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

793 Corporal Arthur Claud Robins, R.F.C. (Maurice Farman Biplane, Royal Flying Corps, Netheravon). May 21st, 1914.

794 Lieut. Ian Malcolm Bonham-Carter (5th Fusiliers) (Maurice Farman Biplane, Central Flying School, Upavon). May 25th, 1914.

795 Leonard Parker (Bristol Biplane, Bristol School, Brooklands). May 28th, 1914.

796 Percy Herbert Maskell (Henry Farman Type Biplane, Shoreham Flying School, Shoreham). May 28th, 1914.

797 Lieut. Gerald Goodwin Carpenter (1st Suffolk Regiment) (Grahame-White Biplane, Grahame-White School, Hendon). May 29th, 1914.

798 Lieut. John Collins (3rd Hampshire Regiment) (Vickers Biplane, Vickers School, Brooklands). May 29th, 1914.

799 Henry Racine-Jaques (Bristol Biplane, Bristol School, Brooklands). May 29th, 1914.

800 Thomas Smith Duncan (Vickers Biplane, Vickers School, Brooklands). May 30th, 1914.

801 Ronald Portman Cannon (Henry Farman Type Biplane, Shoreham Flying School, Shoreham). May 30th, 1914.

802 Midshipman David Sigismund Don, R.N. (Bristol Biplane, Bristol School, Brooklands). June 2nd, 1914.

803 Lieut. Kenneth Reid Van der Spuy (S.A. Defence Force) (Maurice Farman Biplane, Central Flying School, Upavon). June 2nd, 1914.

804 Sub-Lieut. Lancelot Tomkinson, R.N. (Maurice Farman Biplane, Central Flying School, Upavon). June 2nd, 1914.

805 Archibald Maskell (Henry Farman Biplane, Shoreham Flying School, Shoreham). June 2nd, 1914.

806 George Evelyn Cowley (Grahame-White Biplane, Grahame-White School, Hendon). June 3rd, 1914.

807 George John Lusted (Henry Farman Biplane, Shoreham Flying School, Shoreham). June 3rd, 1914.

808 Charles Weber (Grahame-White Biplane, Grahame-White School, Hendon). June 5th, 1914.
(Subject to permission of Aero Club of Hungary.)

809 Rupert Henry Steinbach (Vickers Biplane, Vickers School, Brooklands). June 6th, 1914.

810 John Philip Wilson (Vickers Biplane, Vickers School, Brooklands). June 8th, 1914.

811 Lieut. John Edward Tennent (Scots Guards) (Vickers Biplane, Vickers School, Brooklands). June 9th, 1914.

812 Geoffrey Hugh Eastwood (Bristol Biplane, Bristol School, Brooklands). June 9th, 1914.

The following Certificate was passed in France:—

Jean Marie Landry (Blériot Monoplane, Buc). May 30th, 1914.

British Balloon Records.—The Committee decided to accept as British Balloon Records the following:—

Holder of Record ...	The late Mr. A. E. Gaudron, Lieut.-Col. E. M. Maitland and Mr. C. C. Turner.
Balloon	"Mammoth," capacity 107,963 c.f.
Date	November 18th, 1908.
Voyage effected ...	Crystal Palace to Mateki, Derevni, Russia.
Distance	1,117 miles.
Duration	36½ hours.

Accidents Investigation Committee.—On the motion of Col. H. C. L. Holden, the report on the fatal accident to Mr. Philippe Marty was unanimously adopted, and ordered to be published *in extenso*.

(Full report will be found following these Notices.)

Prize for Safety Belts.—On the recommendation of the Accidents Investigation Committee, it was decided to offer a Prize of £50 for the most suitable form of Safety Belt. The details were left in the hands of the Accidents Investigation Committee.

Suspension of Ralph M. Brown, American Aviator.—Letter was read from the Fédération Aéronautique Internationale, notifying the suspension, by the Aero Club of America, of Mr. Ralph M. Brown, from May 13th, 1914, until August 13th, 1914, for flying over the City of New York on May 9th, 1914.

Daily Mail £5,000 Prize, Circuit of Britain Race.

The Contest for the *Daily Mail* £5,000 will start from Southampton on Saturday, August 1st, 1914, at 6 a.m.

The Royal Motor Yacht Club has kindly arranged to extend Honorary Membership of its Club to the Members of the Royal Aero Club from August 1st to 10th, 1914. The Headquarters of the Royal Motor Yacht Club is the "Enchantress," which is moored in Southampton Water off Netley Hospital, and the starting and finishing line for the Race has been fixed between the "Enchantress" and Netley Abbey.

In addition to the start and finish of the *Daily Mail* Race, Members may witness the various trials of the Motor Boats which are to compete a week later for the British International Trophy for Motor Boats. For Members who are fond of sailing, there are six one design sailing boats belonging to the Royal Motor Yacht Club, which can be hired.

The Royal Motor Yacht Club have reserved a certain number of cabins on the "Enchantress" for the Members of the Royal Aero Club, and Members wishing to book cabins are requested to communicate with the Secretary of the Royal Aero Club.

Shed Accommodation at Southampton.—Arrangements have been made with the Hamble River, Luke and Co., Ltd., of Hamble, Hants, to accommodate the competing machines in their two large sheds. These will be available from July 25th, 1914.

Controls.—The Town Council of Ramsgate have undertaken to provide motor boats to patrol the alighting area at Ramsgate, and it is hoped that similar arrangements can be made at Yarmouth, Scarborough, Aberdeen, Oban, Kingstown and Falmouth. Mr. Perrin, the Secretary, is visiting Scotland this week for the purpose of fixing the Scottish controls, in conjunction with the Scottish Aeronautical Society.

The control at Kingstown, Dublin, will be in the hands of the Aero Club of Ireland.

Full details will be announced later.

Gordon-Bennett Eliminating Trials.

In order to select the three competitors to represent the British Empire in the Gordon-Bennett Aviation Race, to be held in France in September next, the Royal Aero Club will hold eliminating trials in which the following entrants will take part:—

Sopwith Aviation Co., Ltd.	Kingston-on-Thames
A. V. Roe and Co., Ltd.	Manchester
Vickers Ltd.	Erith
British and Colonial Aeroplane Co., Ltd.	Bristol
Cedric Lee Co.	Shoreham

The War Office and the Admiralty have kindly given facilities for the Trials to take place at the Central Flying School, Upavon, during the last week in August.

Shed accommodation for each competitor will be available on Thursday, August 20th, and the actual trials will commence about three days later. Each competitor will be allowed to enter three machines, and the tests will consist of (*a*) Slow Speed Test and (*b*) Speed Test. The Slow Speed Test consists of a flight in a straight line out and back of about 2 kilometres without touching the ground, at a constant height of not more than 30 metres. The speed shall be the mean of the speeds of the flights out and back, which must not exceed 70 kilometres per hour. The Speed Test will be over a circuit of about 8 kilometres, and the total distance to be flown is 200 kilometres.

The War Office and the Admiralty have kindly placed the Officers' Mess at the Central Flying School, Upavon, at the disposal of the Club for the accommodation of the Officials and competitors.

Election of Stewards of the Club.

The following Stewards of the Club have been elected for the current year:—

The Right Hon. The Earl of Lonsdale.
Prof. Sir J. H. Biles.
Brig.-Gen. David Henderson, C.B., D.S.O.
Sir Charles S. Henry, Bart., M.P.
Admiral of the Fleet Sir E. H. Seymour, P.C., G.C.B., O.M., G.C.V.O.
Hon. Arthur Stanley, M.V.O., M.P.

Balloon Races at Hurlingham.

Owing to inclement weather, the Balloon Race on Wednesday, June 10th, 1914, was abandoned.

The next race will be held on Saturday, the 27th inst., at 3 p.m., and will be a long distance contest for a cup presented by Mr. A. Mortimer Singer. Entries close Monday, the 22nd inst.

Members are admitted free to the Hurlingham Club on June 27th, on presentation of their Club Membership Cards.

International Correspondence Schools Race.
London–Paris–London.

(*Under the Competition Rules of the Royal Aero Club.*)
Organised by the Royal Aero Club and the Aero-Club de France.
Starting and finishing at the Hendon Aerodrome,
Hendon, N.W.
Saturday, July 11th, 1914.
Prizes.

Fastest Time...	1st Prize: £500. Presented by the International Correspondence Schools.
Handicap ..	1st Prize: £300. Presented by the Royal Aero Club. 2nd Prize: £150. Presented by the International Correspondence Schools. 3rd Prize: £50. Presented by the International Correspondence Schools.

The Entrance Fee is £5 per aircraft, and entries will be received up till 12 noon, Saturday, June 27th, 1914. Late entries will be received up to 12 noon, Saturday, July 4th, 1914, in which case the Entrance Fee will be £10.

The Entrance Fee will be returned to each competitor who completes the course by 10 p.m. on Saturday, July 11th, 1914.

The Entry Form, which must be accompanied by the Entrance Fee, must be sent to the Secretary of the Royal Aero Club, 166, Piccadilly, London, W.

Full particulars and entry forms can be obtained from the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

The Home Office has granted an exemption from Aerial Navigation Orders to all competitors taking part, permitting them to leave and enter England without alighting in a prescribed landing area. Exemption has also been granted permitting Foreign Competitors to fly direct to the starting point, Hendon Aerodrome, between July 8th and 11th, and also to return from England between July 11th and 14th without landing in prescribed areas. The course to be flown under this exemption is *viâ* Folkestone.

ACCIDENTS INVESTIGATION COMMITTEE MEETING.

A Meeting of the Public Safety and Accidents Investigation Committee was held on Tuesday, June 16th, 1914, at the Royal Automobile Club (by kind permission) when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Eng.-Lieut. E. F. Briggs, R.N., Mr. Alec Ogilvie, Mr. Mervyn O'Gorman, C.B., and the Secretary.

Fatal Accident to Capt. C. P. Downer.—The draft report was finally approved and ordered to be submitted to the Committee.

Fatal Accident to Capt. C. R. W. Allen and Lieut. J. E. G. Burroughs.—The reports of the National Physical Laboratory on the various tests carried out by them, were considered and the Committee's report was drafted.

COMPETITIONS COMMITTEE MEETING.

A Meeting of the Competitions Committee was held on Tuesday last, June 16th, 1914, when there were present: Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Capt. A. E. Davidson, R.E., Major F. Lindsay Lloyd, Mr. Norman C. Neill, Mr. Alec Ogilvie, Mr. Mervyn O'Gorman, C.B., and the Secretary. In attendance: Major W. S. Brancker.

Gordon-Bennett Eliminating Trials.—The report of Major W. S. Brancker and the Secretary on their visit to Upavon was received. The arrangements made by them for the trials were approved.

***Daily Mail* Circuit of Britain Race.**—The Secretary reported the arrangements which he had made for the Race, which were approved.

International Correspondence Schools Race, London–Paris–London.—The following handicappers were appointed: Mr. J. H. Ledeboer, Mr. A. G. Reynolds (representing the Royal Aero Club) and the Marquis J. de Lareinty Tholozan (representing the Aero-Club de France).

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

ACCIDENTS INVESTIGATION COMMITTEE OF THE ROYAL AERO CLUB.

REPORT No. 23.

Report on the Fatal Accident to Mr. Philippe Marty, when Flying a Morane Saulnier Monoplane at the London Aerodrome, Hendon, N.W., on Sunday, April 26th, 1914, at about 6 p.m.

Brief Description of the Accident.—Mr. Philippe Marty was flying a Morane-Saulnier Monoplane fitted with a 60 h.p. Le Rhône motor, at the London Aerodrome, Hendon, N.W., on Sunday, April 26th, 1914, at about 6 p.m. He had been flying in a normal manner up and down the Aerodrome for about ten minutes, at an altitude of about 300 feet, and was making a descent in small flat circles, switching his engine on and off. From a height of 40 feet the aircraft nose-dived to the ground. The pilot was fatally injured and died about two hours after the accident.

Mr. Philippe Marty was a French subject and was granted Certificate No. 816, on March 27th, 1912, by the Aero-Club de France.

Report.—The Committee sat on Tuesday, May 12th, 1914, and received the report of the Club's representatives. Eye-witnesses also attended before the Committee and gave evidence.

From the consideration of the evidence, the Committee regards the following facts as clearly established:—

1. The aircraft was built in France during the latter part of 1913, and rebuilt at Hendon in March, 1914.

2. There was practically no wind at the time of the accident.

3. Mr. Marty, who was acknowledged to have great experience of flying, had made a previous flight earlier in the afternoon on the same aircraft, carrying out many evolutions.

4. Between Mr. Marty's two flights, the aircraft was flown by another pilot, who found it in proper working order.

5. The descent was made in circles slowly, with very little bank, the motor being switched on and off.

6. Mr. Marty had been warned only a week before of the danger of this particular manœuvre at an insufficient height from the ground.

7. The fatal injuries to the aviator were caused by his body being thrown violently forward and his head striking the part of the structure in front of him.

8. The aircraft was not fitted with a speed indicator.

Opinion.—The Committee is of opinion that the accident was due to loss of flying speed resulting in a nose-dive so close to the ground that recovery was impossible. The fatal injuries to the aviator were caused by his body being thrown violently forward and his head striking the part of the structure in front of him. The Committee is further of opinion that some form of quick-release safety belt of an elastic nature might be devised, which, without hampering the aviator's ordinary movements, would restrain such violent forward motion.

Recommendation.—The Committee recommends that every aircraft should be fitted with a speed indicator to show the speed of the aircraft at any moment, so that the pilot can tell when dangerous limits are being approached.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—There was very little flying last week owing to the very high wind on most days, the only machines out being :—

Monday (very windy and showery), No. 45 Caudron, 70 Maurice Farman, 31 Henry Farman. Tuesday (very windy), No. 3 Short and 24 Bristol tractor. Wednesday (very windy), No. 70 Maurice Farman. Thursday (very windy and wet afternoon), No. 70 Maurice Farman. Friday (windy), No. 31 Henry Farman and 24 Bristol; Lieut. Babington on No. 21 Short tractor from Isle of Grain, staying a short time then returning to Grain. Saturday and Sunday (very windy), no flying.

Civilian Flying.—Monday and Tuesday, Mr. Alec Ogilvie was out on his 50 h.p. N.E.C. Wright biplane making short flights. Tuesday, Mr. Gordon Bell with Mr. Fairey as passenger, putting Short tractor through its test before handing over to the Admiralty.

Brooklands Aerodrome.

On Monday morning, last week, Blériot, Vickers and Bristol pupils at work; in the afternoon, Mr. Sippe on Bristol "Scout," Lord Carbery afterwards going up on same machine, and being so favourably impressed with it that he decided to buy it. Mr. Robin Skene for passenger trip on Martinsyde monoplane. Mr. Pixton arrived on Sopwith "Scout." Bristol, Vickers and Blériot pupils again out.

Messrs. J. E. Tennant and J. P. Wilson passed their *brevet* tests Tuesday morning in good style on Vickers biplanes, the former going up to 2,000 ft. in the altitude test, and the latter 600 ft. Vickers, Bristol and Blériot pupils out. Mr. Alcock to Shoreham on 100 h.p. Sunbeam, with Mr. Harold Lane as passenger. Mr. Mahl on 80 h.p. Sopwith. Mr. Dukinfield Jones for several flights on the D.F.W. Mr. Robin Skene for first trip as pilot on Martinsyde monoplane (Mr. Waterfall having been called up for service at Netheravon, Mr. Skene will now pilot his machine). In the afternoon, Mr. Pixton to Farnborough on Sopwith "Scout," Mr. Goodden from Hendon on the late Mr. Hamel's looping Morane, Mr. Jullerot on Bristol biplane, Mr. Gower on a Blériot, Mr. Skene again on Martinsyde, Mr. Wilberforce on 45 h.p. Anzani-Blériot, Mr. Mahl solo and with passengers on 80 h.p. Sopwith, Mr. Goodden looping, turnovers and tail slides on Morane, Mr. Dukinfield Jones solo and with passengers on D.F.W. Blériot, Vickers and Bristol pupils out. *Brevet* tests in good style on Bristol biplanes by G. H. Eastwood (altitude 1,000 ft.) and Capt. Walcot (A and B tests only).

Mr. John Collins, who obtained his pilot's certificate at the Vickers Flying School, Brooklands, on May 29th.

Mr. R. P. Cannon, another pilot who has just secured his certificate at the Shoreham Flying School.

On Wednesday, no flying in morning. In the afternoon, Mr. Goodden, with Paul Gondre as passenger, started for Tunbridge Wells on the 80 h.p. Morane. Departure of Bristol "Scout" for delivery to Lord Carbery.

With a wind blowing up to 40 miles an hour there was no flying on Thursday.

Friday morning, Messrs. Merriam and Stutt out on Bristol biplanes with pupils and passengers, Mr. Dukinfield Jones on D.F.W., Mr. Mahl with passenger on Sopwith biplane, Mr. Raynham testing new standard 80 h.p. Avro ordered by R.F.C. In the afternoon, Mr. Mahl on 80 h.p. Sopwith, Mr. Raynham on 80 h.p. Avro, Mr. Stutt on Bristol biplane, Mr. Raynham looping on 80 h.p. Avro, Mr. Skene on Martinsyde, Mr. Gower on 50 h.p. Blériot, the de Bolotoff triplane out for engine test.

On Saturday, Mr. Raynham to Farnborough to deliver 80 h.p. Avro to R.F.C.; in the afternoon, Mr. Hawker on Sopwith "Scout" and Mr. Raynham on another 80 h.p. Avro.

The thunderstorm lasting all Sunday afternoon stopped air work.

Bristol School.—Monday, last week, as passengers: Lieut. Nugent (6 trips), Mr. Adamson (3), Lieut. Moule (2), Mr. Rutledge (3), Mr. Charlesworth (2), Mr. Lucas. Solos by Mr. Chambers, Mr. Gresley (2) and Lieut. Richard.

Tuesday, as passengers: Mr. Lucas (6), Mr. Adamson (5), Mr. Charlesworth (3), Lieut. Nugent (2), Lieut. Britten, Lieut. Ames, Mr. Rutledge. Solos by Capt. Walcot (2), Mr. Eastwood (2). Capt. Walcot then took the first and second parts of his certificate, and Mr. Eastwood did the complete tests for his.

Wednesday and Thursday, tuition impossible owing to the high wind.

Friday, as passengers: Mr. Lucas, Lieut. Nugent and Mr. Treloar (2). Further tuition impossible.

Saturday, tuition impossible.

Vickers School.—Monday, last week, Messrs. Wilson and Miller solos on biplane.

Tuesday, with instructor: Lieut. Gillman and Messrs. Klingenstein and Warrand (new pupil). Messrs. Parker and Miller solos. Lieut. Tennant and Mr. Wilson both took *brevets* in excellent style. Lieut. Eberli solo.

Wednesday, Mr. Warrand on biplane with Knight. Wind and rain prevented any further school work for week.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Messrs. Winter, Robinson and Boyesen solo circuits. Messrs. Wyles, Shepherd, Lui and Major Peck straights with Instructor Howarth in passenger seat.

Mr. Dunn straights with instructor and afterwards alone.

Tuesday, Major Peck, Messrs. Lui, Palmer and Shepherd straights with Instructors Barrs, Birchenough and Howarth. Messrs. Boyesen and Robinson solo circuits, afterwards Mr. Boyesen passing first and second parts of *brevet* tests. Mr. Dunn solo straights.

Friday, Messrs. Lui, Shepherd and Major Peck straights with Instructors Birchenough, Barrs and Howarth. Messrs. Lowe and Dunn solo circuits, &c. Mr. Courtnay (new pupil) rolling with instructor. Mr. Robinson solo circuits.

Beatty School.—Pupils out with instructor during last week, Messrs. MacLachlan, 36 mins; Cheung, 46; Ruffy, 32; Allen, 13; Bentley, 11; Capt. Bass, 43; Lieuts. Dalley, 136; Browning-Paterson, 30.

Princess Ludwig of Lowenstein-Wertheim has recently joined the school and made her first flight Friday morning, being up for 12 mins. Mr. Stewart out taking extra practice and flying very well.

Hall School.—Monday, last week, wind and rain. In evening, No. 1 Caudron was brought out and Messrs. A. L. Brookes and J. Rose made four and two good straight flights respectively. H. C. G. Allen was also out on his Blériot practising straight flights, but wind proved too strong for circuits, so machines were taken in.

Tuesday, at 6.30 a.m., J. Clappen in charge, Messrs. J. Rose, A. F. Arcier, A. L. Brookes and H. Gearing straights at 20 to 40 ft. Too windy for circuits. Later, J. L. Hall took up A. Charig on Avro. In evening Hall out on school Deperdussin.

Wednesday and Thursday, gale. Friday, very windy. J. L. Hall on Avro mounted to about 8,000 ft. and after being lost in the clouds for some minutes came down in 10-minute spiral *vol plané*. In evening wind dropped somewhat, and J. Clappen taking charge of school had No. 1 Caudron and Anzani-Deperdussin brought out, Messrs. A. L. Brookes, A. F. Arcier and H. Gearing flying the Caudron and J. Rose doing straights and hops on Deperdussin. Saturday and Sunday, gale blowing.

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ROYAL FLYING CORPS (MILITARY WING).

War Office summary of work for week ending June 13th, 1914:—

Concentration Camp.—Headquarters, Headquarter Flight, Aircraft Park, Nos. 2, 3, 4, 5 and 6 Squadrons.—The training programme, consisting of aircraft reconnaissances and tests, M.T. convoy schemes, experiments, lectures, conferences and committees, was continued throughout the week. Reconnaissances were carried out daily as ordered, with the exception of Friday, 12th inst., when, owing to low-lying clouds, observation was not possible. The results obtained in all branches of training have been very satisfactory. The camp was visited on the 11th inst. by the General Officer Commanding-in-Chief, Southern Command, who inspected the sheds, workshops and camp lines, and the troops on parade. He also attended a lecture by one of the Squadron Commanders on "Observation of Artillery Fire."

Tests.—Speed tests of machines of various ages, work and exposure, were held over a level course 1,342 yards long. Two runs in each direction were made and the mean taken. The following machines were tested:—Avro, 50 h.p., B. E.; Blériot, 80 and 50 h.p., Henry and Maurice Farman (1914). The highest speed was attained by the 70 h.p. Renault B.E., viz. 73 miles p.h., the lowest being the 50 h.p. Blériot, 58·28 miles p.h.

Climbing Tests.—Pilots had to climb 3,000 ft. as rapidly as possible, the machines being fully loaded (two-seaters carrying passengers). The following machines were tested:—Avro, 50 h.p., 70 h.p. Renault B.E., Blériot, Henry and Maurice Farman. The best performance was made by the 70 h.p. Renault B.E., in 9½ minutes.

Landing Tests were carried out over tapes 7 and 22 ft. high. The same types of machines as above were tested with the following best results:—

50 h.p. Avro, 7 ft. tape: 1st graze, 43 yds.; run, 60 yds.; total, 103 yds.

50 h.p. Blériot, 22 ft. tape: 1st graze, 76 yds.; run, 84 yds.; total, 160 yds.

Flying at night has been carried out on several occasions, when landings by the light of special flares have been successfully made.

ROYAL FLYING CORPS.

The following appointments were announced by the Admiralty on the 11th inst.:—

Lieut.-Commanders F. L. M. Boothby, to the "Pembroke," additional, as Squadron Commander, for special service with Royal Naval Air Service (previous orders cancelled); and H. L. Woodcock to the "Pembroke," additional, as Squadron Commander for command of Farnborough Airship Station and of Naval Airship No. 4, temporary (previous orders cancelled), both to date May 29th. Lieut. R. B. Davies, to the "Pembroke," additional, as Squadron Commander, for special service with Royal Naval Air Service (previous orders cancelled), May 29th.

The following was announced by the Admiralty on the 15th inst.:

Lieut. D. H. Hyde Thompson, to "Pembroke," additional (T.), for duties with Aircraft, temporary, June 13th.

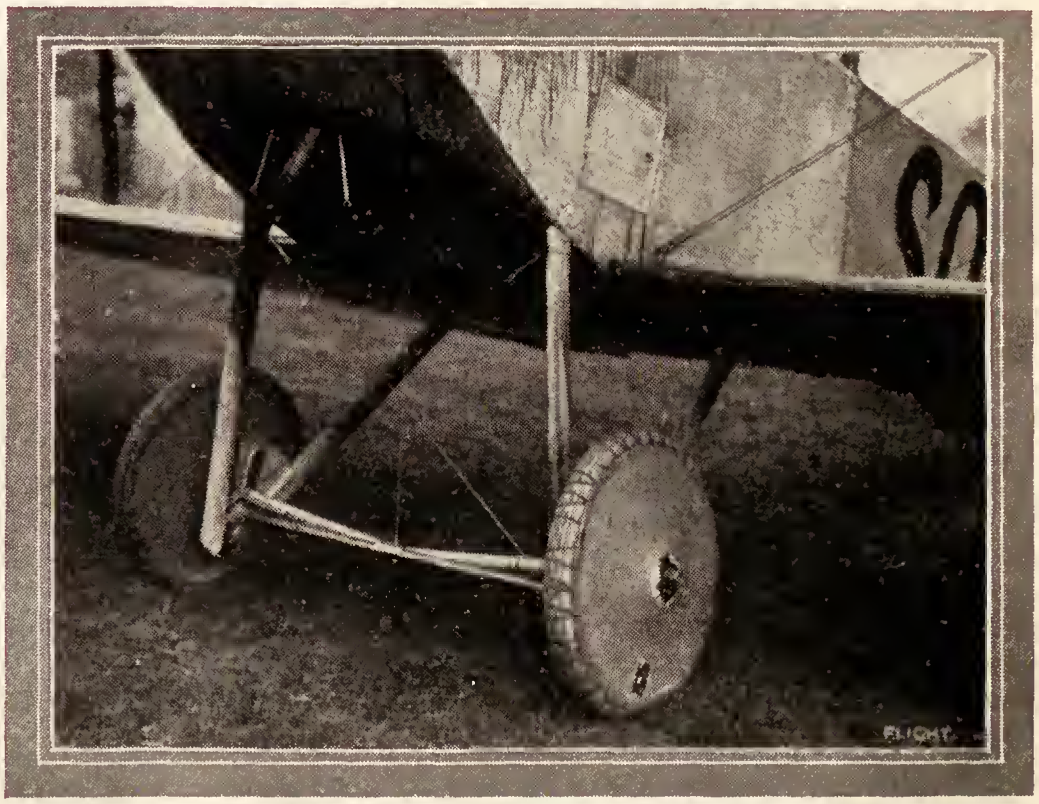
Indian Army Flying School.

The following were notified in the *London Gazette* of the 12th:—

Indian Army Central Flying School.—To be Commandant—Capt. S. D. Massy, 29th Punjabis; December 1st, 1913. To be Instructors—Capt. C. G. Hoare, 39th Central India Horse; April 14th, 1914. Lieut. H. L. Reilly, 82nd Punjabis; December 28th, 1913. Lieut. C. L. N. Newall, 2nd Battalion 2nd Gurkha Rifles; November 17th, 1913.

R.F.C. to go to Portsmouth.

Arrangements have now been made for the transference of No. 5 squadron of the Military Wing of the Royal Flying Corps to its new station at Fort Grange, Portsmouth, and the machines are to be flown there from Salisbury Plain during the first week in July



"Flight" Copyright.

The special racing chassis fitted on the Sopwith Scout flown by Mr. Barnwell in the Aerial Derby.

HOW TO READ A GRAPH.

SEVERAL correspondents have asked us to give an explanation of how to read the graphs that frequently accompany articles in FLIGHT, and which are in general much used for the illustration of scientific facts.

A graph is a pictorial way of illustrating the relationship of one thing to another that depends upon it. For example, suppose the resistance of a certain object is known to vary as the square of the speed, it is possible to show this relationship pictorially by means of a graph. The way in which a graph is drawn is to take a piece of squared paper (Fig. 1), and to use the lower edge as a scale for measuring one of the variable quantities. The vertical edge is used for measuring the other variable quantity.

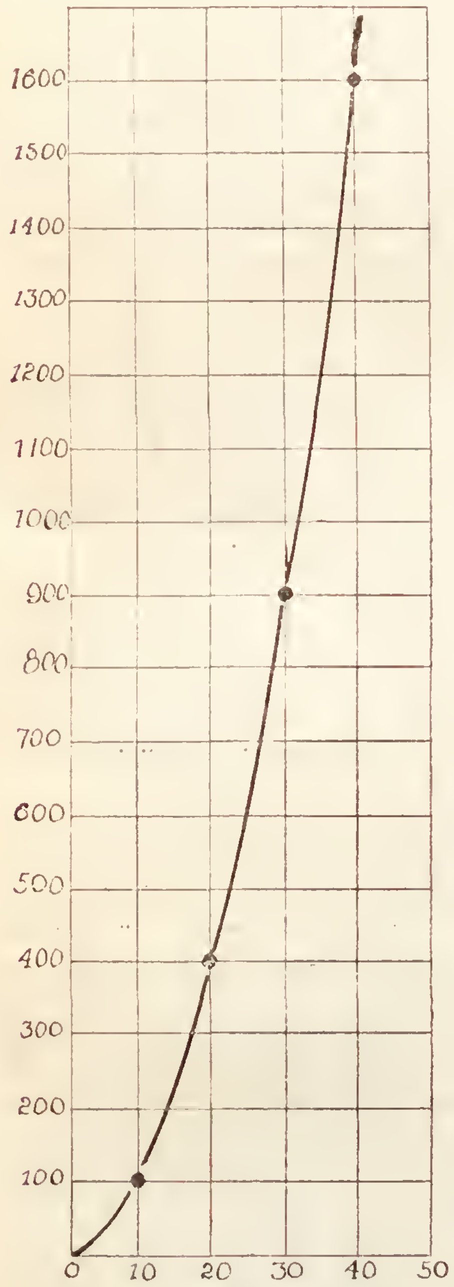


Fig. 1.

Let us, for the sake of example, suppose that we want to illustrate the relationship represented by a resistance that is always numerically equal to the square of the speed in miles per hour. In this case we will use the horizontal scale for the purpose of measuring the velocity, and each division shall represent, for convenience, say, 10 miles an hour. Similarly the vertical scale will be a measure of the resistance, and for convenience each division shall be, say, 100 lbs.

Taking the first division on the scale of velocity, the figure is 10, and the square of 10 is 100. The point corresponding to a velocity of 10 on the scale of resistance will be opposite the figure 100 on that scale. Above 10 and opposite 100 we therefore put a little circle or a dot. Similarly for the next division on the scale, the square of 20 is 400, so we put another dot above 20 and opposite 400 on the resistance scale, and so on opposite to 900 above 30 and opposite 1,600 above 40. Through the series of dots we draw a line, which is called a "graph." It passes through all the intermediate positions that we did not calculate, and thus in a simple accurate manner it completely presents the relationship between the two quantities speed and resistance.

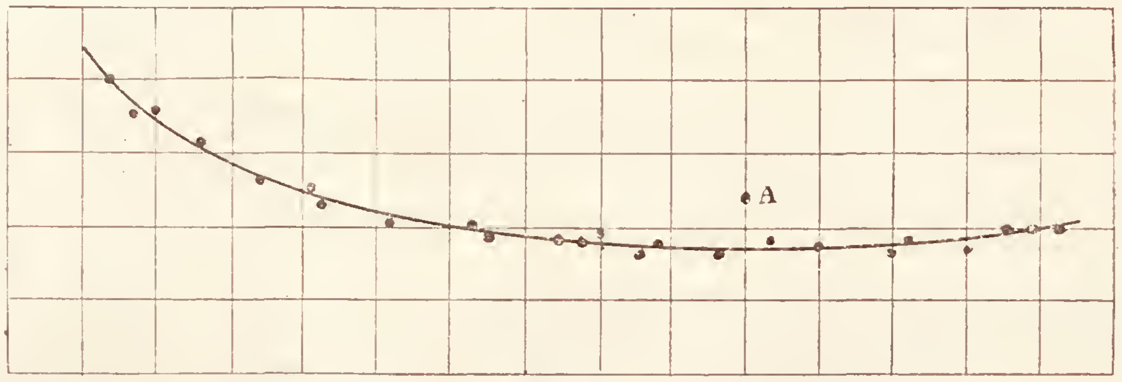


Fig. 2.

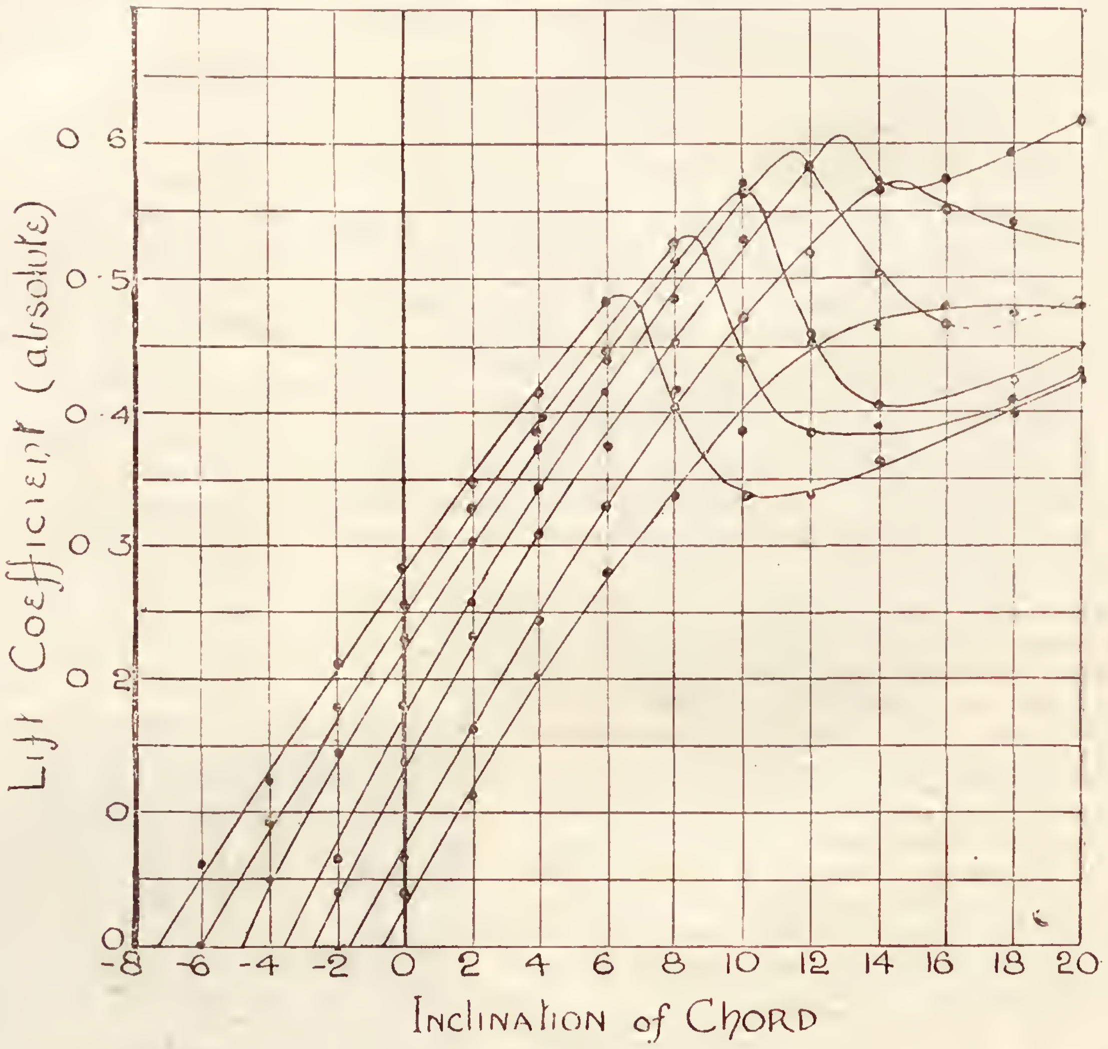


Fig. 3.

Now being told that the resistance varies as the square of the speed may or may not have conveyed an adequate impression on the mind, but seeing this graph leaves absolutely no excuse for anyone to fail to recognise the extreme rapidity with which the resistance increases at high speeds. The steepness of the latter part of the curve shows that at a glance, and it is by studying the *slopes* of graphs that we are able to bear in mind the characteristic effects produced by various relationships that have experimentally been proved to be true.

In the making of tests, graphs are of the utmost utility in presenting the results. For instance, when a great many tests have been made we shall have a great many pairs of figures each representing a relationship between the two variable quantities. By taking a piece of squared paper and marking off the divisions to any arbitrary scale we can insert the dots accordingly, and when they are all inserted we can draw a curve through them. (Fig. 2.)

Now if the majority of the dots cluster closely round the curve that is drawn through their midst it is proper to suppose the real relationship that holds good is represented by that curve, and in this way we may arrive at a mathematical expression for the relationship. If in the series there happens to be one dot far removed from the others (A, Fig. 2) it is a sure sign that something is peculiar about that particular test. This, therefore, draws attention to another purpose of the graph, which is that of checking a series of results by plotting them on squared paper so as to see whether they arrange themselves in proper sequence. Suspicion is immediately cast upon any isolated point that lies far removed from the others.

An excellent example of the use of a graph is that illustrating the relationship between lift and angle of incidence for a cambered wing. At a certain angle the conditions suddenly change, and as the angle increases the lift *decreases* instead of increasing, as it will be found to do up to that point. A graph shows the change immediately, and a series of such graphs serves as the best possible way of comparing a group of sections. Thus, a group of flat-bottomed wing sections having a variable height of camber was tested at the National Physical Laboratory, and it was found that the wing having the greatest camber reached its critical angle at the least amount of positive inclination (Fig. 3), whereas the thinner wings reached their critical angles at greater inclinations. Notwithstanding this, however, the group of curves illustrating the tests showed a likeness in their general form, and thus it is that such a graph may be said to be a "characteristic curve" for cambered wings as a class. Such curves, which are used in all branches of science and engineering, are often spoken of in these terms, and those interested in the subject are supposed to have the general form of the more important graphs clearly fixed in their minds, so that they may be able to use them as a common basis for discussion.

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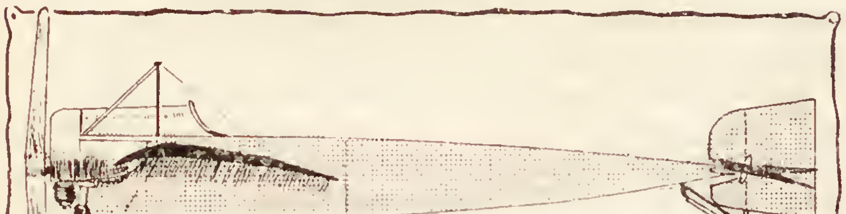
AEROPLANE TYPES.

THE KANTNER-MOISANT MONOPLANE.

AMERICA has not produced many monoplanes that could be called original in design, most of them being of the Blériot type, but in fairness it must be said that they possess many interesting points in details and construction. Such is the case with the Kantner-Moisant monoplane, which was built by the Moisant Aviation Co. to the designs of Mr. Harold Kantner, who has piloted the machine himself with some considerable success. At first sight this machine resembles the Morane-Saulnier monoplane, but on closer inspection it will be seen that there are two or three distinct differences. In the first place, the main planes are almost rectangular in plan-form, the leading and trailing edges being of the same span; secondly, the landing chassis is of the Blériot type. The tail is of the balanced elevator type. The *fuselage* is of rectangular section from the nose to a point level with the trailing edge of the main planes, from whence it tapers to a horizontal knife-edge at the tail; it also decreases slightly in width from this point. The *fuselage* is built up in the usual box-girder style, wire braced, and is divided in the middle for the purpose of facilitating transport. The pilot's cockpit is situated well forward, while observation below is improved by cutting away a portion of the main planes at the leading edge of the main planes, and also from the rear spar to the trailing edge. The 50 h.p. Gnome engine is mounted in front of the *fuselage*, and is protected by an aluminium cowl or shield which extends to the cockpit, protecting the pilot from both wind and oil. The main planes are built up on two large spars, and taper slightly from root to tip. The top *cabane*, a pyramid of four steel tubes, is mounted well forward, and the wing cables have specially designed attachments whereby the detachment of the planes is easily and quickly accomplished. The chassis, of the Blériot type, slopes forward in order to bring the wheels well forward to prevent the machine from turning over on its nose. The principal dimensions of this monoplane are: Span, 30 ft.; length, 21 ft.; chord, 6 ft. (root) 5 ft. 9 ins. (tip); supporting area, 698 sq. ft.; speed, 70 m.p.h.

"VEE JAY."



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The German Triangular Race.

THE committee in charge of the Triangular Race over the Berlin–Leipzig–Dresden course, a report of which was given in our last issue, has issued its awards, the five leading places being: 1. Schuler (Ago biplane, 150 h.p. Benz), 1,274 kiloms. in 21h. 25m. 12s.; 2. Janisch (L.V.G. monoplane, 80 h.p. Gnome), 1,137 kiloms. in 24h. 52m. 51s.; 3. Koenig (Court monoplane, 100 h.p. Mercedes), 900 kiloms. in 7h. 33m. 20s.; 4. Langer (Hirth biplane, 100 h.p. Benz), 1,274 kiloms. in 22 hrs. 24 mins.

GYROSCOPIC ACTION OF ROTARY ENGINES.

THE EFFECT OF ALTERING THE POSITION OF THE AXIS OF ROTATION ON THE STABILITY OF AN AEROPLANE.

So much has been written in the past on the subject of the danger associated with rotary engines owing to gyroscopic effects, that it is somewhat refreshing to read of a suggestion whereby this action can be usefully employed for stabilising purposes on aeroplanes. Gyroscopic action becomes active in a machine propelled by a rotary engine when it is caused to deviate from a straight course, and it was, at one time, believed by many people that this gyroscopic torque was directly responsible for several fatal accidents that had occurred. It is now known that, ordinarily, no inconvenience is experienced by the pilot. The conclusion arrived at by the Departmental Committee that investigated the causes of accidents to Army monoplanes, the report of which appeared in FLIGHT for February 8th, 1913, was to the effect that the couple due to gyroscopic action does increase the stresses upon the engine mounting, and affect the steering, but "there is no reason to anticipate serious consequences on either ground." And in commenting upon its effect upon the steering it was observed that this might be "compared with that produced by a small gust of known direction, and should cause no difficulty to the flyer."

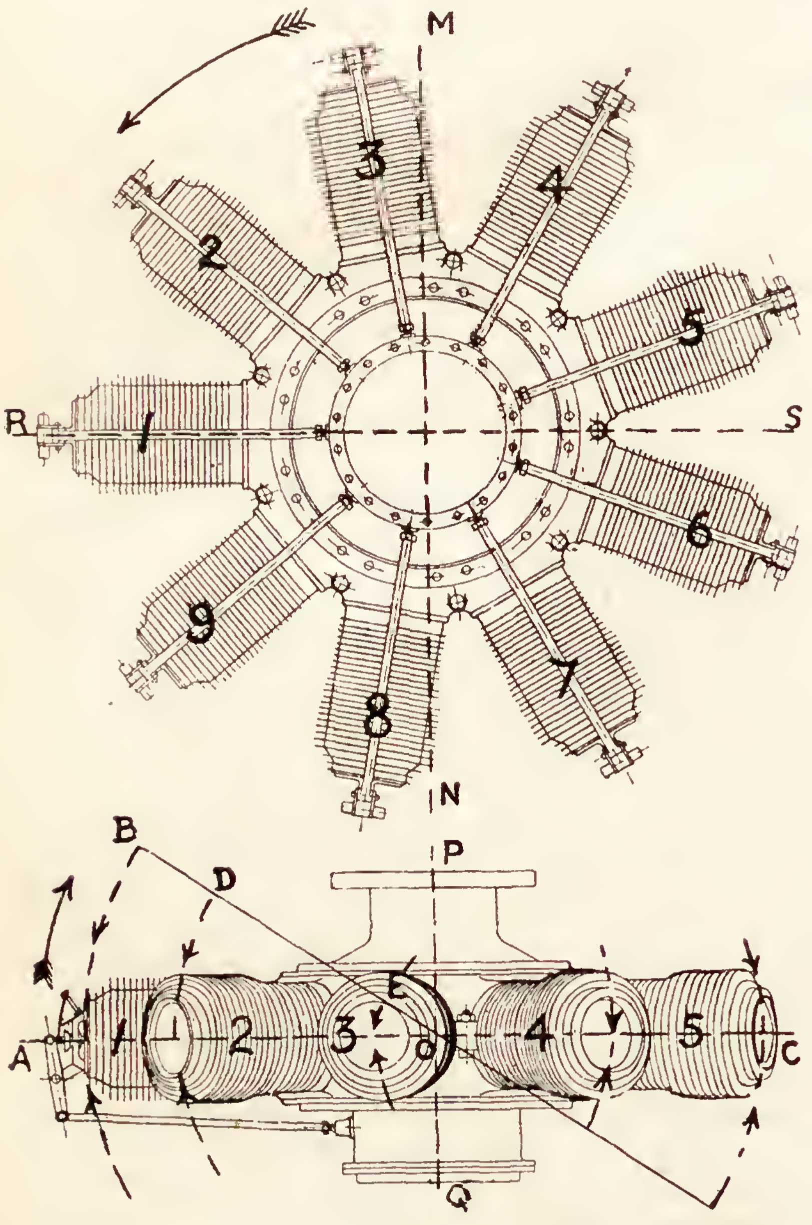


Fig. 1.

Much of the misapprehension that was then felt had its origin in the obscurity and mystery with which gyroscopic action was, and even now is, enshrouded; and it will not, therefore, be amiss if we first explain how it is produced, and the direction in which it is active.

It will be assumed that the engine in Fig. 1 rotates in an anti-clockwise direction about the crank-shaft as shown, and that while so doing it is caused to move, during a certain interval of time, through the angle AOB about an axis M N in the direction indicated by the arrow. Such a movement would correspond to that which is given to a rotary engine on a tractor machine during a right-hand turn. It will be seen that during the time that the angular displacement is being effected, the axial distance of each successive cylinder from the original plane of rotation undergoes considerable change. For example, when No. 1 cylinder moves from the vertical to take up the position occupied by No. 3 cylinder in the figure, its axial displacement is proportional to the perpendicular distance between E and the line A C in the plan; whilst when it has assumed the horizontal position, its axial displacement is proportional to the perpendicular distance between B and A C, and similar changes take place during the succeeding quadrants. Now these several angular positions are taken up in order by all the cylinders consecutively; and, therefore, the axial velocities of the cylinders are subject to continual variation during the revolution of the engine, being proportional to the perpendicular distance from the point considered on the cylinder to the vertical line, M N. To bring about these changes in velocity it is necessary that an accelerating force (which may be either positive or negative) should be impressed upon the cylinders, and since action and reaction are equal and opposite, an equal and opposite force is transmitted to the frame or support.

Let us now consider the direction in which these forces act. During the angular displacement of the rotating engine about the axis, M N, the cylinders are accelerated when passing through the upper left and the lower right-hand quadrants, and, therefore, the applied force must act in the direction in which the movement takes place; while in the remaining quadrants the cylinders have their axial displacements and velocities diminished, and hence must be subjected to a decelerating force. If we examine the directions of these applied forces we shall find that the cylinders, when above the horizontal line, R S, are acted upon by a force directed at right-angles to the plane of and passing downwards through the paper, while during their passage through the two quadrants below R S they are acted upon by a force at right-angles to the plane of the paper and outwards from it. Hence these two sets of forces which act in opposite directions on the two sides of the horizontal centre line, are the result of displacement of the engine about its vertical axis, M N, and the reactions upon the engine supports are as shown by the dotted arrows drawn in the plan—the arrows above the line A C showing the direction of these forces during the upper half and those below A C being for the lower half of the revolution.

It will now be apparent that a tractor machine fitted with an engine rotating in a clockwise direction viewed from the rear, will in making a turning movement to the right tend to dive, whilst in executing a left-hand turn, the machine will exhibit a tendency to tilt. In a similar manner, if the disturbing force causes a downward movement of the head of the machine, the gyroscopic couple will endeavour to move the nose towards the left hand.

The magnitude of the gyroscopic torque produced by any particular engine will depend upon the rate of change of direction or position, and varies inversely as the radius of the circle in which the machine is turning, and directly as the velocity of transit and as the speed of revolution, the square of the radius of gyration and the weight of the engine. For example, supposing that an aeroplane travelling at a speed of V miles per hour is steered round a circle of R feet radius; that the speed of revolution of

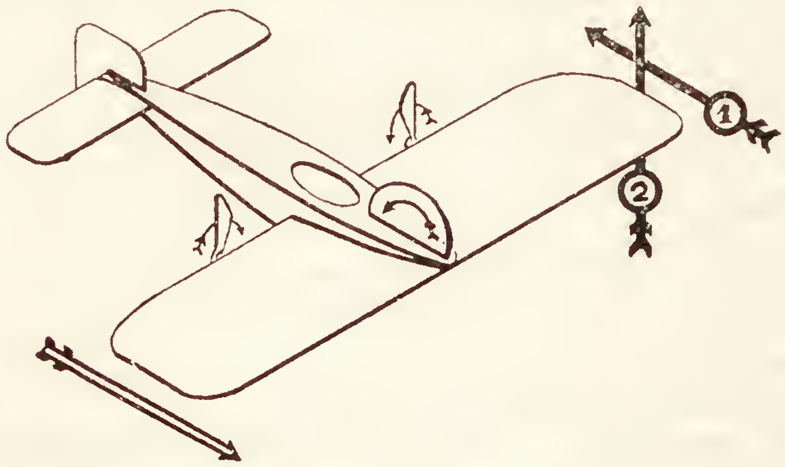


Fig. 2.—Machine making a right-hand turn—automatic banking.

the engine per minute is denoted by N, its weight being W lbs., and its radius of gyration λ feet. Then—

$$\text{Gyroscopic torque} = \frac{W}{g} \times \frac{V \times 5280}{60 \times 60 \times R} \times \frac{2\pi N}{60} \times \lambda^2$$

$$= 0{\cdot}0048 \frac{W V N \lambda^2}{R}$$

Also, if the moment of inertia is represented by I, the angular speed of rotation is ω radians per sec., and the angular speed of deviation is Ω, then we have the well-known expression—

$$\text{Gyroscopic torque} = I\omega\Omega$$

the units employed being either metric (kilos., metres and radians) or English (lbs., feet and radians).

Thus, if we consider the case of an engine running at a speed of 1,200 revs. per min., and having a radius of gyration of 1·1 ft. and a weight of 250 lbs., when the machine to which it is fitted is steered round a course of 200 ft. radius at a true speed of 70 miles per hour, the gyroscopic couple will amount to 610 lbs. ft. It should be observed, however, that the inertia of the machine will tend to materially retard the movement of the aeroplane as the result of this torque, and in this connection it is interesting to observe that Herr Otto Schlick, in a paper entitled "Gyroscopic effects of flywheels on board ship,"* stated that, for a powerful effect, it is necessary for

$$\frac{I\,\omega}{\theta\mu_0} = \frac{1}{5}$$

where I = moment of inertia of flywheel about the axis of rotation
ω = angular velocity of flywheel
θ = moment of inertia of vessel about the horizontal longitudinal axis passing through the c.g.
μ_0 = greatest angular velocity with which the vessel, without a flywheel, attains the middle upright position,

but that if the numerical value of the left-hand side of the equation is 0·1, the power of the appliance (Schlick's gyroscopic apparatus) will, in many cases, be sufficient.

In the preceding examination, no consideration has been given to the effect of the rotating propeller, because the couple produced by it is small by comparison with that from the engine; and, in addition, is variable in magnitude—its maximum and minimum values being attained when the moments of the axial accelerating forces acting upon the propeller-blade about the line of intersection of the plane in which the machine is moving with the plane of rotation of the engine are at a maximum and a minimum respectively.

In a recent number of the *Scientific American*, the novel suggestion is made that the axis of rotation of a rotary engine should be arranged transversely in the machine, and that the direction of rotation should be anti-clockwise when viewed from the right-hand wing. To overcome any gyroscopic action due to the propeller effect, it is proposed that there shall be two propellers—driven by gearing, and rotating in contrary directions. Fig. 2 shows this arrangement applied to a monoplane in diagrammatic form, which has been taken (together with the remaining illustrations) from the above publication, but it is clearly evident that a similar design could be adapted for employment on a biplane. The proposal would appear to possess sufficient merit to render it worthy of closer examination.

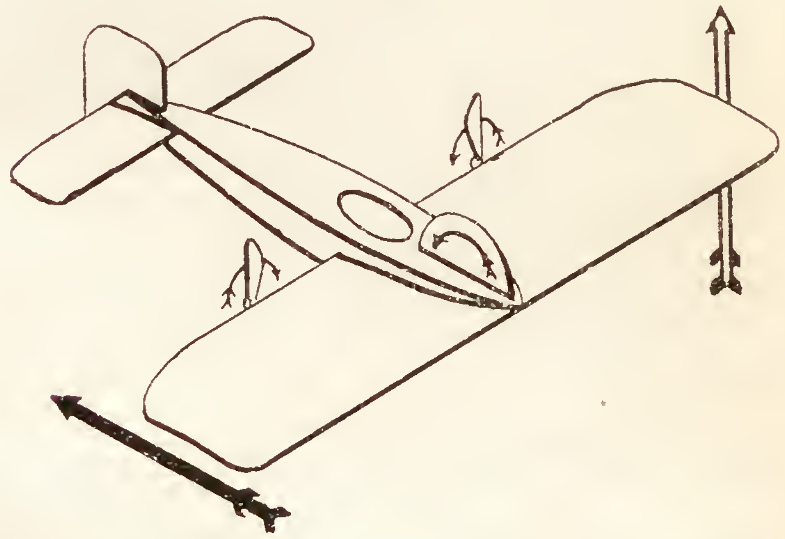


Fig. 3.—Left wing of machine struck by a wind gust.

It will be seen that no disturbance in the longitudinal plane can detrimentally affect the equilibrium of the machine through gyroscopic action, since the movement will take place in the plane of rotation. When one wing only is affected by a head wing gust, the primary effect produced on the machine is that that wing is lifted and retarded. This causes the machine to tilt about its longitudinal axis, and in so doing rotates the motor about its horizontal axis, thus instituting a torque which tends to turn the nose of the machine towards the side on which the gust is encountered. These actions are illustrated in

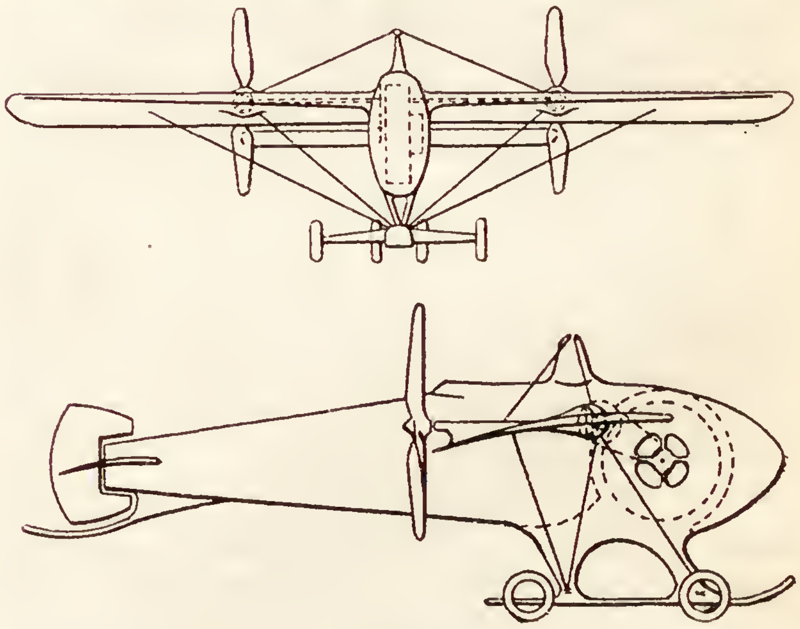


Fig. 4.

Transactions of Institution of Naval Architects—1904.

Fig. 2, as indicated by the arrows, the full arrows showing the direction of the applied forces and the unshaded arrow the resultant tendency due to precession. When a right-hand turn is made, as in Fig. 3, the engine is rotated about its vertical axis, the cylinders passing through the leading upper quadrant are decelerated—hence there is a torque tending to bank the machine over towards the right. These actions, as well as others that result from a disturbance in a lateral direction, and which will readily suggest themselves to the reader, are similar to those which a pilot endeavours to produce with the assistance of his controls; consequently, such an arrangement of engine would conduce to some degree of lateral stability; while, in addition, the mounting of the motor would be considerably facilitated, a better and more rigid framework of the body would be made possible, and the construction of the body would readily lend itself to a streamline formation of lower air resistance than is customary. The centre of gravity of the machine could also be lowered. It may be objected that these same forces will be at work during the time that the machine is being brought back to an even keel, but if the directions in which they are effective are examined, it will be found that they will normally assist, rather than retard, the restoring forces.

In regard to the constructional difficulties which might arise, it will be seen that some form of gearing would be absolutely essential, but in view of the high efficiency attained with modern gears, and the better efficiency of the propeller at lower speeds of revolution, this is not likely to altogether prohibit its adoption, as it has, in fact, been already successfully employed on many engines. Fig. 4 shows the completed arrangement of such a design on a machine fitted with two propellers, but it will be readily apparent that by the embodiment of either a bevel or a worm drive, preferably, as an integral part of the engine, it would be possible to drive a single screw placed either in front or at the rear of the main supporting surfaces.

THE ACTION OF THE CONTROL ORGANS OF AN AEROPLANE IN CRITICAL ATTITUDES.

The following is an abbreviated translation of a lecture by M. Louis Bréguet to Société Française de Navigation Aérienne:—

The two main problems which confront the aeroplane constructors are:

Firstly, to design machines capable of carrying their load with a small expenditure of power, while at the same time having motors capable of developing two or three times, or even four or five times as much power as is required for ordinary flight. These qualities are obtained by reducing the passive head resistance to a minimum, by refining the lines of the machine generally, and by giving the wings the best possible section.

Secondly, to bring out machines possessing a good stability in the air, and having control organs which are effective in all conceivable positions of the machine.

In this lecture I propose to deal with the study of the forces to which aeroplanes are subject, and the way of modifying the points of application of these forces by means of rudders, elevators and *ailerons*, in order to right a machine which has been thrown out of its normal attitude of flight.

The frequent accidents tend to give one the impression that the equilibrium of an aeroplane is very precarious, and that once the machine gets past certain attitudes the pilot is unable to control it and thus prevent a fatal accident. Is it true that these critical attitudes are so dangerous? Evidently not, for aviators like Pegoud, Chevillard, Garros, &c. have proved by actual experience that a machine can occupy all conceivable positions and yet be righted with ease. The critical conditions are: 1. Too low speeds. 2. Too high speeds. 3. Sideslips and dives.

1. *Too Low Speeds.*—When an aeroplane loses its speed the reaction of the air on its planes is insufficient to support it in spite of the increased angle of incidence. For angles of incidence of from 15 degrees the lifting forces do not increase with the angle of incidence, and for angles from 20 degrees they decrease. Generally when an aeroplane loses speed it turns over either to the right or to the left. This is what is called a sideslip. If the pilot tries to right his machine by warping he will only increase the sideslip, and if his motor is failing he can only right the machine by diving it until it has regained it flying speed. If the motor possesses great reserve power it is possible to right the machine before the sideslip has become very pronounced. Whilst this sideslip is, of course, dangerous when the machine is close to the ground, there is little or no danger when it is flying at an altitude sufficiently high to allow of regaining its speed by a dive. Besides, a machine with a proper *empennage* will not lose its speed unless the pilot wishes it to do so, and it does not seem necessary to fit an automatic control organ for the purpose of helping the pilot. It is, however, alway advisable to fit speed indicators which will keep the pilot informed as to the behaviour of his machine.

2. *Too High Speeds.*—It is generally admitted that the conditions of too high speeds present a certain danger. It has been said that aeroplanes flying at very small angles of incidence may, by a sudden longitudinal swerve or dive, receive a sudden pressure on top of their wings, and thus losing all sustentation, they fall.

The point to be studied with regard to high speeds is: How do the points of application of the forces to which an aeroplane is subject vary for possible variations in the angle of incidence during these high speeds? Experiments with scale models in the laboratories are very instructive, and it has been possible to verify that certain machines with too deeply cambered wings, or with insufficient *empennage* or badly adjusted, may become unstable when flying with very small angles of incidence. It should be remembered that for a cambered plane the centre of application of the resultant of the forces acting on it travels backwards, progressively as the angle of incidence decreases, and that for very small angles of incidence the travel of these centres is considerable.

At the Eiffel laboratory a series of experiments have been commenced with scale models of aeroplanes flying with the most critical angles of incidence by placing them in the air current, and the interesting results obtained lead to the conclusion that it is easy to design machines which the pilot can always right by means of the control organs.

3. *Sideslips and Dives.*—A fall started either by side-slipping or stalling always terminates, if the machine has a suitable *empennage*, in a vertical nose dive. The study of forces, acting on scale models, shows that even from this attitude the machine may be righted by suitably operating the control organs. The most important thing to observe is that the pilot is not thrown out of his seat, and that, thanks to an efficient safety belt he is able to operate his controls, whatever the attitude of his machine.

Suppose that a machine through some cause or other is making a nose dive, and that the pilot is strapped in his seat. He finds that he is unable to right the machine by operating his elevator—such a contingency occurs often, and many pilots have experienced it. The thing to do in a case like that is to push the rudder over as far as it will go, for instance, to the right, in order to make the machine turn to the right with relation to its vertical path of flight, and at the same time warp the wings so as to make the machine revolve around its longitudinal axis after the fashion of the hands of a clock. The aeroplane will then right itself by describing a spiral similar to those favoured by certain pilots in their exhibition flying.

A Prize for a Safety Belt.

IT will be seen from the Official Notices of the Royal Aero Club on page 648 that the Committee, acting on a suggestion of the Accidents Investigation Committee, is offering a prize of £50 for the most suitable form of Safety belt.

The conditions under which the prize will be awarded are now being considered by the Accidents Investigation Committee. It will also be noticed that the Committee in their report on the fatal accident to Philippe Marty make a reference to the use of safety belts.

The British Gordon-Bennett Trials.

BOTH the War Office and the Admiralty are lending splendid assistance to the Royal Aero Club in connection with the organisation of the British Eliminating Trials for the Gordon-Bennett Cup which will be held at the Central Flying School, Upavon, during the last week in August. Shed accommodation for each competitor will be available on August 20th, and the speed tests will commence about three days later. The officers' mess at the C.F.S. has been placed at the disposal of the Royal Aero Club for the use of the officials and competitors.

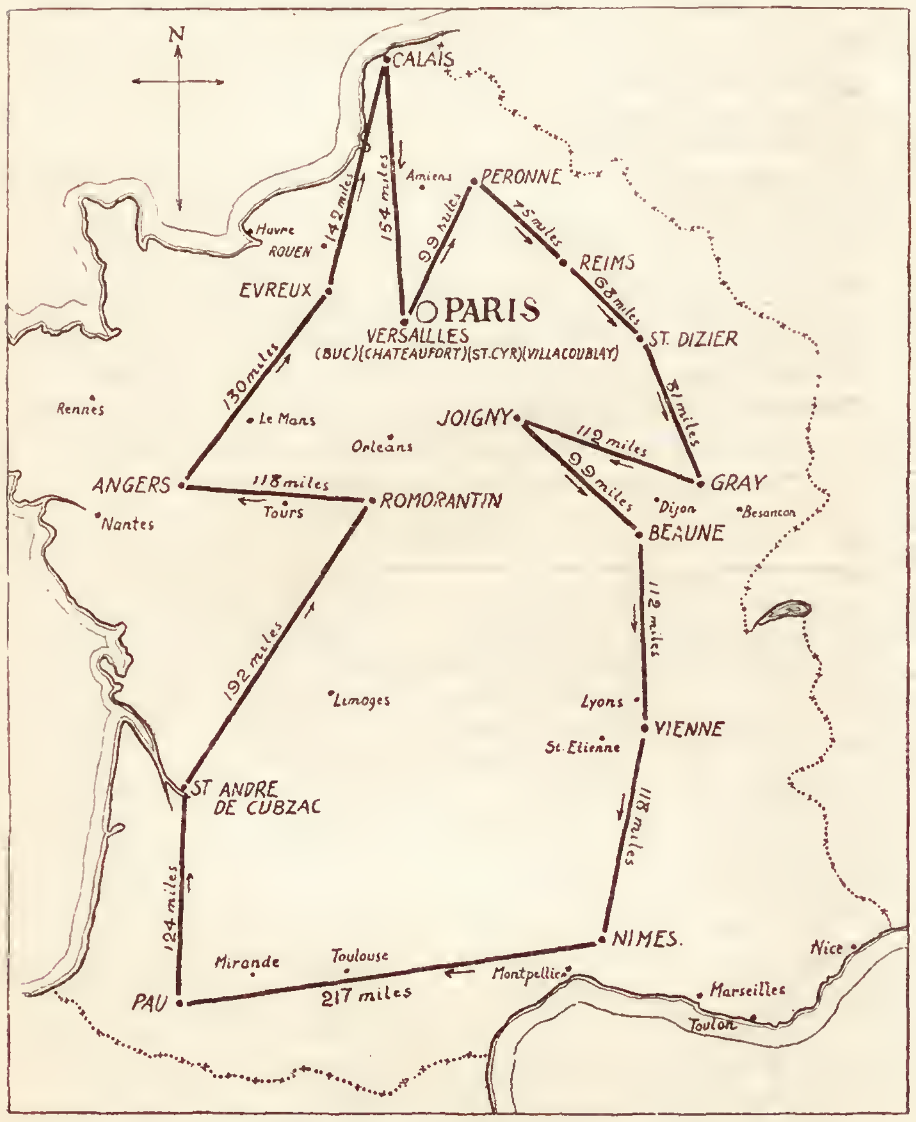
GILBERT'S FLIGHT ROUND FRANCE.

IN last week's FLIGHT brief reference was made to the very fine flight round France made by Gilbert, and in the accompanying table will be found the distances between the various controls and the times of starting and arriving at each. Only once during the whole trip of 1,841 miles did Gilbert fail to reach the control set as his destination. Running out of petrol when near Mirande he had to make a forced landing, and as it was getting too dark to continue he decided to postpone the completion of the stage till the following morning. The fact that the weather conditions were extremely unfavourable makes the flight even more creditable.

As to the actual progress of the tour we can hardly do better than reproduce M. Gilbert's own account of his doings:

"I suddenly decided to make the 'Tour of France' for the Michelin Cup. The event appealed to me because instead of having to fly into a foreign country or to turn round and round like a squirrel in a cage the new regulations called for a flight which was of value as showing the utility of the aeroplane, while it would also be interesting.

"The day before the start I studied maps and routes in order to be able to find my way easily. In this manner I studied about 15 metres of maps—those nice coloured Government maps. I cut out the route for the journey which I had marked off with a straight line in blue pencil, leaving about 15 centimetres on each side. The strip thus formed I rolled up and found it to be of great use on my two days' journey. The start took place on June 8th at 3 a.m. from Villacoublay. As the day progressed it began to rain. Members of the Aeronautical Ligue of France had been requested to be on the aerodromes or controls where I had to land, at certain indicated hours in order to verify my passing and to sign my check card. At Peronne, the first control, where I arrived at 4.10, ahead of my scheduled time, nobody was up. However, the noise of my engine soon caused two heads to appear from the depths of a shed. I shouted and made desperate signs from the seat of my machine. The two heads—and the rest—came hurrying along, signed my card and I was off again. I continued to Rheims, tossed about by the wind and soaked by the rain. Landed on the military aerodrome, had my book signed and a few minutes later was on my way again. I had to rely upon my map and my compass for finding my way. As for the numbers painted on top of gasometers and roofs of houses, and intended for signposts for aviators, words fail me. These numbers will be very useful when an aviator can say to his passenger: 'I say, will you look in the Wirelessphone Directory and see what 346·68 stands for,' but until then . . . On the other hand, the hangars on the landing places are clearly visible and one can easily read the name, painted on the roof in black or white letters, of the county over which one is flying.



"Thanks to the careful arrangements of the Le Rhone firm replenishments were awaiting both my engine and myself at five different towns. At Gray Edouard Martin was waiting, at Vienne and Pau my mechanics, and at Evreux M. Verdet. I cannot emphasize too strongly the great service all rendered to me.

"The magnificent panorama which was unrolled beneath me on the first part of my journey and also during the latter part was one of the finest sights I have ever seen. Perhaps the dark weather contributed towards making the delicate shadings stand out more. I saw the North with its houses hidden amongst the trees; I saw the Vosges with its perched habitations, and the immense chain of the Cevennes, the summit of which was hidden in the clouds. Then the green prairies of Midi . . .

"I had counted on being able to spend the night at Pau, but unfortunately I had the wind against me from Nimes and night was approaching rapidly, so as I was near Mirande, I decided to stop there. The field in which I landed had been at one time used for an aviation meeting, but what I took to be a suitable landing ground turned out to be a field covered with one meter high grass, and I had several anxious moments.

"'Eh! We thought you were dead,' said a peasant who came running up, followed shortly by several others. 'Eh! You are not ill? Eh! you come from Paris? . . .' After asking one of the peasants to look after my machine, I got them to show me the way to the nearest telegraph office so that I could reassure my friends before going to the hotel for a few hours' rest.

"When I woke up the next morning I could not at first make out why I was in that room, but then I suddenly remembered the 'tour.' I jumped out of bed and looked at the clock. It was half-past two! Some kind friends at the hotel who had promised to help me to start were all fast asleep. When I arrived at the field where I had left my machine the man in charge was sleeping peacefully under one of the wings. I roused him and was soon on the way to Pau. In the moonlight the white houses and the churches of Midi resembled vague shadows. In the distance arose the imposing chain of the Pyrenees.

"I arrived at Pau at dawn and left again a quarter of an hour later, keeping at an altitude of between 150–300 metres on account of the fog. I was assailed by a form of drowsiness and sang at the top of my voice in order to keep awake. After passing Evreux renewed courage seemed to come to me. I fancied that I was at the end of my journey. At this moment a terrible storm brought me back to merciless reality. In the middle of a violent hail storm flashes of lightning rent the sky on all sides and I expected to be struck by the lightning at any moment. Finally I arrived at Calais. With what haste I started for the last time towards 'home' 250 kilometres away.

"I was again surprised by a storm, and this time fell a victim to it as I had lost my bearings. After wandering about for nearly an hour I found myself flying along the sea. I descended, and, without stopping my motor, asked in which direction Paris lay. An hour and a quarter later I arrived at Villacoublay, and completed the voyage of 3,000 kilometres, not counting those extra ones covered on the last stage. The fatigue was not very great. I had the advantage of will-power, and will-power is able to overcome fatigue. My machine has been replenished five times, and I . . . the same number of times. Cold chicken at Vienne, cold chicken at Mirande, chicken at Romorantin.

"What chickens!"

JUNE 8TH.

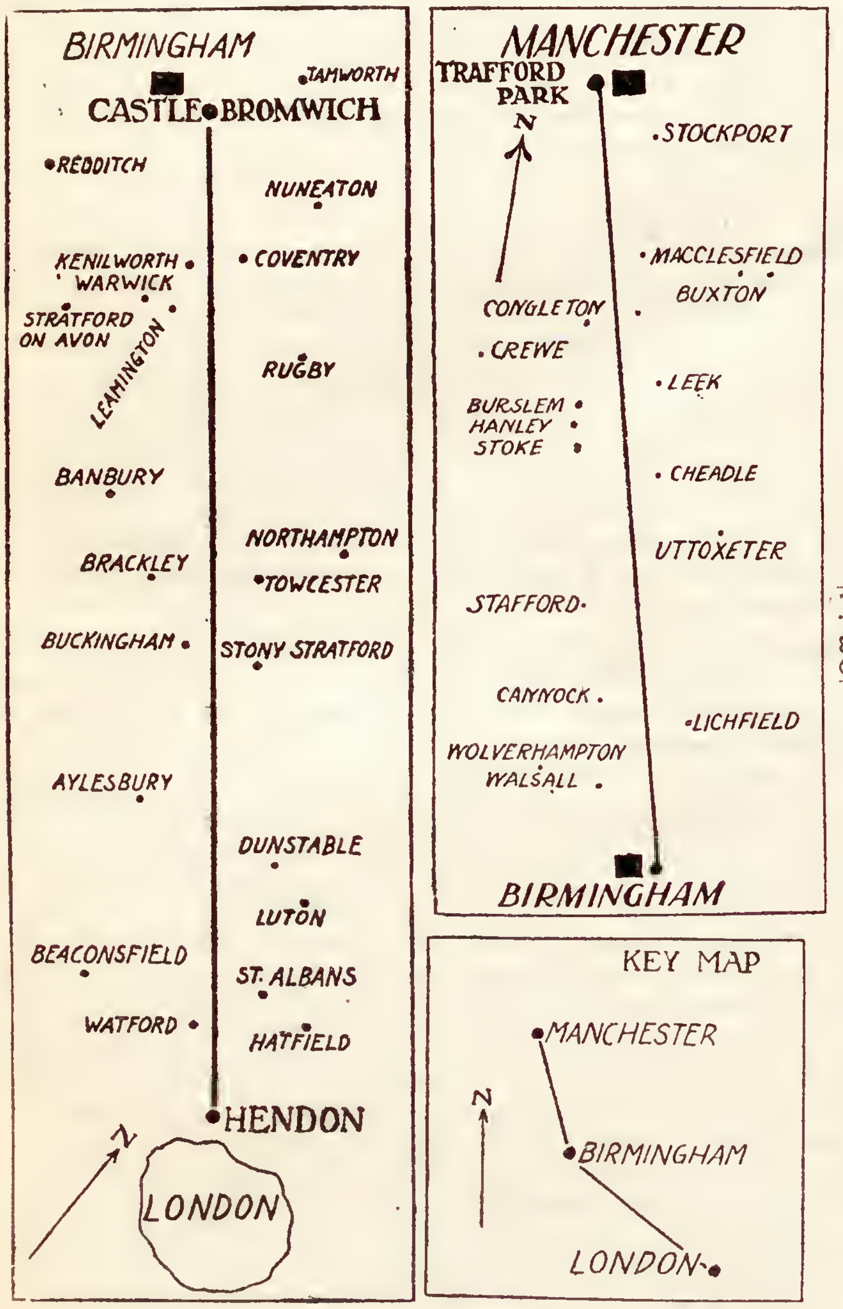
Villacoublay (dep. 3.1). Peronne (arr. 4.10)...	99	miles.
Peronne (dep. 4.25). Reims (arr. 5.20)	75	,,
Reims (dep. 5.35). St. Dizier (arr. 6.10)	68	,,
St. Dizier (dep. 6.15). Gray (arr. 7.30)	81	,,
Gray (dep. 8.5). Joigny (arr. 9.40) ...	112	,,
Joigny (dep. 9.50). Beaune (arr. 11.10)	99	,,
Beaune (dep. 11.30). Vienne (arr. 12.50)	112	,,
Vienne (dep. 1.30). Nimes (arr. 3.30)	118	,,
Nimes (dep. 3.40). Ran out of petrol and landed at Mirande (arr. 8.15). Spent night here.		

JUNE 9TH.

Left Mirande at 3.15 a.m., and arrived at Pau (arr. 4)	217	,,
Pau (dep. 4.15). Saint André-de-Cubzac (arr. 6.15)	124	,,
St. André-de-Cubzac (dep. 6.30). Romorantin (arr. 9)	192	,,
Romorantin (dep. 9.30). Angers (arr. 11.30)	118	,,
Angers (dep. 11.40). Evreux (arr. 1.15 p.m.)	130	,,
Evreux (dep. 1.35). Calais (arr. 3.50)	142	,,
Calais (dep. 4). Villacoublay (arr. 6.39)	154	,,
Total	1,841	miles.

LONDON TO MANCHESTER AND BACK AIR RACE.

The air race from London to Manchester and back, *via* Birmingham, for the *Daily Mail* Trophy and "Pratt's" £750 prize, which will, all being well, be flown to-morrow, Saturday, will be vastly different to the "race" from London to Manchester of four years ago, when Claude Grahame-White gloriously lost the prize to Louis Paulhan. Then no special time or day was fixed for the start, any competitor starting as soon as he was ready, after having given the Royal Aero Club 48 hours' notice. This time, however, the competitors—and there are 14 entries—start at fixed times; it is, in fact, a handicap race. It is interesting to look back on the early event, for there were several incidents that form curious comparisons with what is likely to take place this time. For instance, on Grahame-White's first attempt, Mr. Perrin and two mechanics left in pursuit on a car as soon as the pilot had officially started, and not only kept the biplane in view for some considerable time, but arrived at Rugby about ten minutes ahead of it. A similar instance occurred during Paulhan's flight, but in this case a special train containing Mm. Paulhan and Henry Farman accompanied the aeroplane as far as Rugby. With the speed of some of the machines in to-morrow's race we do not think that train or motor car will be able to keep up with the competitors.



Sketch map of London–Manchester Air Race.

Entries for to-morrow's race closed on Monday last, and the total number received was fourteen. A list of pilots and machines will be found in our accompanying table, from which it will be seen that with two exceptions all took part in the last Aerial Derby, so that for further particulars of the machines, &c., we would refer our readers to Flight for May 22nd. The two exceptions are H. G. Hawker, who will fly the 100 h.p. Sopwith, and R. R. Skene, who will fly the Martinsyde monoplane. The course, which is shown by the accompanying sketch-maps, passes near such important centres as St. Albans, Dunstable, Birmingham, Leamington, Warwick, Walsall, Wolverhampton, Lichfield, Dudley, Sutton Coldfield, Stafford, Uttoxeter, Stoke, Hanley, Burslem, Macclesfield, &c., and totals to a distance of 322 miles. The competitors, besides stopping one hour at Manchester, must stop for thirty minutes both on the outward and homeward journeys at the control at Birmingham. The distance from Hendon to the first control, Castle Bromwich Playing Fields, Birmingham, is 91 miles, and the distance thence to Manchester is 70 miles.

Competitors will leave the Hendon Aerodrome in the order of their handicap times, which order is indicated by their official numbers. The first is due to start at 8 a.m., and the winner is expected to cross the finishing line at Hendon at about 5 p.m.

Public enclosures have been erected at the Birmingham control, where the first pilot is expected to arrive from Hendon at about 9.30 a.m.

Enclosures have also been erected at Manchester at the Trafford Park Grounds, where the first arrival may be expected about 11 a.m., and the competitors will be arriving and departing at frequent intervals up to about 3.30 p.m. The time of arrival of each competitor will be taken at the moment of landing within the boundary of the control, and each competitor will be officially restarted from Manchester one hour after alighting, and at Birmingham thirty minutes after alighting.

The prize for the fastest time is the *Daily Mail* Gold Trophy and £400 presented by the Anglo-American Oil Co., (the Distributors of Pratt's Motor Spirit) in commemoration of the Anglo-American Peace Centenary. This Company has also presented the sum of £250 as first prize, and a further sum of £100 for a second prize in the handicap.

At Hendon, after the competitors have left, special exhibition and passenger flights will be made by the Hendon pilots, and in the afternoon a speed handicap will be flown for the "Oddinino" Trophy—presented by Mr. A. Oddinino; whilst at the Birmingham control Claude Grahame-White will give exhibition and passenger flights on the three-seater 80 h.p. Henry Farman biplane. The Anglo-American Oil Co. will have a large time board erected at this control on which the progress of the race will be displayed.

LONDON–MANCHESTER AND BACK AIR RACE, JUNE 20th. Particulars of Pilots and Machines.

Official No.	Pilot.		Machine.		Type.	Engine.
						h. p.
1	F. Bjorkland	Sw.	Blériot	F.	Monoplane	50 Gnome
2	W. Birchenough	B.	M. Farman	F.	Biplane ...	70 Renault
3	Pilot to be nominated		Grahame-White	B.	Biplane ...	50 Gnome
4	”		H. Farman	F.	Biplane ...	80 Le Rhone
5	P. Verrier	F.	H. Farman or	F.	—	80 Gnome
			M. Farman	F.	Biplane ...	70 Renault
6	L. A. Strange	B.	Blériot	F.	Monoplane	80 Gnome
7	J. Alcock	B.	M. Farman	F.	Biplane ...	100 Sunbeam
8	R. Carr	B.	Morane	B.	Monoplane	80 Gnome
9	W. L. Brock	U.S.	Morane	B.	Monoplane	80 Gnome
10	L. Noel	F.	Morane	B.	Monoplane	80 Gnome
11	R. R. Skene	B.	Martinsyde	B.	Monoplane	120 Austro-Daimler
12	Lord Carbery	B.	Bristol or	B.	Biplane ...	80 Le Rhone
			Morane	F.	Monoplane	80 Le Rhone
13	F. P. Raynham or another	B.	Avro	B.	Biplane ...	80 Gnome
14	H. G. Hawker	A.	Sopwith	B.	Biplane ...	100 Gnome

A. = Australian. B. = British. F. = French.
Sw. = Swedish. U.S. = United States.

⁂

The London–Paris–London Air Race.

The race from London to Paris and back in one day will take place, weather permitting, on Saturday, July 11th, and it is anticipated that in addition to several well-known Continental pilots, most of the pilots entered for to-morrow's race will also take part in this event. Entries, at £5 each, close on the 27th inst., and should be sent to the Royal Aero Club, 166, Piccadilly, W. Late entries at double fees will be accepted up to July 4th. The start of the race will be from the London Aerodrome, Hendon, the competitors leaving in the order of their respective handicap times, from 5 a.m. onwards. After leaving Hendon they will pass over Harrow, Epsom and the South Coast, and from thence across the Channel to Boulogne and then on to the Buc Aerodrome near Paris. The return journey will be *via* Folkestone, Epsom and Harrow, to Hendon. In passing over the places mentioned, the competitors will have to descend sufficiently low for their numbers to be easily distinguished by the observers. Competitors are required to make a compulsory stop of one hour at Buc Aerodrome, which time may be occupied by replenishments and such repairs as are permitted. Any time spent in the Aerodrome beyond the one hour allowed will count as flying time.

EDDIES.

Although the Aircraft Co., Ltd., have met with great success in building Maurice and Henry Farman biplanes under licence, they are too enterprising a firm to rest satisfied with building these machines, however excellent they are. In this connection they have secured the services of Mr. G. de Havilland, with a view to designing and constructing original machines. Mr. de Havilland, as our readers are, of course, aware, has been connected for several years with the Royal Aircraft Factory at Farnborough, where he has had long experience both in designing and piloting aeroplanes, and he is probably one of our cleverest scientific pilots at the present day. While at Farnborough Mr. de Havilland has had a great number of different machines, factory built as well as privately constructed, pass through his hands, so that he must have at his finger tips, as it were, the good and bad features of practically all the aeroplane types.

With a designer of such experience, a firm which maintains so high a standard of workmanship as does the Aircraft Co., should be in a position to produce something really startling. For the exact form which this "startler" may assume, I must for the present leave my readers to "wait and see."

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Marcus D. Manton, who has, it will be remembered, joined Mr. B. C. Hucks in giving exhibitions of looping the loop and other "scientific experiments," relates the following amusing incident: At the local cinema theatre of one of the towns where he had been giving exhibitions, a film was shown representing Manton doing a loop. Preceding the film a lantern slide portrait of Manton, taken at Hendon some time ago, before he was adorned with a moustache, was flashed on the screen. Following the film showing the looping was another portrait of him taken just after landing, showing him, of course, with the very decorative adornment of his upper lip which is now a source of great pride, sufficient to overcome objections to any possible increase in head resistance. One of the audience was heard to clamour loudly for information regarding the kind of "grower" used by Manton and which was capable of producing a moustache whilst he looped the loop.

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Talking about moustaches reminds me of another case in which, however, the procedure was reversed. An Austrian pilot is said to have shaved himself whilst flying at an altitude of about 6,000 ft. The report does not state whether he used a safety or an ordinary razor, but at any rate the pilot may be assumed to have had "a close shave."

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Mr. Pemberton-Billing tells me that Supermarine P.B.1 was taken out for a short test on the water the other day, but that owing to the propellers being unsuitable only a short hop was accomplished. P.B.1 has been altered from a single-screw tractor to a twin-screw propeller machine, as Mr. Pemberton-Billing is now concentrating on that type, and so wished to obtain some data which might be useful in designing the new P.B.7. I understand that two machines of the P.B.7 type are on order from Germany and are already in the course of construction. Briefly, P.B.7 will consist of two separate units—the boat, which is of more or less standard hydroplane type, and the wings and tail planes. The engine will be placed down in the hull of the boat and will drive, through a chain transmission, two propellers situated behind the main planes, and in addition a water propeller placed under the rear end of the boat. By means of guide release devices the wings and tail planes may be instantly detached from the boat, which is thus converted into a high-speed motor boat, driven in the ordinary way by means of the submerged propeller. Floats placed under the wing tips and under the inner ends of the lower main planes will keep these afloat, so that in a fairly smooth sea it should be possible to "back" the boat into the wings again, secure them in place and proceed as a waterplane. The experiment is a highly interesting one, and should furnish some valuable information, even if the first attempt should not be a perfect success.

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Mr. Louis Noel, who, it will be remembered, was the first man back in the Aerial Derby, but who was disqualified for not passing the last two controls, is to receive, as a consolation prize, from the distributors of "Shell" motor spirit, a solid silver model of his Morane-Saulnier monoplane. Last Saturday Noel received another consolation prize in the form of a miniature replica of the large cup presented by Mme. Manio and won by R. H. Carr.

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According to a report from Germany an aeroplane is said to have made a flight of a quarter of an hour's duration over Cologne on Sunday last with nobody on board. It appears that the engine was started before the pilot got into his seat, and the machine taking charge was flying about for fifteen minutes when the petrol supply gave out and the machine perforce had to return to the ground. The propellers were smashed in landing, but it is hoped that with a little more training the machine can be taught the intricacies of alighting like a good little machine should.

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This is not, however, the first instance of an aeroplane running away, for a couple of years ago a machine—a Blériot, I think—got away from a pupil at Hendon, and was only caught after quite an exciting chase. On another occasion Mr. Ewen's Dep. monoplane made a dash for liberty, but was forced to abandon the attempt, as Mr. Warren managed to get hold of a wing tip, and stopped the machine by swinging it round until it charged into the railings of one of the enclosures. Neither of these machines, however, had the nerve to take the air.

× × ×

Mr. W. R. Ding, who annexed great fame by flying across the Channel with Princess Ludwig of Löwenstein-Wertheim as a passenger on his Handley Page biplane a short time after obtaining his "ticket," has been giving some very successful exhibition flights at Bath. Among the numerous passengers carried, the first was Miss Ivy Ashman, the well-known Bath soprano, who took very kindly to the air. Besides exhibition flights, Mr. Ding gave demonstrations of bomb dropping, a hayrick serving as a target. Out of the four bombs dropped from an altitude of between 200 and 300 ft. the nearest was only 15 ft. away from the target, whilst the other three distances were 45, 50 and 58 ft. respectively. Considering the short experience he has had, Mr. Ding's handling of his machine is remarkably good, and the fact that he has so quickly mastered the control, is still further confirmation of the ease and handiness of the Handley Page biplane.

"Æolus."

CORRESPONDENCE.

Brakes for Aeroplanes.

[1870] I have read with considerable interest the letters in your correspondence pages on air and other brakes. It seems to me, however, that these methods of checking the speed of aeroplanes are wrong. Would not a better method be to reverse the engine, as is done with ships? This would make it quite safe to land on ground which would spell disaster at present. My opinion, as an engine builder, is that it would be quite easy to build a reversible engine. The opinion of your readers regarding the effect of reversing the engine on the stability of the aeroplane would be of interest.

Silsden, near Keighley. MECHANIC.

[1871] I shall be glad if you will permit me space to reply on the points and suggestions contained in Mr. Herman Shaw's letter appearing last week.

I do not think the events which your correspondent foresees are likely to occur at all, as, of course, the brakes would not be applied suddenly and violently, immediately the machine touched earth, but gradually, and with increased pressure as soon as the aeroplane had appreciably slackened speed; and for this reason I do not see that a sudden nose-dive, or any severe shock, would occur if the brakes were properly applied.

Touching Mr. Shaw's suggestion of air or wind brakes, these have been found to be of little or no use, as the braking effect is small even at high speeds, and when the machine is travelling comparatively slowly it is totally inefficient, and in the case of a following wind, it would actually increase the speed of the aeroplane. The braking effect of a skid is also very small, and has several other disadvantages.

In an interesting article which appeared in FLIGHT some time ago, Mr. de Havilland stated the disadvantages and comparative uselessness of any form of brake of the drag or skid type, and also of a wind or air brake.

The utility of a brake, such as the one which I referred to in my previous letter, will on consideration be quite apparent, and would not, as in the case of any form of drag-brake, or skid, cause the slightest damage to the surface of any ground, growing crops, &c., upon which the aeroplane should happen to alight; which, in the case of a sudden forced descent, would be a consideration.

Walthamstow. V. H. MAIR.

Turbine Blade Camber.

[1872] In FLIGHT of the last week in May, a correspondent gives a sketch of blade camber of a turbine blade. In case readers should compare it with aero-cambers, it would be as well to show the great difference between them.

Steam at a high pressure is not at all similar to air in its action on blades, and in a turbine the blade is not serving the same purpose as an aerofoil.

The blades in a Parsons are placed close together, and the steam in passing between them encounters a nozzle-shaped passage, so losing some pressure and gaining some velocity, as under:—

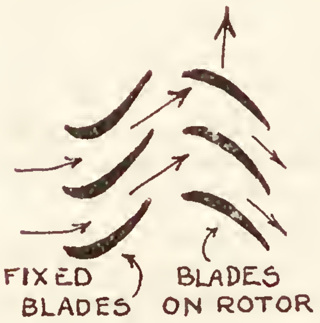

Fig. 1.

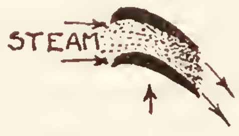

Fig. 2.

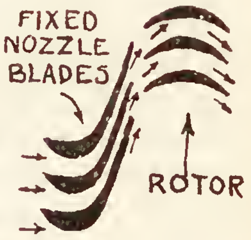

Fig. 3.

It may be seen (Fig. 1) that the impulse is both derived from the change of direction of the steam and *also* from its increase in velocity due to the "trailing edges" of the blades being closer together (at right angles to flow of steam) than are the entering edges.

So the blade is really in position, relative to the steam, as shown in Fig. 2.

Of course, this scheme, applied to an aeroplane, would give a considerable "drift" value—which in a turbine is utilised to balance the thrust of the propeller.

The blades of a purely "impulse" turbine are more analogous to an aeroplane, as the "gap" is a larger proportion of the "chord," and the former does not converge (Fig. 3). All the pressure is turned into velocity in the fixed nozzle blading.

H.M.S. *Shannon*, NOEL F. WHEELER, R.N.
Second Cruiser Squadron.

A sharp rise by Mr. B. C. Hucks on his Blériot during his recent visit to Leicester for exhibition flying.

Foreign Aircraft News.

New World's Records by Garaix.

On the Paul Schmitt biplane fitted with 160 h.p. Rhone motor and Integral propeller, Garaix on the 10th inst. at Chartres made new speed records up to 100 kiloms., for pilot and four passengers and up to 150 kiloms. for pilot and five passengers. The new records are as follows, and wherc there were records existing, they are given in brackets.

PILOT AND 4 PASSENGERS.

Speed.

kils.	m.	s.		h.	m.	s.
10	5	$27\frac{2}{5}$	(Busson	0	7	8)
20	11	$0\frac{1}{5}$	(Busson	0	14	$0\frac{4}{5}$)
30	16	$32\frac{2}{5}$	(Champel	0	21	$53\frac{4}{5}$)
40	22	$1\frac{4}{5}$	(Champel	0	29	$13\frac{3}{5}$)
50	27	$32\frac{4}{5}$	(Champel	0	37	31)
100	55	$12\frac{4}{5}$	(Champel	1	13	$1\frac{1}{5}$)

Greatest speed.

110·091 k.p.h. (Busson, 87·251 k.p.h.).

Time.

$\frac{1}{4}$ hour 26·580 kils. (Champel, 20 kils.).

$\frac{1}{2}$ hour 53·141 kils. (Champel, 40 kils.).

1 hour 107·580 kils. (Champel, 84·343 kils.).

PILOT AND 5 PASSENGERS.

Speed.			h.	m.	s.
10 kils.	...	..	0	5	$32\frac{2}{5}$
20 kils.	...	...	0	11	$5\frac{2}{5}$
30 kils.	...	...	0	16	$39\frac{2}{5}$
40 kils.	...	...	0	22	14
50 kils.	...	...	0	27	$47\frac{2}{5}$
100 kils.	...	...	0	56	20
150 kils.	...	...	1	24	$11\frac{1}{5}$

Greatest speed.

108·448 kils.

Time.

$\frac{1}{4}$ hour 20 kils. $\frac{1}{2}$ hour 50 kils. 1 hour 106·168 kils.

Distance.

150 kils.

Duration.

1 h. 24 m. $11\frac{1}{5}$ secs. (Faller, 1 h. 10 m. 17 s.).

The passengers were MM. R. Poulain, A. Mathieu, J. Rouede, G. Chantreau, P. Wagner, their combined weight being 327·5 kilogs. The pilot weighed 87 kilogs. and there were also carried 140 kilogs. of fuel and 54 kilogs. of oil, so that the total load was 608 kilogs.

550 Kiloms. in Five Hours.

On the 12th inst., Lieut. Quillien, on a Blériot Gnome, set out to fly from Epinal to Cherbourg on a military machine, but owing to a very thick fog he was obliged to land at Longues. He had, however, effected a non-stop flight of 550 kiloms. in five hours, flying for most of the time at a height of 2,000 metres.

Flying from Paris to Lausanne.

Having received orders to rejoin his regiment, a Swiss pupil at the Farman school at Etampes, on the 11th inst., determined to fly back to Switzerland. Accompanied by a friend on his H. Farman, he flew from Etampes to Basle, with a stop for lunch at Dijon, and the next day went on over the Alps to Lausanne.

Crotoy to Buc on a Caudron.

Having to carry out some tests before a military commission at Buc, Chanteloup on the 13th inst. flew on his Caudron from Crotoy to Issy and then across to Buc.

Buc-Verdun on a Farman.

On his H. Farman biplane, Sergeant Chatelain, accompanied by his mechanic, on the 12th inst. flew from Buc to rejoin his centre at Verdun. He had to fly against a very strong wind so that the trip took 4 hrs. 10 mins. including a stop at Perthuis (Marne) for replenishments.

The Gordon-Bennett Meeting.

The main lines of the programme for the Gordon-Bennett Meeting at Buc have now been arranged as follows: September 19th, Qualifying Events for French Eliminating Trials. September 20th, French Eliminating Trials in morning, other events in afternoon. September 26th, Qualifying Speed Tests for the Cup Competition. September 27th, Race for the Gordon Bennett Cup in the morning, and other events in the afternoon.

R.E.P. again President of Chamber.

At the Annual General Meeting of the Chambre Syndicale des Industries Aeronautiques last week, M. R. Esnault-Pelterie was re-elected President, while MM. Henry Kapferer, Alfred Leblanc and Leon Morane were elected Vice-Presidents with Mr. A. Groupy as Treasurer. M. Andre Granet was also re-appointed General Secretary.

The Stability Competition.

Some tests in connection with *Concours de la Securité en aeroplane* were made at Buc on the 11th inst. The competitors were required (1) to make a right-hand turn and land with motor stopped, and (2) make a left-hand turn, slacken speed and accelerate without touching the ground. The tests were accomplished by Molla on a R.E.P. "parasol," Capt. Eteve on a M. Farman fitted with his stabiliser, Lumiere on a Monge "parasol." Others taking part were Mr. Watson, Durafour on a Deperdussin fitted with the de la Celle control, and a Balassanian monoplane. The Moreau "aerostable" was also demonstrated. Pelletier and Le Bourhis were seriously injured when testing parachutes for use on aeroplanes.

Sunday at Juvisy.

Although there were no actual competitions some remarkable flying was seen at Juvisy on Sunday afternoon as will be realised when it is mentioned that those who were up included: Pequet (Morane), Pourpe (Deperdussin), Audemars (Morane), Chevilliard (Farman), Bill (Farman), Espanet (Nieuport), Gaubert (Aviatik), Brindejonc des Moulinais (Morane), Garros (Morane), Gilbert (Morane), Molla (R.E.P.), Prevost (Deperdussin), Rose (Morane), Baudry (Morane), and also Champel on his big Anzani-engined biplane. Most of the pilots arrived by air during the morning, and returned by the same way to their headquarters in the evening.

Testing the Dorand Biplanes.

Having accomplished the first stage, from Villacoublay to Rheims, of the long test flight, on the 8th inst., the escadrille of six Dorand-Anzani armoured machines went on to Verdun, *via* Sedan, on the following day, while on the 10th a trip of 460 kiloms. took the machines back to Villacoublay by way of Troyes, Chalons Camp, and Romilly. On Monday last the second part of the test was commenced with a flight from Villacoublay to Dijon and Chatillon.

1,000 Kiloms. in a Day.

A busy day was spent by Adjudant Quennehen on Friday last when, in out and home trips from Epinal he covered more than 1,000 kiloms., being accompanied throughout by an observer. The trips from Epinal included to Chaumont and back, to Chalons-sur-Saone *via* Nancy and back by Jussey, to Dayon and back, to Nancy and back and a circuit *via* Dayon and Vittel.

Fatal Accident to Major Felix.

It is with the greatest regret that we have to record the death of Major Felix, which occurred as the result of an accident at Chartres on Wednesday when testing a new machine designed by a Polish engineer. It will be recalled that Major Felix did some fine flying on the Dunne machine, including a trip from England to France.

French Military Fatality.

While a military biplane, piloted by Brigadier Blot, was manœuvring above a wood close to Toul on the 13th inst., the machine side-slipped, and then dived to the ground; the pilot was killed on the spot, and the passenger, Sapper Cheveau, was so seriously injured that he died on Sunday.

A Mishap to Pegoud.

While making a trial flight at Warsaw on the 9th inst., Pegoud's machine was upset by a sudden gust of wind. It fell among some trees, and the pilot fortunately escaped serious injury, being caught by the branches.

Capt. Amundsen a Pilot.

At the Gardermoen military flying ground near Christiania, on the 11th inst., Capt. Amundsen, the well-known Arctic explorer, qualified on a Farman biplane for a pilot's certificate. Just previous to making the tests Capt. Amundsen was making a flight with Capt. Sem Jacobsen, when the machine dashed to the ground and was smashed. According to one account the motor failed, while another says that the elevator broke; fortunately pilot and passenger escaped with a shaking.

Guillaux in Australia.

On the 9th inst., Guillaux, on his Blériot-Gnome, flew rom Bendigo to Ballarat, a distance of 80 miles in 55 mins. During the trip the machine attained a height of 4,864 metres.

Eight-Hour Trip by "Z7."

During the evening of the 11th inst. the military airship "Z7" started from Frankfort and cruised to Wurzburg and back, being in the air for eight hours.

Another Zeppelin Wrecked.

During a voyage from Cologne, which it had been intended should end at Metz, the military airship "Z 1" was wrecked at Diedenhofen, close to the French frontier. The airship was caught in a storm, and after losing a good deal of gas, the envelope became soaked with rain and the pilot decided to land. This manœuvre was rendered more difficult by the wind, and one gust caught the stern of the vessel and forced it to the ground, with the result that the main frame was broken. Troops were soon at hand and secured the airship, which was dismantled as quickly as possible. Fortunately no one was injured.

THE FLYING MACHINE FROM AN ENGINEERING STANDPOINT.

By FREDERICK WILLIAM LANCHESTER, M.Inst.C.E.

(*Continued from page* 635.)

We may now proceed to consider the interrelation and compatibility of engine and propeller. It has already been pointed out that in order to get the full output from a given engine (as is also well known to be the case in marine propulsion), a propeller pitch has often to be selected far from that proper to highest efficiency. The difficulty has (as in the early Wright machine) been met by adopting a reduction gear; alternatively (as also in the Wright machine) a multiplicity of propellers may be employed. It is evident, for example, that, if four propellers be used in place of one propeller, the individual diameter may be halved, and consequently for a given pitch (and therefore revolution speed) the pitch diameter ratio doubled. The original Wright machine furnished a good example of a case in which the propeller pitch diameter ratio was made approximately that of best efficiency, and this result was obtained, in spite of the low velocity of the Wright machine, by a combination of both methods: that is to say, two propellers were used instead of one, and these propellers were geared down from the engine in the relation 10 to 33.

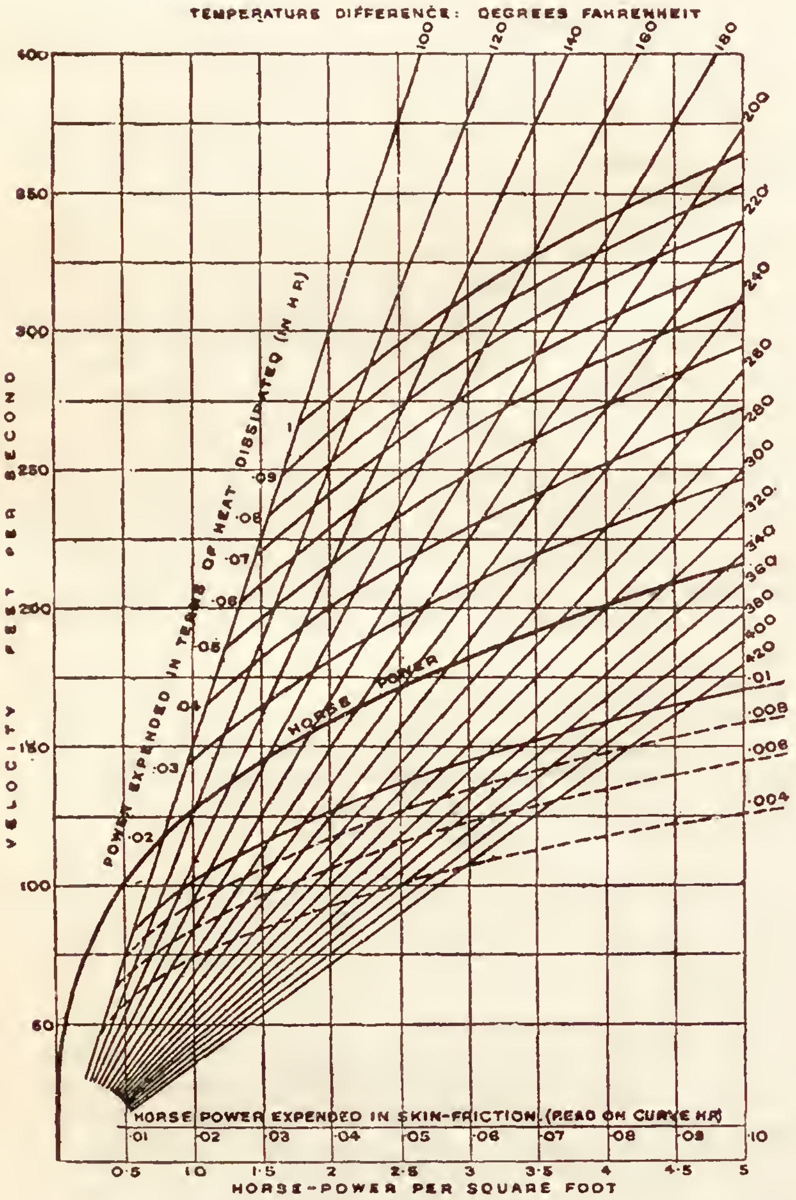

Fig. 28.

The incompatibility at present existing between the engine speed and the propeller pitch becomes less as the flight velocity is increased, so that, in the case of an ordinary machine of about 1,400 lbs. total weight, the propeller speed (for best efficiency) for a single screw machine becomes appropriate to the normal engine speed at about 100 miles per hour. Since the loss of efficiency for a fine pitch propeller, even down to half the pitch ratio of best efficiency, is not great, it may be taken that for flight speeds of 50 miles an hour upwards the balance of advantage lies definitely with the direct-coupled propeller; this agrees with experience. A point of interest in connection with propellers of comparatively fine pitch and somewhat reduced diameter, such as commonly in use to-day, is the fact that, with the engine opened fully out, there is very little difference between the thrust and the revolution speed whether the machine is standing or is in full flight—it is commonly reported that the revolution speed does not increase more than 10 per cent. from "standing" to full normal flight speed—the thrust variation also is slight. This fact constitutes the only justification for the static test of aeronautical propellers, frequently resorted to when approximate data are required. There is no doubt that in a propeller of theoretically perfect proportion, or in an existing propeller, if fitted to a machine of less resistance, there would be a far greater response to flight speed variations. Actually this is the case in marine propulsion where the propeller revolution recorder is commonly found to give more reliable readings than the ship's log.

8. *Relating to the Design of the Aerofoil.*—We shall now proceed to the discussion of the more detailed arrangements and structural features of the machine. First, the aerofoil. The pressure appropriate to least resistance we have already seen to be given by the expression $0{\cdot}32\ \rho V^2$ in abs. units, or $\frac{\rho V^2}{100}$ in lbs. per square foot. (Compare Figs. 17 and 18 and text. The constant 0·32 is empirical.)

Consequently if w is the weight (in flying order) the area required is $\frac{100\,w}{\rho V^2}$ as appropriate to least resistance.

The above is the whole basis of any initial "lay out"; there are many refinements, however, to be considered which enter into the complete problem; the principal of these are:—

The fact that part of w is a function of the aerofoil area—the quantity we are determining—means that the best area will be less than given by the foregoing expression. This point has been dealt with by me in *Aerial Flight*, 1907, vol. i, §§ 171, 194, 195, 196; also more recently by the staff of the N.P.L. (*See* Report of the Advisory Committee, 1911-12, p. 78).

Beyond the above the specification of flight velocity for any machine consists more often than not in the prescription of higher and lower limits rather than of a set fixed speed. Under these circumstances the final values and proportions are based on a lay out of graphs of resistances, thrust, &c., on the lines of the diagrams already given, Figs. 11 and 12.

It is evident from the general character of the resistance velocity curve as shown diagrammatically in Figs. 11 and 12, that whereas considerable departure may be permitted from the normal velocity of flight on either side of the minimum without incurring appreciable increase in resistance, at the limits of the flight speed range, the slope of the resistance curve is considerable, and there will be sharply defined points at which the resistance is equal to the maximum propeller thrust and no liberties can be taken. It is important to note that at the maximum limit of flight speed the equilibrium of thrust and resistance is stable, whereas at the minimum limit the conditions are those of instability, so that should the machine at any time fall below the minimum, the aeronaut can only recover his power of flight by calling upon gravity to assist him, that is to say, by taking a downward course. If, as when near to the ground (or an obstacle), the downward course is not permissible,

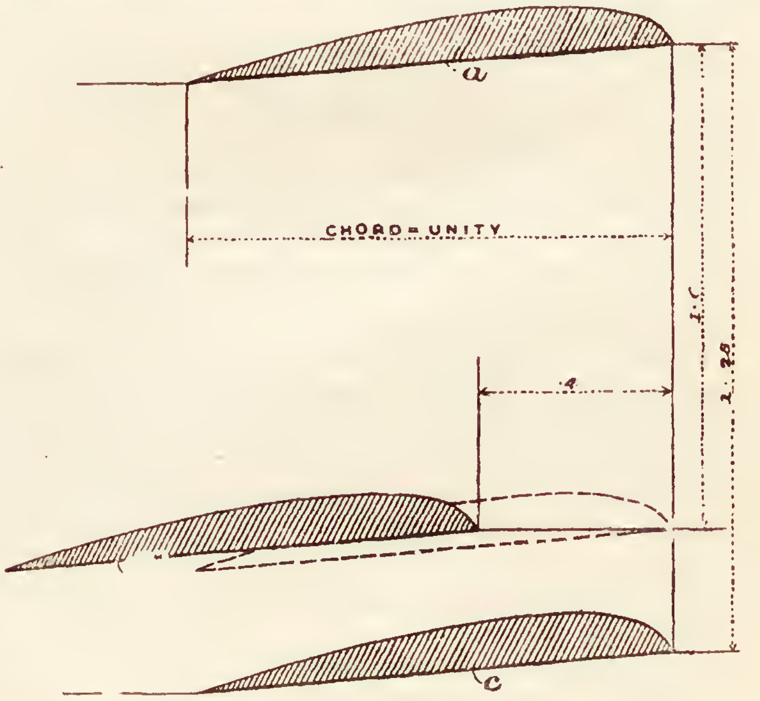

Fig. 29.

the machine will execute an undignified descent, to which the verb "to pancake" has been applied. The critical speed at which this will take place is not necessarily related to the critical "least velocity" angle of the aerofoil.

Briefly, for a given machine the extent of the flight speed variation is a function of the reserve of thrust over the minimum resistance value, the absolute value of the limits being fixed by the load that the aerofoil is called upon to sustain. In the case of a high-powered machine, however, the lower limit may be prescribed by the critical angle of the aerofoil.

The choice between monoplane and biplane is, in the main, a question of constructional engineering; there is not a great deal to choose between the two from an aerodynamic standpoint, but with equally good design the monoplane gives a slightly better lift/drift ratio. The interference effect of the two members of a biplane aerofoil has been studied by many investigators. Langley showed, about 1890, that with superposed planes (aspect-ratio = 4) the interference was not serious when separated by a distance equal to their lesser dimension. The results of a more recent investigation by the staff of the N.P.L. are published in the report of the Advisory Committee for the year 1911-12 (p. 73), from which Table VIII has been taken. In addition to obtaining quantitative data for the particular aerofoil chosen (Blériot, aspect-ratio = 4), an investigation was also made on the effect of staggering the planes. It is shown to be advantageous to arrange the upper foil in advance of the lower; thus the combination *a b*, Fig. 29, is of the same efficiency as the combination *a c*.

TABLE VIII.—*Table of Multiplying Factors to Obtain Coefficients from the Coefficients for a Single Aerofoil.*

Biplane Spacing.	Lift Coefficient.			Lift/Drift.		
Gap/Chord.	6°.	8°.	10°.	6°.	8°.	10°.
0·4	0·61	0·62	0·63	0·75	0·81	0·84
0·8	0·76	0·77	0·78	0·79	0·82	0·86
1·0	0·81	0·82	0·82	0·81	0·84	0·87
1·2	0·86	0·86	0·87	0·84	0·85	0·88
1·6	0·89	0·89	0·90	0·88	0·89	0·91

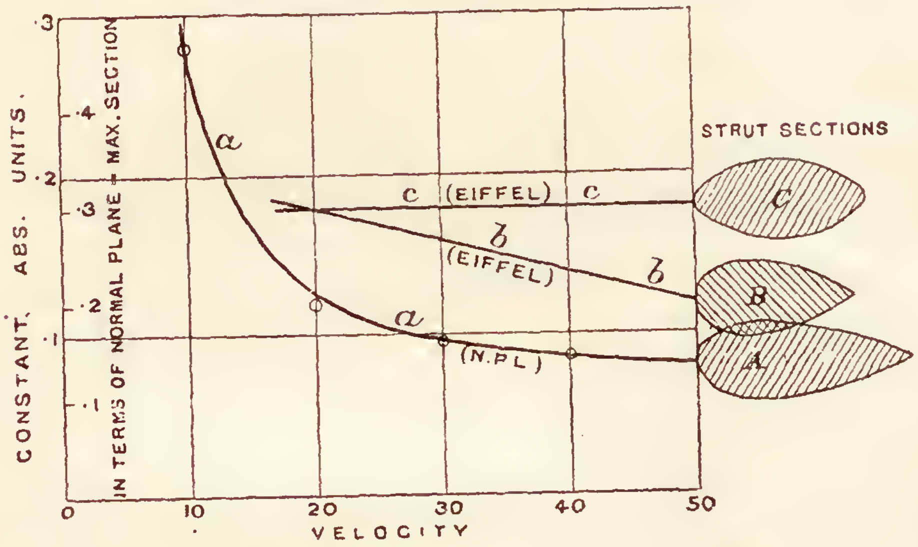

Fig. 30a.

Considering the aerofoil, whether monoplane or biplane, from a structural standpoint, and in investigating the strength of the aerofoil as a whole, it may be treated definitely as an inverted cantilever system. Thus, comparing the stresses in an aeroplane to the stresses in a cantilever bridge, we have the weight of the *fuselage* with its alighting chassis, motor, passengers, &c., the inverted equivalent of the supporting reaction on the central pier of a cantilever girder. We have the air-pressure force, by which the said load is sustained, distributed along the aerofoil length corresponding to the weights of the outstanding members of the cantilever. We have a variation of pressure from point to point due to gusts, eddies, &c., corresponding to some degree to the movable loads representing traffic over the bridge. In the case of the aerofoil, we have in addition something not represented in the analogy of the cantilever girder, *i.e.*, the weight of the aerofoil itself directly supported by the pressure reaction; we may, however, regard this equal and opposite distribution of weight and pressure as superposed on the main system, and as not contributing to the stresses in the aerofoil members. So far as the analogy to the bridge holds good, it is evident we have a well-known engineering problem which is capable of being treated by well-known methods. In the calculation of stresses of the aerofoil members two alternative methods are in current use; in the one the aerofoil struts are treated as pin-jointed members, by the usual truss-girder construction; according to the other method, in place of the hypothesis of the pin-joint, we have the hypothesis of continuity in the main longitudinals. The first and simpler method has been used by several firms for many years past, and gives results which under ordinary conditions, are very much on the safe side; the second method has been developed during the last few years by the N.P.L. (*see* Report of the Advisory Committee, 1912–13, No. 83,) and has been adopted by the R.A.F., and more recently by other manufacturers.

On the pin-joint hypothesis the stresses are solved by the well-known graphic stress diagram; the alternative method is considerably more complex; reference should be made to the report cited. It is well to remark that though the pin-joint hypothesis gives results usually on the safe side, the extent of the factor of safety so introduced is not one that can be relied upon, and may in special cases be even negative. It is hardly necessary to point out that the more important and vital the problem, the less appropriate become methods of an approximate and inexact character.

9. *Resistance of Struts, Wires, Wheels, &c.*—The question of the resistance of components such as are commonly embodied in the design of existing machines has been studied experimentally at the N.P.L., at the Aerodynamic Laboratory at Gottingen, and by Mr. F. Eiffel, in Paris. A few results relating to strut sections are given in Fig. 30*a*. The graph *a a* is a plotting from N.P.L. data (*see* Report of Advisory Committee, 1912–13, p. 111), relating to the sections *a*, representing one of the best forms tested, graphs *b* and *c* relating to sections *b* and *c* as determined by Mr. Eiffel (*see Resistance of the Air and Aviation*, p. 184). In Fig. 30*a* ordinates represent resistance coefficient in absolute units, also in terms of normal plane (the normal plane unit being that of maximum section). In Fig. 30*b* are given two strut sections designed at the R.A.F. These were reported upon by the N.P.L. as giving less resistance *for given strength* than a number of others submitted. Approximately, strength for strength, these sections gave one-fourth the resistance of struts of circular form. (*See* Report of the Advisory Committee, 1911–12, p. 96.)

The resistance of wires and ropes has been investigated both by the N.P.L. and by Prof. Prandtl of Gottingen; the position may here be summarised by saying that the resistance of a rope or stranded cable, at right angles to the direction of motion, is virtually equal to that of its projected area in normal plane. The resistance of smooth wires is about 20 per cent. less. Both these results only hold good above a certain minimum value of lV, which may be taken at about 1·5; thus at 100 ft. per second, the rule may be taken as applying to cables or wires down to about $\frac{3}{16}$ths inch (=0·015 ft.) diameter. (Compare Memoranda 40 and 75, Reports of the Advisory Committee.)

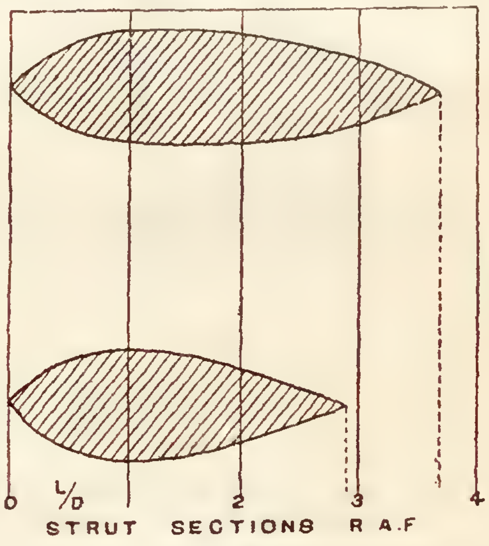

Fig. 30b.

Another interesting set of determinations, for which we are indebted to the N.P.L., is that relating to the resistance of alighting wheels; these have been tested both in respect of resistance and lateral reaction. (*See* Memorandum 74, Report of the Advisory Committee, 1912–13.) The direct resistance of a 26-inch wheel fitted with 2½-inch pneumatic tyres appears to be equal to about a third of its projected area in terms of equivalent normal plane, the projected area being taken to be that of the tyre itself. For fuller information reference should be made to the Memorandum cited.

(*To be continued.*)

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The Vienna Meeting.

FOR the flying week at Vienna, which opens on Sunday, 21st inst., 33 entries have been received. Among them is one from Great Britain—a Bristol—12 from France, 1 from Russia, 8 from Germany, 1 from Hungary, and 10 from Austria, including one lady, Lilly Stein Schneider.

Models

Edited by V. E. JOHNSON, M.A.

Mr. G. H. Kilshaw's Tractor.

"Just a word," writes Mr. Kilshaw, "to let you know how much I appreciate your good aims and efforts in Flight model section, in pushing forward the advanced model and its ultimate uses. I send you with this some scale drawings, &c., of a large tractor r.o.g. monoplane I had out on February 28th.

"On her first run she sped along about 10 ft. and then pivotted round on the ground, on her left wing-tip. Adjustment of the rudder, however, put her right, and the model then did about four hops on the next attempt. On her fourth, after being given a little more lift on the front, she rose gracefully and continued flying for about ten seconds, head to wind, but on gradually turning down-wind nose-dived, breaking the tractor screw and damaging the front skid.

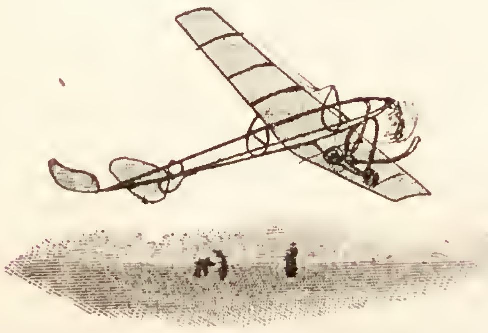
"However, I had her out on March 7th, and although the wind must have been blowing at about 20 miles per hour at times, I managed to secure a few short flights, these only being attempted on account of the risk of breakage, and even on these the machine was buffeted to the ground and then off again, but without any damage. At times the model appeared to be hovering quite stationary in the air and was decidedly pretty to watch.

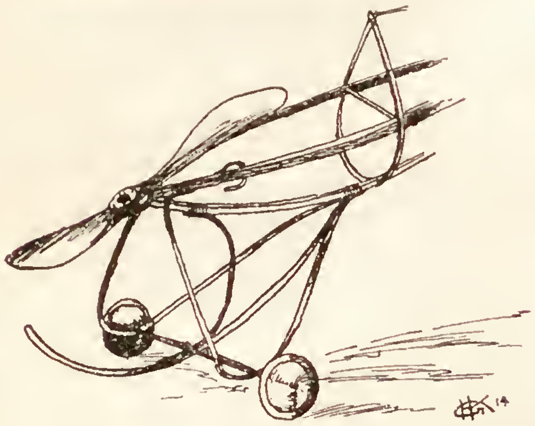
"I shall now, however, put the machine aside for a short time until rough winds abate, when I expect some good sport.

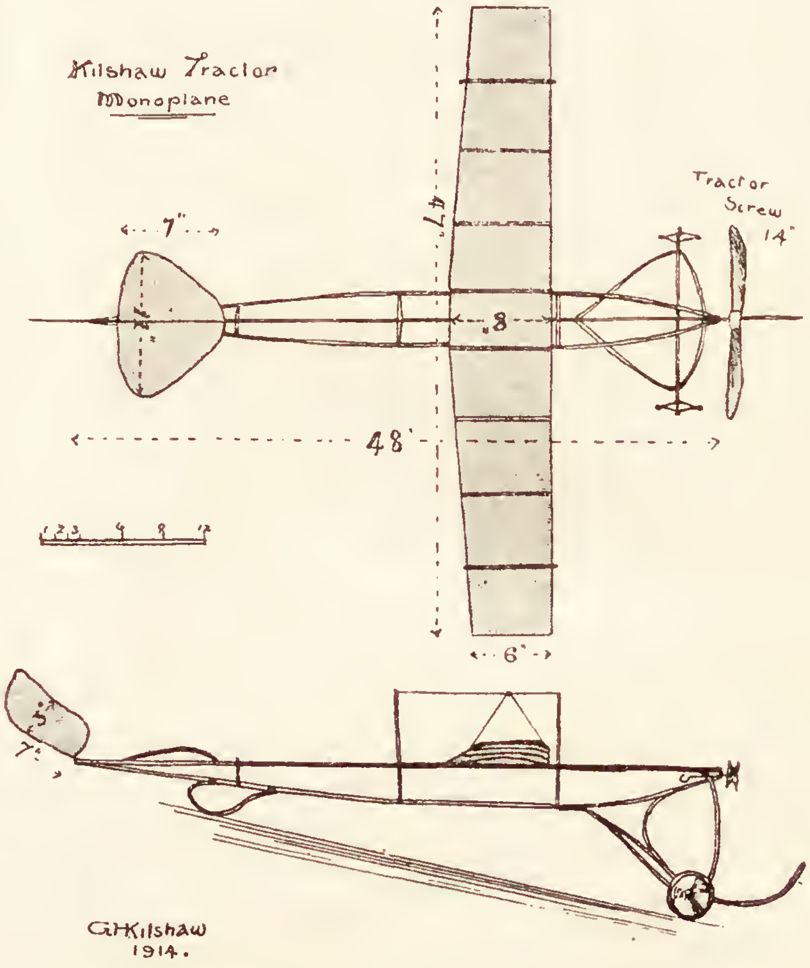
"The dimensions of the model are: Span, 47 ins.; average chord, 7 ins.; *fuselage* length, 48 ins.; tractor screw, 14 ins. diam., 18 ins. pitch; tail, 11 ins. by 7 ins.; fin, 7 ins. by 4 ins.; wheels, $3\frac{1}{2}$ in. discs, divided axles, pivoted in the centre, and rubber-sprung near wheels.

"The encouraging results of above have led me to contemplate building one of my twin tail models about the same size, with, I hope, as good results."

We trust that our correspondent will not fail to do as he contemplates, because we are perfectly certain that some results worth knowing would be learnt from the behaviour of such a model.



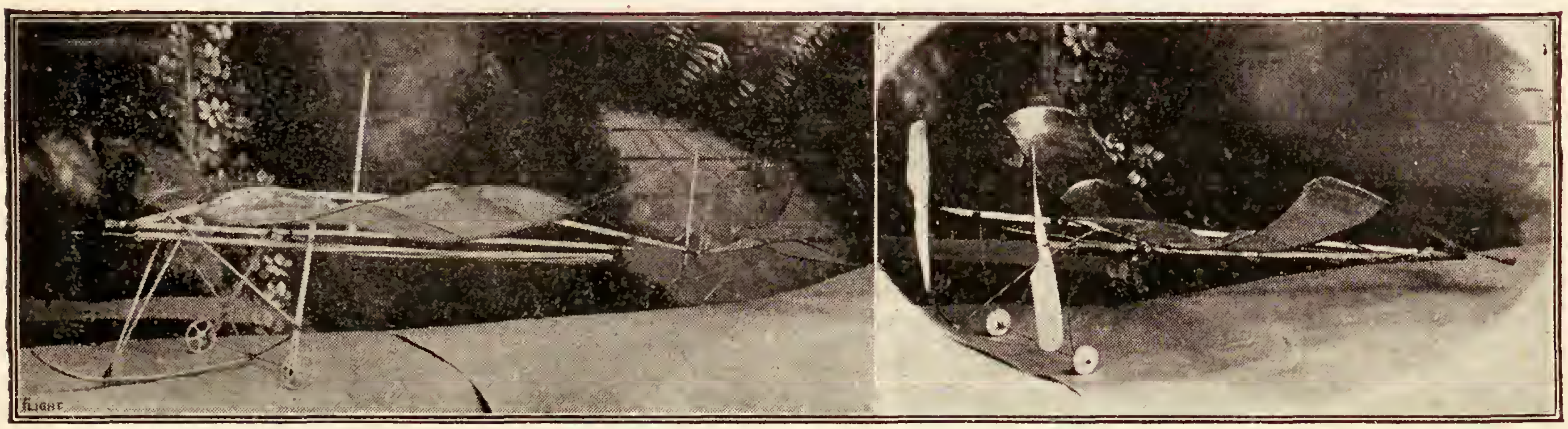




Mr. G. H. Kilshaw's tractor monoplane.

Mr. S. J. Stevens' Tractor Models.

"Enclosed please find," writes our correspondent, "photographs of a single-screw tractor monoplane weighing $8\frac{3}{4}$ ozs., and a 4-oz.



MR. S. J. STEVENS' MODELS.—On left, single-screw tractor; on right, twin-screw tractor.

twin tractor. The single-screw tractor has only so far had some half dozen trials, but I have had flights of 100 yards off the ground; the model flies steadily and lands well, even in a short flight it glides right out flat, without any tendency to nose dive, thus landing on its wheels. I am expecting much better flights when the model is tuned up more. The motive power is a dozen strands of $\frac{1}{4}$ in. by $\frac{1}{32}$ in. Duree rubber. The twin-screw tractor is capable of rising from the ground and flying well for about 400 yards. I first tried the model with a straight plane, but it was a failure. I next tried it upturned, and obtained a fairly good flight. I then made the angle much greater, as shown in the photograph, with the result that the model gets up quickly and flies well. The motive power is two skeins of 6 strands of $\frac{1}{4}$ in. by $\frac{1}{32}$ in. Duree rubber. I thought these photos might interest some readers of FLIGHT. Many thanks for assistance obtained through it."

The Use of Models in the Development of the Aeroplane.*

By V. E. JOHNSON, M.A.

The Three Periods.

The subject is one which naturally divides itself into three distinct periods:—

(1) That of the early modellists, such as Stringfellow, Henson, Wenham, Penaud, Tatin, Hargrave, Langley, &c., *i.e.*, the past.

(2) The near past and the present, including the model experiments of Lanchester, J. W. K. Clarke, Roe, Dunne, Handley Page, &c. Experiments carried out at the National Physical Laboratory and similar places abroad. Experiments which have been made at the East London and other Technical Colleges, and lastly the experiments of model aeroplane clubs and private individuals.

(3) The work of the future. The past, as stated in number one, refers entirely to experiments made prior to the coming of the successful full-sized machine. Number two refers to some experiments that were made before that date, but generally to experiments that have been made since.

Now what part have 1 and 2 played in the development of the full-sized machine as we see it to-day? There are those who contend that the part which they have played is, comparatively speaking, but a small one, and trace the practical development of successful flying from Lilienthal, Pilcher, Chanute and the brothers Wright. Whereas I would not for a moment underrate *their* work, it is very certain that earlier model work, to say nothing of the work of Philips, Maxim, &c., *rendered their experiments possible.* When Langley's steam-driven model flew for a distance of some three-quarters of a mile over the Potomac, he considered that he had demonstrated the *possibility* of flight, and events since then have most certainly proved that he was right.

Prior to this, as long ago as 1809, the English scientist, Sir George Cayley, made a most profound study of flight, and forecasted practically all the chief features of flying as we know it to-day. In 1874, Penaud (the first to use rubber as a motive power on model aeroplanes) brought Cayley's researches to the notice of the *Soc. Française de Navigation Aerienne* in France, and himself considerably added to the principles and laws laid down in Cayley's work. In fact, so far did Penaud go, that if the principles which he enunciated could have been fully and correctly grasped by a practical engineer provided with the petrol motor as we have it to-day, there is no theoretical reason that I know of why we should not have been flying as long ago as 1874.

The Aim of Early Experimenters.

Before the advent of the full-sized machine many, perhaps most, of the flying models were first built with a view to discovering the amount of power necessary to sustain certain known weights in the air. The earlier models were not successful owing mainly to the inefficiency of their motors; when these were improved a definite step forward was accomplished. These earlier machines were found to be, as one would expect, very unstable, and then commenced a series of tests having for their aim the study of stability. These experiments were not confined to models, however, but were made with man-carrying gliders as well, to which reference has already been made.

One reason why experiments with models were very largely given up was owing to the short duration of their flights. Professor Langley himself confesses that some 10 to 12 seconds was the *most* duration that he could get out of a rubber-driven model; and this was the real reason why he went to all the trouble and expense of constructing his famous power-driven machines.

The Value of Penaud's Work.

Had Penaud's experiments been only carried on and extended as the rubber-driven model has been extended since modern clubs came into existence, then there is little doubt that so far as our present aerodynamical knowledge of *principles* goes, our present knowledge would not be greatly decreased, supposing the full-sized machine still non-existent.

Part Played by Power-Driven Models.

I do not think it can be said that experiments which have been made with power-driven models have so far really added much to our knowledge.

All our present knowledge of principles could have been laid down without them. With respect to the future, however, the case is most probably very different.

The Real Factor in Successful Fight.

It must always be remembered that the real factor which gave us the successful flying machine when it did, had nothing directly to do with aeronautics at all. *It was the invention and successful development of the internal combustion motor which rendered flying possible.* Without that in vain were all the experiments of the aeromodellists; the lives of Lilienthal and Pilcher, the falls of Blériot, the enthusiasm of Santos Dumont or the carefully reasoned out experiments of the Wrights. In this, so far as I know, the model has played no part whatever. I may be wrong in this conclusion; I would willingly learn that such was the case.

The Part Played by the Model Prior to 1903.

Summing up the case of the model prior to the successful advent of the full-sized machine, we thus see that it did directly and also indirectly play a very important part in the development of the aeroplane. But not such an important part as it might have done, one reason undoubtedly being that designers of full-sized machines were somewhat dubious as to how far model experiments could be applied in full-size practice. Lack of sufficient data was one of the chief reasons; experiments wanted either confirming or disproving, as well as extending and discussing.

Model Work since 1903.

Passing on now to the second period, if we omit a certain number of experiments made, principally with gliders, by designers of full-sized machines for the main purpose of studying various problems in stability, we have the enormous number of experiments, thousands upon thousands, tens of thousands, perhaps, of experiments that have been made by aeromodellists all over the country chiefly during the past five years. What have all these experiments done with respect to the development of the aeroplane and hydro-aeroplane as we have them in this year of grace 1914?

To be brutally candid, so far as I can see, they have done, practically speaking, at present, nothing—nothing directly, that is. One cannot consider in such a paper as this, the effect say of a person who first of all becomes interested in aeronautics as an aeromodellist and afterwards becomes a pilot or a designer of full-sized machines, &c.

Why is this? The question is not such an easy one to answer as one might think. It is complicated owing to several causes, one of which appears to be the following:—

The Powered Model and the Glider.

I made mention that builders of full-sized machines experiment with models almost solely of the *glider* type. Now the models with which aeromodellists experiment are *powered* models. Now there are distinct and well marked differences in the results obtained with the two types. The glider is the simpler but less advanced type, and is (at present) preferred by the theoretician and the full-sized builder; the powered model gives or should give, if the results are correctly interpreted, far truer and more valuable results. Just at present, however, the full-sized worker appears to view such results with some suspicion, and the aeromodellist looks on gliders as more or less beneath his notice. Probably both views are wrong. Again, the development of the full-sized machine, *up to the present*, has been so rapid—so rapid, *i.e.*, inasmuch as records, &c., are concerned—that the full-sized worker has had no leisure to seriously consider the simultaneous development of the model which has gone on side by side.

Full-Sized Designers and Model Workers.

Signs are, however, not wanting that the development of the present type of machine has in some respects reached the limit of efficiency in several respects. If this be so, then undoubtedly designers will once again deign to consider the humble model, provided, of course, it exists in other types than those of full-sized machines which have been already developed. Supposing that the assumption that any limit of efficiency has been reached or even nearly reached is wrong, then we may still find designers and builders of full-sized machines once again taking up the study of models with a view to develop still further existing types if it can be demonstrated to them that experiments with models can be successfully applied to full-sized work. This necessitates a further investigation of the laws of similitude which undoubtedly do exist between the two. Because it is not sufficient to show theoretically that model experiments *can* be so applied, it must also be shown *how* they can be applied.

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* A paper read by Mr. R. M. Neilson (for the author) before the model section of the Scottish Aero. Society, March 18th, 1914.

The Importance of Data.

Now before we can have scientific laws, or indeed even general statements of any kind, we must have a large collection of *data.* The more the number of experiments, the more plentiful the data, the more likely is our law, which we will suppose to be deduced solely from experiment, to be correct, and the greater its value.

Results Must be Pooled.

But these data are valueless as a whole if different data are known to different individuals, and are not either shared in common or known to some individual, or body of individuals, possessed of the requisite scientific attainments, to sift the wheat from the chaff, the really valuable from that of lesser worth, and deduce from the most reliable data new generalizations which can be applied to the science of aviation as a whole, with a view, it may be, to specially advancing the efficiency of some particular part.

(*To be continued.*)

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver	85 secs.
Twin screw, do.	Distance	R. Lucas	590 yards.
	Duration	G. Hayden	137 secs.
Single screw, rise off ground	Distance	W. E. Evans	290 yards.
	Duration	W. E. Evans	64 secs.
Twin screw, do.	Distance	L. H. Slatter	365 yards.
	Duration	J. E. Louch	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance	C. C. Dutton	266 yards
	Duration	J. E. Louch	91 secs.
Do., off-ground	Distance	C. C. Dutton	190 yards.
	Duration	J. E. Louch	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter	60 secs.
Engine driven off grass	Duration	D. Stanger	51 secs.

Competitions.—On June 13th, the fourth annual competition for the *Model Engineer* Challenge Cup took place on Wimbledon Common in a gusty wind. This year the competition was altered, in regard to the average being taken of the three trials instead of the longest duration. Mr. H. G. Bond proved the winner with an average of 57⅓ secs., who will hold the handsome trophy for one year (from annual prize distribution), and winning the *Model Engineer* silver medal which accompanies the cup; Mr. H. H. Bedford, of the Leytonstone Club winning the Association silver medal with 55⅔, and Mr. J. E. Louch 3rd with 53⅔ secs. taking the Association bronze medal. The following gives the results of the first competitors:—1. H. G. Bond, K. and M.A.A. and Leytonstone, average, 57⅓ secs.; 2. H. H. Bedford, Leytonstone, 55⅔; 3. J. E. Louch, K. and M.A.A. and Leytonstone, 53⅔; 4. L. H. Slatter, K. and M.A.A. and Wimbledon, 35; 5. T. Kimpton, K. and M.A.A. and Leytonstone, 33⅓; 6. A. F. Houlberg, K and M.A.A., 30; 7. W. A. Rogers, K. and M.A.A., 28⅓; 8. D. A. Pavely, K. and M.A.A. and Croydon, 27. The longest duration was made by Mr. J. Louch in his third trial, viz., 112 secs. The model hon. sec., Mr. H. A. Lyche, was in charge of the meeting.

Official Trials.—These take place to-morrow on Wimbledon Common at 3 p.m. It must be clearly understood that no entries for trials can be accepted on the ground; all such entries must be received seven days prior to such trials.

Kite Competition.—The competition for prizes presented by Messrs. Brooke and Westhorp will be held to-morrow on Wimbledon Common at 3.30 p.m.

Model Competition.—Wanstead Flats, Leytonstone; station, Forest Gate, G.E. Ry.; for route see the Leytonstone Club notes to-day. Saturday, June 27th, at 3 o'clock; entries close June 20th. Longest flight competition for models, rising off ground under their own power (open to the world). Prizes, presented by Mr. A. W. Gamage: 1st, challenge cup and gold medal; 2nd, silver medal; 3rd, bronze medal. For rules see pages 5 and 6. Special rules Nos. 1, 2, and 3 in official programme. Additional rules governing this competition: 1. Competitors must be at the judges' flag at 3 p.m. sharp. Those not present at that time will be disqualified. 2. This competition will be decided on the longest flight and not on the average.

Inter-Team Competition for Models.—Open to affiliated clubs. For the Farrow Challenge Shield and Baden-Powell medals. All affiliated club secretaries should send in their application to the gen. hon. sec. at once, so that the secretaries can meet on 25th to draw for the first round, which will take place on July 4th.

27, Victory Road, Wimbledon. W. H. AKEHURST, Gen. Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Bristol and West of England Aero Club (Model Section) (42, ROYAL YORK CRESCENT, CLIFTON, BRISTOL).

Notice to the London and Provincial Clubs.—Cheap day and half-day excursions are being arranged to the *Bristol International Exhibition* on the day of the Model Aeroplane Competition from Bath, Birmingham, Cheltenham, Gloucester, London, Penycraig, and other centres, and there will be steamboat sailings from Cardiff and South Wales. Full particulars of the excursions will be forwarded to the competitors on receipt of their entry forms. Programmes and entry forms may be obtained from the secretaries of the clubs in London and Birmingham, or by post on application to Mr. R. V. Tivy at the above address. All entry forms (or applications for entry forms) must be sent in not later than June 21st. *The acceptance of entry forms and fees from competitors not resident in Bristol or Bath will be conditional on the running of excursions from the various centres.* Full particulars of the events were published in FLIGHT on June 12th. The promoters of the competition trust that, in view of the special railway facilities, the model aero clubs in London and the West of England will co-operate with them by sending exhibits to Bristol (on or before July 11th), and by sending one or more representatives to fly them on Saturday, July 18th.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

JUNE 21ST, flying Wanstead Flats, 6.30 and 10.30 a.m. June 27th, 3 p.m., Gamage Cup Competition. Route—From Liverpool Street to Forest Gate; on leaving station follow tramlines to the left; Wanstead Flats will be reached in 3 or 4 minutes, and the competition will be held on the right hand side, about 5 minutes from the road.

UNAFFILIATED CLUBS.

Finsbury Park and District (66, ELFORT ROAD, HIGHBURY, N.).

JUNE 20TH, flying at Finsbury Park, 3 p.m.; r.o.g. duration contest, all types, at 5 p.m.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

WEEK-END meetings on Woolwich Common and Blackheath at usual times.

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The next Olympia Aero Show.

THE Aero Committee of the Society of Motor Manufacturers and Traders after an enquiry among aeroplane manufacturers, has recommended that the next exhibition of aeroplanes, &c., at Olympia should be held in 1916.

A Change of Address.

MESSRS. HEWLETT and BLONDEAU, Ltd., notify us that they are now moving their works and offices to Leagrave, and that after Saturday next all communications should be addressed to them at Omnia Works, Leagrave, Beds. Their telephone number will be 13 Leagrave, while the telegraphic address will be "Aeromnia, Leagrave.

Looping by Hall School Pupil.

IT will be recalled that Lieut. T. Gran, who looped the loop recently at the Blériot school at Buc, and who intends to attempt to fly from Scotland to Norway, was formerly a pupil at the Hall School at Hendon.

Mr. A. W. Schaef in England.

OUR readers will be interested to hear that Mr. A. W. Schaef, who has been experimenting with a monoplane of his own construction in New Zealand for some time, and who is the New Zealand agent for the General Aviation Contractors, Ltd., arrived in England on Wednesday. He proposes to visit the British aeroplane works, and then visit France and Germany for a similar purpose, subsequently returning to England with a view to securing his "ticket" at one of the British schools.

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NEW COMPANIES REGISTERED.

Pneumosphere, Ltd., 18, Fleet Street, E.C.—Capital £30,000, in 28,500 pref. shares of £1 each and 30,000 ordinary shares of 1*s.* each. Manufacturers of and dealers in airships, aeroplanes, &c. First directors, L. Harris, H. Whitaker, W. E. Cobb, and L. J. Jones.

Shoreham Flying School, Ltd.—Capital £1,000, in £1 shares. Acquiring the flying school, &c., carried on by W. H. Elliott, G. L. Lusted, and B. H. England at the Shoreham Aerodrome, Shoreham, Sussex, as the Shoreham Flying School. First directors, W. H. Elliott, B. H. England, G. J. Lusted, and H. H. R. Aikman.

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Aeronautical Patents Published.

Applied for in 1913.

Published June 11th, 1914.

11,676. H. FABRE. Hydroplanes.
11,757. H. W. J. E. GOLTSTEIN. Projectiles for shooting at airships, &c.
17,438. SOC. ANON. DES ETAB. NIEUPORT. Bodies of aerial machines.
20,110. SOC. DITE AEROPLANES MORANE-SAULNIER. Aerial machines.
21,196. AKT. GES. METZELER AND CO. Fabric for aircraft.

Published June 18th, 1914.

12,361. H. ZIEMSS. Aeroplanes.
12,436. A. D. WIGRAM. Hydro-aeroplanes.
18,930. W. E. THORN. Flying machines.

Applied for in 1914

Published June 18th, 1914.

1,678. JACOB LOHNER AND CO. Ground-brake for aeroplanes.
4,065. J. STASIAK. Aerial bomb-dropping apparatus.

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CONTENTS.

Editorial Comment:

PAGE
The New Naval Air Service ... 667
Collision in the Air ... 668
The Race to Manchester and Back ... 668
Royal Flying Corps at Netheravon ... 670
Royal Aero Club Official Notices ... 678
From the British Flying Grounds ... 679
London–Manchester–London Race ... 681
Flying at Hendon ... 683
Eddies. By "Æolus" ... 683
Royal Naval Air Service Re-organisation ... 686
The Trans-Atlantic Flight. Lieut. Porte's New Route ... 689
British Notes of the Week ... 690
The Flying Machine from an Engineering Standpoint. By F. W. Lanchester 691
Foreign Aircraft News ... 692
Models. Edited by V. E. Johnson, M.A. ... 693

EDITORIAL COMMENT.

The New Naval Air Service.

From the Secretary of the Admiralty we have received a most important Memorandum, setting forth the details of the scheme of re-organisation of the Naval Air Service. The text of this Memorandum will be found on another page of this issue of FLIGHT, and from it will be seen that the Admiralty scheme is not so much one of re-organisation as of a complete re-casting of the whole organisation. In the first place, it constitutes probably the most whole-hearted admission that has ever been made of the enormously important place that aircraft will have in the warfare of the future—nothing approximating to it has been announced by any other Power or by ourselves. Under the new scheme aircraft assume an almost more definitely important place in the organisation of the Navy than the submarine branch, since the latter remains a part of the Naval organisation as such, while the air service is given a place of its own which is practically separate and apart from the main trunk, as it were.

We fully recognise that this is really not so when things are fully examined, and that the air service remains as much a part of the Navy as any other branch, but the point is that it is the only branch which is dignified by a separate establishment and organisation of its own—a sort of *Imperium in Imperia*.

Undoubtedly this important departure—experiment it has been called, though we dislike the word as it is applied, for the reason that we can see nothing of the really experimental about it, but rather the outcome of a well-considered judgment—springs in great part from the keen personal interest which has been manifested in flying by Mr. Churchill ever since he took office as First Lord of the Admiralty. No Minister of our time has been at so much pains to become thoroughly acquainted with the work of his department as the present head of the Navy, with the result that probably no First Lord has at any period had so deep and thorough a knowledge of the work and needs of the Navy as Mr. Churchill.

Apart from the main interest of this important scheme of re-organisation the principal feature of the new idea is that connected with the admission of civilian airmen to the ranks of the newly constituted service. This is a very distinct departure—even more so than the experiment which was inaugurated nearly twenty years ago of transferring officers of the R.N.R. to the active list of the regular service. No distinction of rank, pay, or privileges will be made between officers entering from the Royal Navy or Royal Marines and those entering from civil life. In more ways than one this is a move of capital importance. It has been realised for a long time now that the Naval air service of the future will call for a very large number of officers and men who, under the existing scheme of things, can ill be spared from Fleet duties. Already the supply of combatant officers hardly keeps pace with the wastage caused by death, ill-health and retirement for various causes, and, if that is the case in a time of profound peace the problem must necessarily become a most serious one should we become involved in war with a great Naval Power. The possibilities of war wastage will be enormously enhanced by the employment of aircraft so that the problem of securing a sufficient number of trained officers to fill the gaps caused by casualties, already sufficiently serious, must necessarily be greatly magnified even to the point of impossibility of solution. It is evidently with this in view that the Admiralty has decided upon so drastic a departure from custom, for it is evidently the intention of the Whitehall authorities to gradually build up a large aerial corps which will in future become almost independent so far as the *personnel* is concerned of the combatant ranks of the Navy itself. Undoubtedly this is the most attractive proposition that has hitherto been offered for the consideration of civilian airmen. They are given the opportunity of entering the finest Service in the world, on equal terms with those who have made of the Navy their life's profession, with good pay, excellent prospects, and, above all, that equality of rank which counts for so much in a Service which is apt to look rather askance at "Acting" and Reserve appointments.

There is one aspect of these Admiralty changes which must not be lost to sight, and that is the influence they will probably exert on aviation generally. Up to the present there has been somewhat of a lack of incentive to men to take up flying, unless they happen to be of the moneyed and leisured class and fond of flying as a sport. It offered very little of a career to the enthusiast who was keen but to whom it represented a means of livelihood. Now, however, with the prospect of entrance into the Naval Air Service the whole thing is changed, and an excellent career opens up to the skilled pilot possessed of the qualifications required by the Admiralty.

* * *

Collision in the Air.

Quite the most terrible, because at the same time the most dramatic, accident which has hitherto been recorded in the history of aviation was that which happened in Austria the other day, when an Army aeroplane collided in mid-air with a dirigible, involving both in a common ruin and causing the death of all on board the two craft. There have been accidents which involved a greater loss of life, but none which were quite the same as this. The main lesson which seems to be conveyed by this terrible affair is one of the future of war in the air. What seems to have happened was that the aeroplane attempted to fly above the dirigible, the pilot misjudged the distance and touched the envelope of the larger craft, with the inevitable result that both were wrecked. In time of peace we regard such accidents as these as being very terrible in their character, but they will in the future be the commonplaces of war. It is easy to imagine that devoted aviators, knowing that actual collision in the air is the most effective weapon of the aeroplane against the dirigible will deliberately sacrifice themselves if by so doing they can involve the enemy's craft in their own ruin—and it will be the nation possessing the greater number of such devoted airmen which will win through in the end.

* * *

The Race to Manchester and Back.

It is only a bare four years since Paulhan by his flight from London to Manchester confounded the critics who decried the possibilities of aviation, and incidentally won for himself the £10,000 prize offered by the *Daily Mail*. When the prize was first offered, it is a matter of record that many people said it had only been put up because those concerned with its offer knew of a certainty that it would never be won! A lot of water has run beneath the bridges since then, and a lot of progress has been made in aviation. So great has been this progress, that when last Saturday's race was announced there was none to doubt the possibility, even the certainty, of the accomplishment. In the result the journey was safely carried out by three machines out of eight which started, and of the five failures not one was caused by any inherent fault in principles. Therefore, in spite of these failures having taken place, we feel that we are justified in regarding this event as yet another milestone of those which mark the progress of flight in this country.

* *

Birthday Honours.

CONGRATULATIONS to Colonel (temporary Brigadier-General) David Henderson, C.B., D.S.O., Director-General of Military Aeronautics, War Office, who, on the occasion of His Majesty's birthday was created K.C.B.; and to Commander Mansfield George Smith-Cumming, R.N., retired, who recently secured his *brevet* at the Farman school, who was gazetted a C.B.

ROYAL FLYING CORPS.

THE following announcement appeared in the special issue of the *London Gazette* of Monday last containing the honours conferred in connection with the celebration of the birthday of H.M. the King:—

The King has been graciously pleased to approve of the under-mentioned officers being promoted by *brevet* for services in connection with the Military Wing, Royal Flying Corps. Dated June 22nd, 1914:—

To be Majors:

Capt. (temporary Major) George H. Raleigh, the Essex Regiment.

Capt. (temporary Major) John H. W. Becke, the Sherwood Foresters (Nottinghamshire and Derbyshire Regiment).

Capt. (temporary Major) John M. Salmond, the King's Own (Royal Lancaster Regiment).

Capt. (temporary Major) Charles A. H. Longcroft, the Welsh Regiment.

Among the Naval promotions announced on the King's birthday was the following:—

Commander O. Schwann to be Captain. Dated June 22nd, 1914.

The following promotions were announced by the Admiralty on the 24th inst.:—

Lieuts. A. M. Longmore and J. W. Seddon to be Acting Lieut. Commanders, to date June 24th.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending June 20th, 1914:—

Concentration Camp, Netheravon.—Headquarters, Headquarter Flight, Aircraft Park, Nos. 2, 3, 4, 5 and 6 Squadrons.—The training scheme, including Aircraft Reconnaissances M.T. Convoy runs, experiments, lectures, conferences and committees were continued daily throughout the week. The aircraft exercises consisted of locating the headquarters of units, in searching lines of advance and in estimating the length of columns on the road. The M.T. carried out several convoy runs by night. It has only been necessary to deviate from the fixed programme on one occasion. This was in consequence of the prevalence of a thick ground mist.

The evenings from 6 onwards are devoted to games and athletics. No. 2 Squadron won the inter-Squadron Football Cup. The annual Sports of the Royal Flying Corps (Military Wing) take place on the 20th. The annual dinner of the warrant officers and serjeants took place at the Holborn Restaurant, London, on the 13th inst. Serjeant-Major Ramsay, No. 3 Squadron, the senior warrant officer was in the chair, General David Henderson and Colonel Sykes were amongst the many officer guests present.

No. 1 and 7 Squadrons, Farnborough.—The organisation of these was continued at Farnborough.

The Use of Aircraft in Somaliland.

ASKED in the House of Commons as to whether he had any information showing that two British officers were at present in Somaliland conducting inquiries as to the feasibility of using an airship for the purpose of an expedition to subdue the Mullah, Mr. Harcourt, Secretary for the Colonies, stated two British Officers with experience of aeronautics have recently visited Somaliland, but it is at present inadvisable in the public interest that any statement should be made regarding the objects of their visit.

Liverpool Flying Corps Scheme Abandoned.

AT a meeting in Liverpool on Wednesday, it was announced that the Executive Committee which has been considering the matter had been unable to recommend any practical scheme for the formation of a local Flying Corps. It was found impossible to get either the War Office or the Admiralty to guarantee the local facilities which were desired. The general committee decided to return the amounts collected to various subscribers, thanks being tendered to Messrs. W. E. and C. A. Cain for their patriotic offer of two aeroplanes.

The Seaplane Disaster.

THE body of Commander A. Rice, the passenger in the seaplane which fell into Southampton Water on June 4th, was washed ashore at Fishbourne, Isle of Wight, on the 16th inst. At the inquest held on the following day, a verdict of "Accidentally Drowned" was returned.

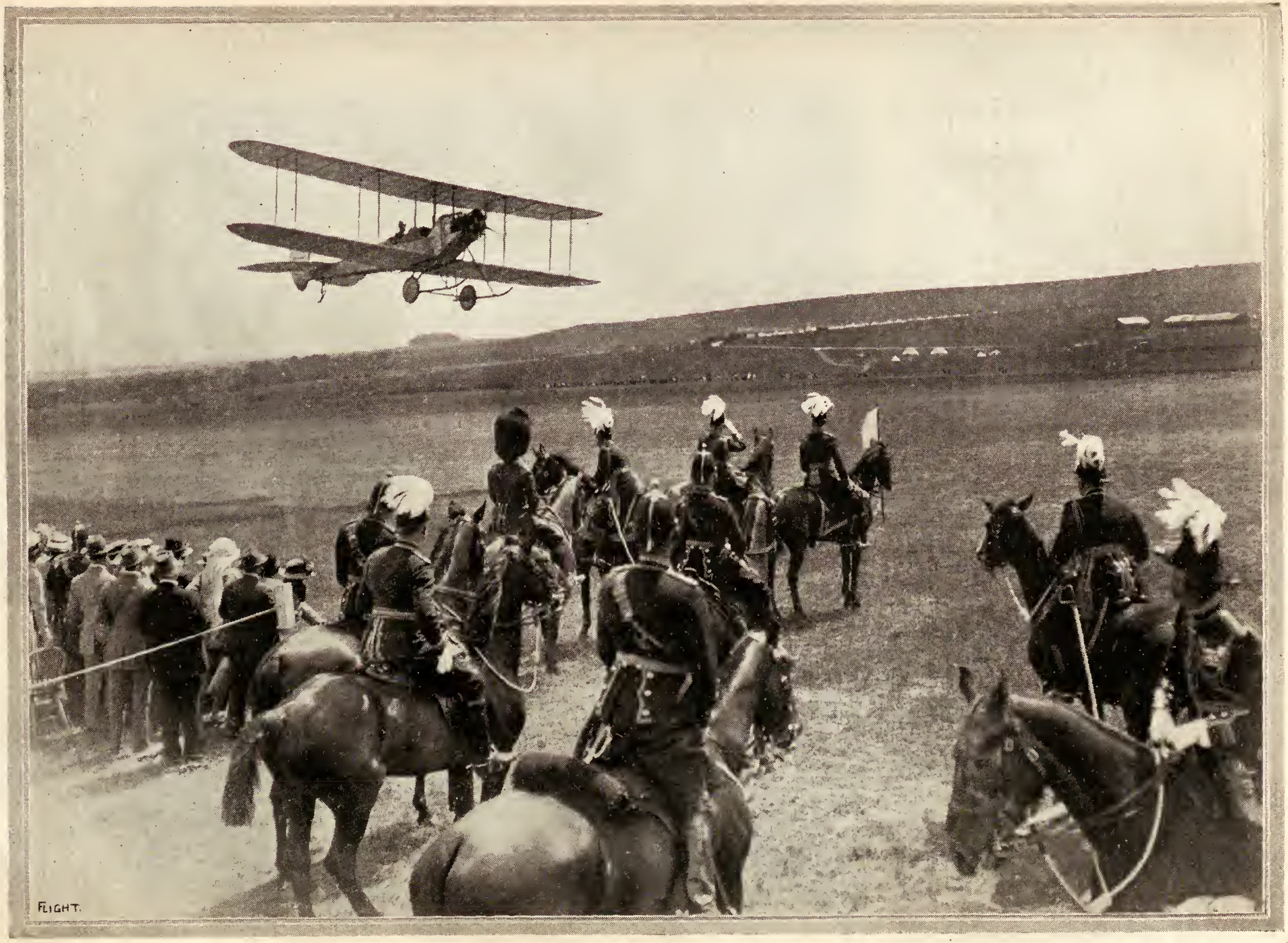


Photo by Alfieri.

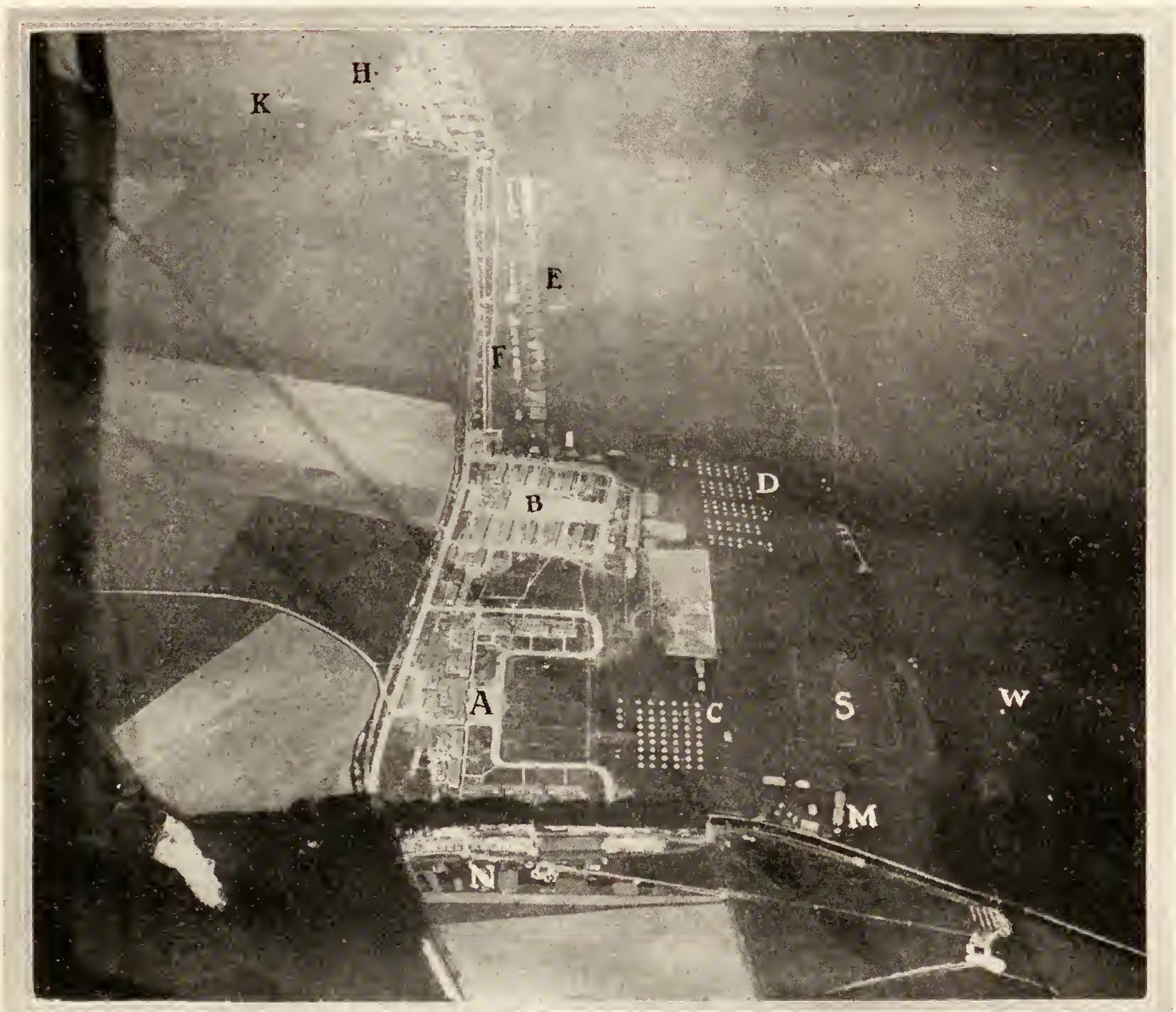
THE KING'S BIRTHDAY.—General Smith-Dorrien reviewing troops at Ludgershall. In our photograph the "fly past" of one of the aeroplanes is seen at the moment of dipping before the saluting base.

ROYAL FLYING CORPS (MILITARY WING) AT NETHERAVON. THE CONCENTRATION CAMP.

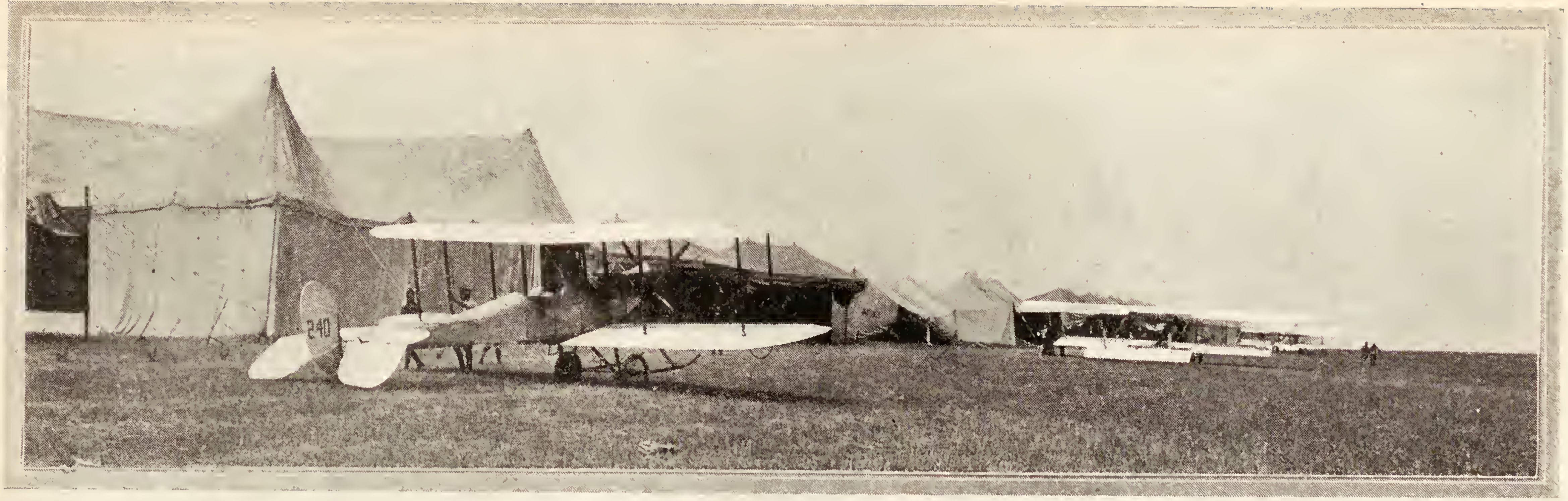
DURING last week, through the courtesy of General Sir David Henderson, K.C.B., we were privileged to spend a few days at the Concentration Camp of the Military Wing of the Royal Flying Corps at Netheravon, where there are upwards of 700 officers and men of the Headquarters Flight, Aircraft Park, Nos. 2, 3, 4, 5 and 6 Squadrons, and a detachment of the Kite Section. As the result of our visit we are prepared to affirm that whatever may be the relative position of any other branch of the Service compared with that of foreign powers, the Royal Flying Corps should be able to render an entirely satisfactory account of itself when occasion arises for its employment against the King's enemies; and Col. Sykes, through whose efforts the Camp largely came into being, as well as his capable Staff, are to be congratulated upon the results which they have been able to achieve. So great indeed is the progress which has been made, and so high is the standard of efficiency attained that it is most difficult to believe that it is only a little more than two years since this Corps was first formed.

Of the military value of bringing the various squadrons together so that they may engage in combined exercises under conditions that nearly approximate to those that will exist during war, exchange opinions and discuss various aspects of the possibilities of aerial warfare we need hardly enlarge upon here, as this aspect of the Concentration will be clearly manifest after a perusal of the subsequent matter contained in this article.

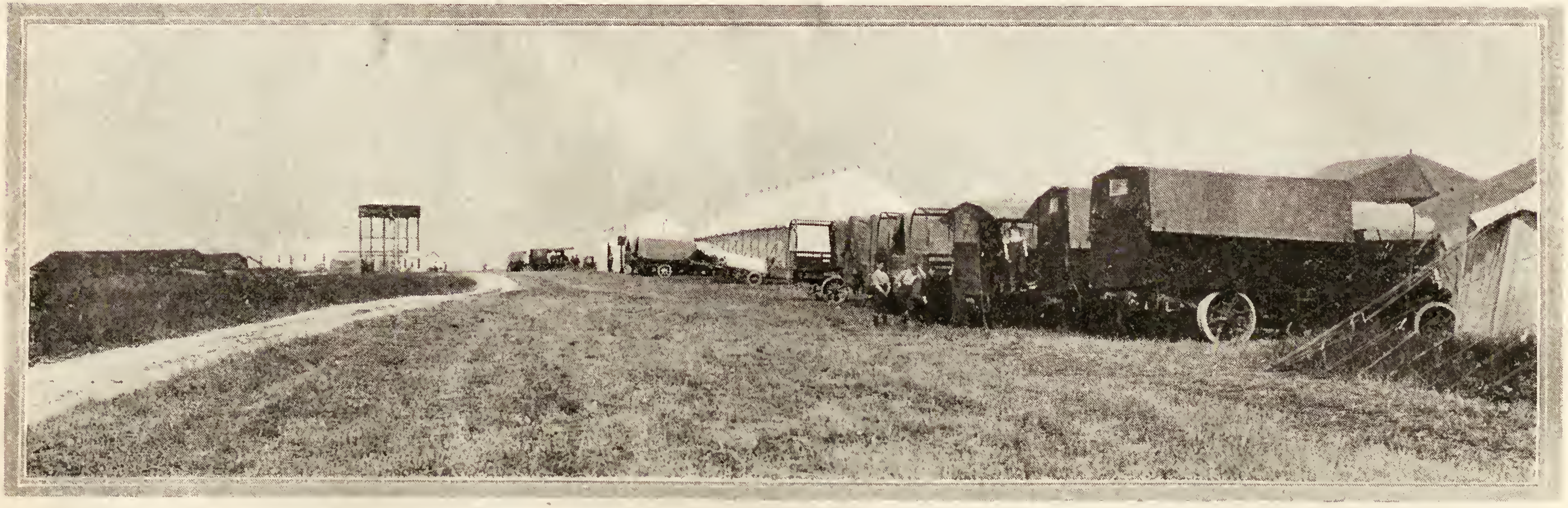
One is apt to measure military strength by numbers; but those who are acquainted with the art of war are well aware that morale is of far greater importance than numerical superiority, and organisation than either of these factors. The possession of a large number of efficient military machines is most essential; and compared with other European Powers in this respect we are undoubtedly inferior; but a close inspection of the Concentration Camp at Netheravon reveals the fact that the morale and skill of the officers and men of the R.F.C., as well as the organisation involved in the handling and transport of machines, stores, spares, men, &c., leaves nothing to be desired. The keenness and cheerfulness of the whole camp is of the highest order despite long and irregular hours; for although in the ordinary routine reveille is sounded at 6 a.m. and "lights out" at 10.15 p.m., the actual working day—normally, from 8 a.m. to 4.30 p.m.—is sometimes much more protracted, since early morning flying and night exercises with machines and with transport are freely indulged in outside these hours. Nevertheless the men have ample leisure during the



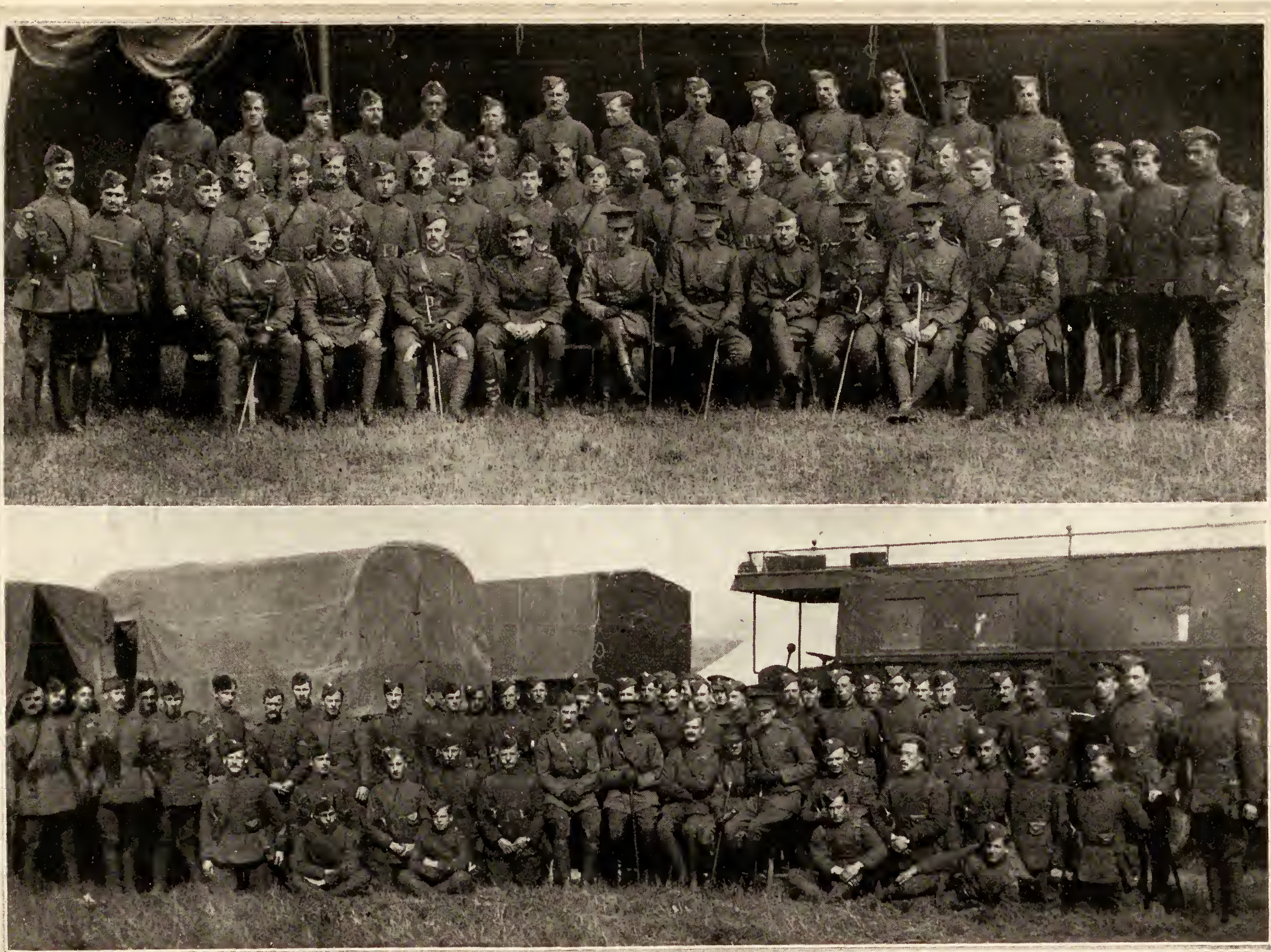
View of the Concentration Camp of the Military Wing of the Royal Flying Corps at Netheravon, taken from an aeroplane at a height of 2,000 ft. on the 19th inst. A. Permanent quarters of the officers of Nos. 3 and 4 Squadrons. B. Permanent quarters of the men of Nos. 3 and 4 Squadrons. C. Officers' lines of the visiting squadrons. D. Men's lines of the visiting squadrons. E. Temporary aeroplane sheds of the visiting squadrons. F. Transport of the visiting squadrons and Aircraft Park. H. Permanent aeroplane sheds of Nos. 3 and 4 Squadrons with repair shops, &c., at the back. K. Portion of the Kite Section. M. Mess tents of the officers of visiting squadrons. N. New married quarters for men of Nos. 3 and 4 Squadrons. S. Sports ground. W. Wireless station.



A view of the temporary aeroplane sheds at the Concentration Camp at Netheravon.



ANOTHER VIEW OF THE TRANSPORT AND REPAIR LORRIES OF THE R.F.C. AT NETHERAVON.—The large Piggott tent which "houses" the B.Es. of No. 2 Squadron is seen in the centre of the photograph.



Officers, N.C.Os. and men of the Headquarters Flight (top) and the Aircraft Park (bottom) of the Royal Flying Corps at Netheravon.

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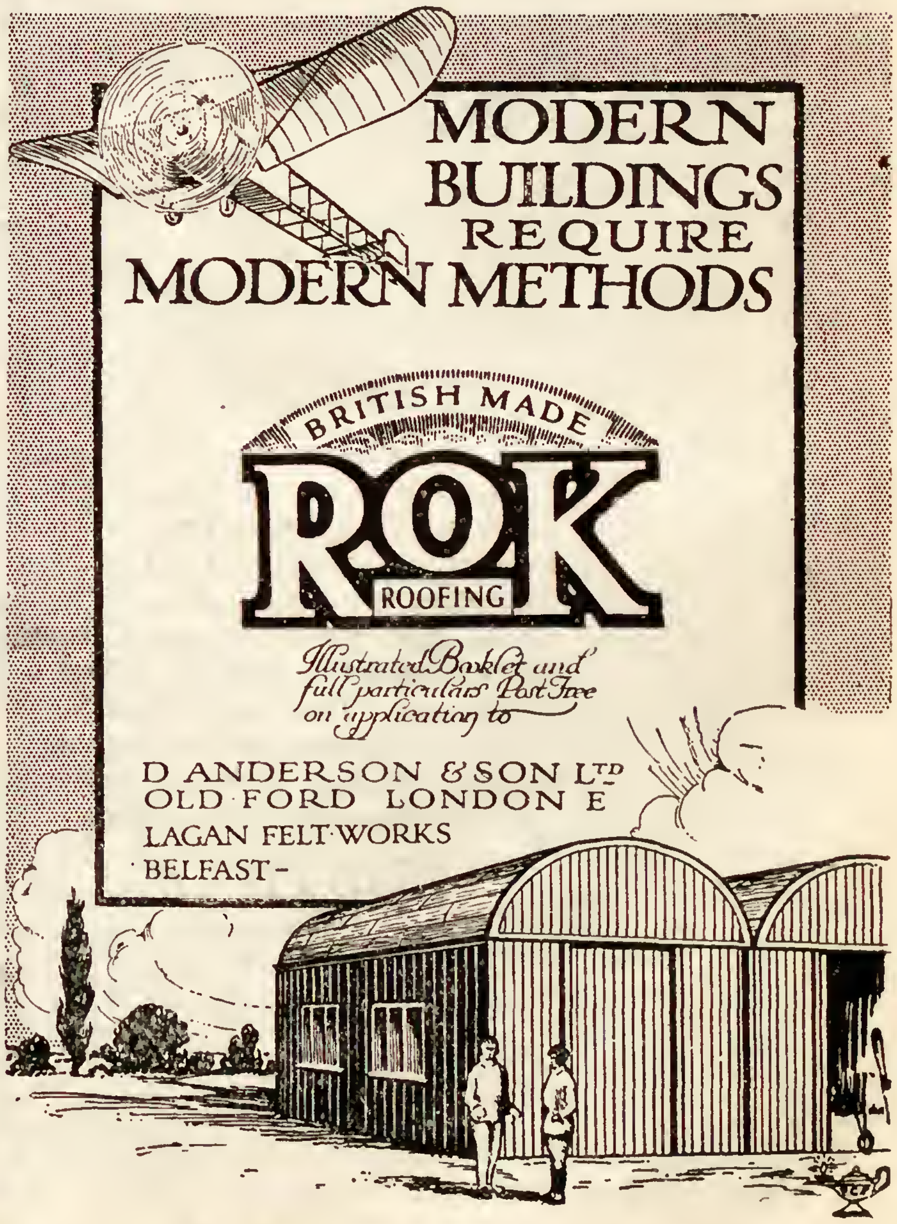

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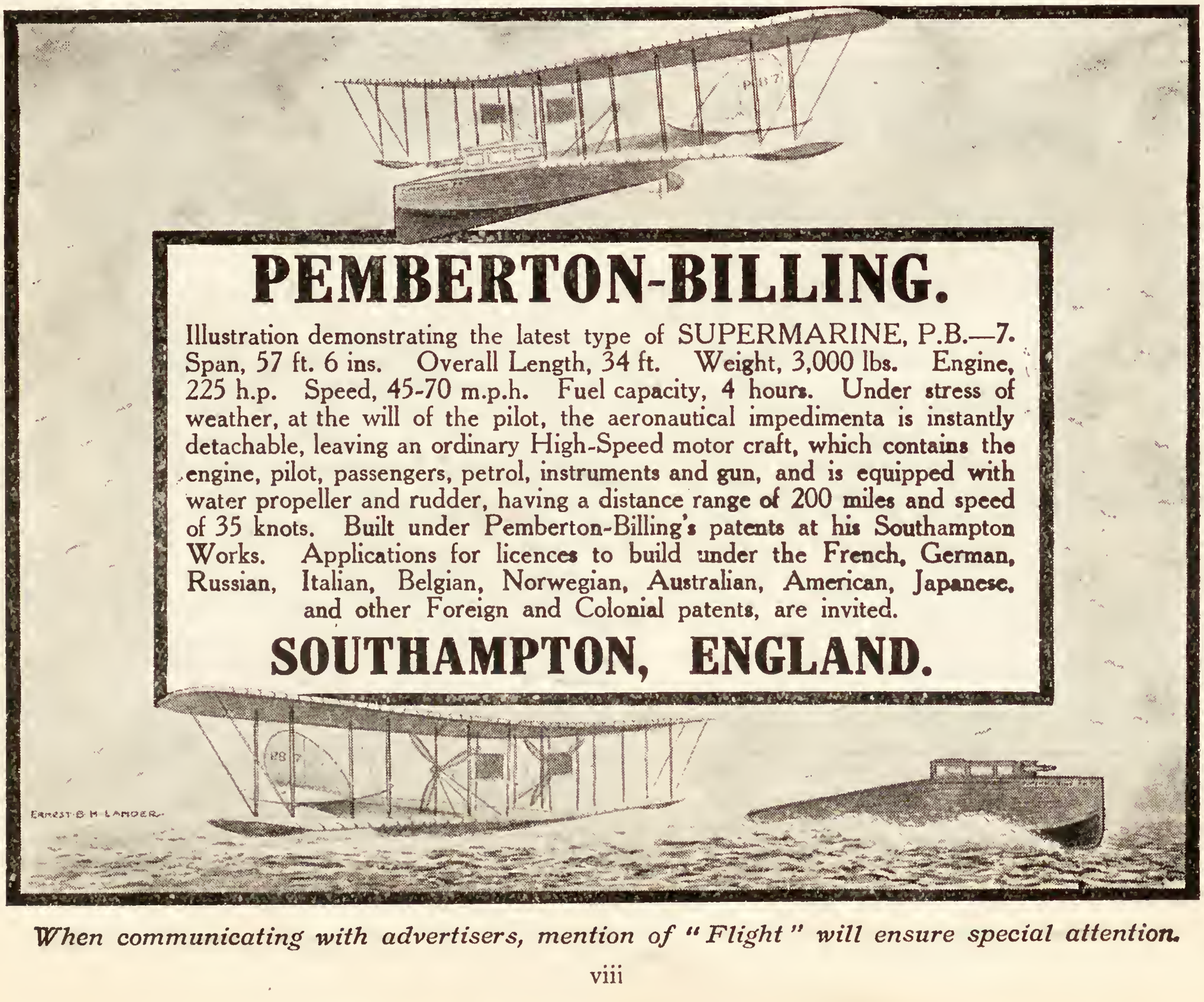
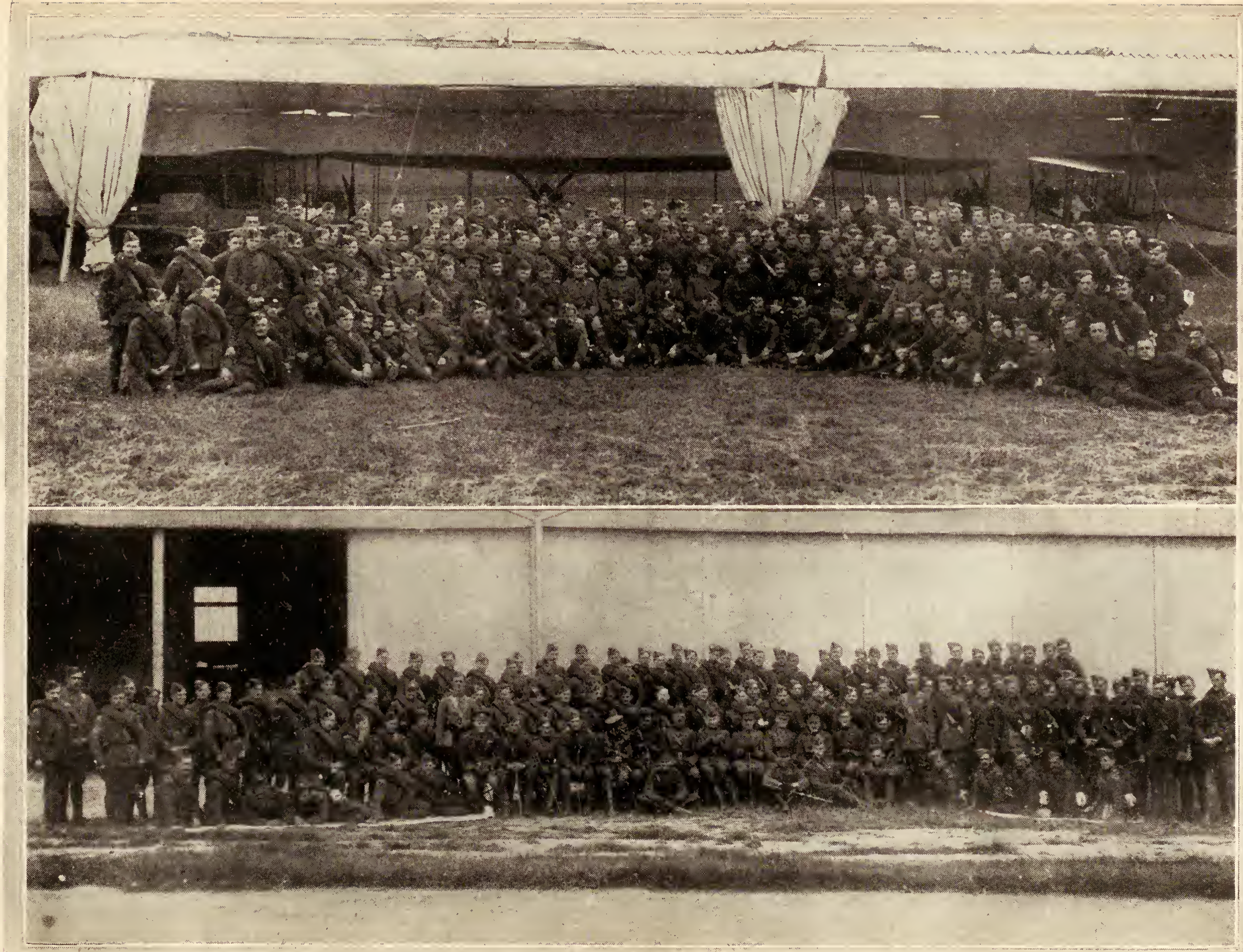


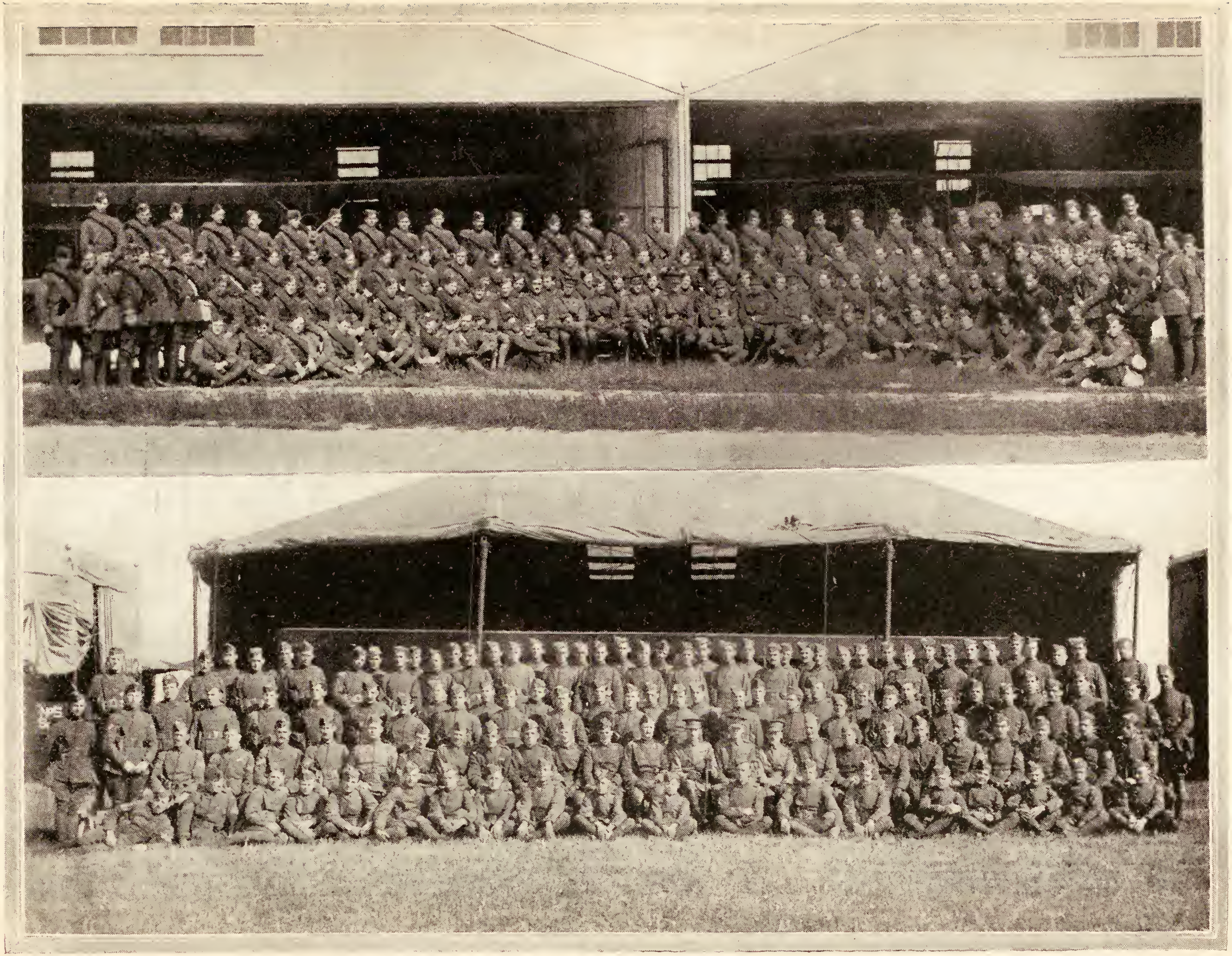
PEMBERTON-BILLING.

Illustration demonstrating the latest type of SUPERMARINE, P.B.—7. Span, 57 ft. 6 ins. Overall Length, 34 ft. Weight, 3,000 lbs. Engine, 225 h.p. Speed, 45-70 m.p.h. Fuel capacity, 4 hours. Under stress of weather, at the will of the pilot, the aeronautical impedimenta is instantly detachable, leaving an ordinary High-Speed motor craft, which contains the engine, pilot, passengers, petrol, instruments and gun, and is equipped with water propeller and rudder, having a distance range of 200 miles and speed of 35 knots. Built under Pemberton-Billing's patents at his Southampton Works. Applications for licences to build under the French, German, Russian, Italian, Belgian, Norwegian, Australian, American, Japanese, and other Foreign and Colonial patents, are invited.

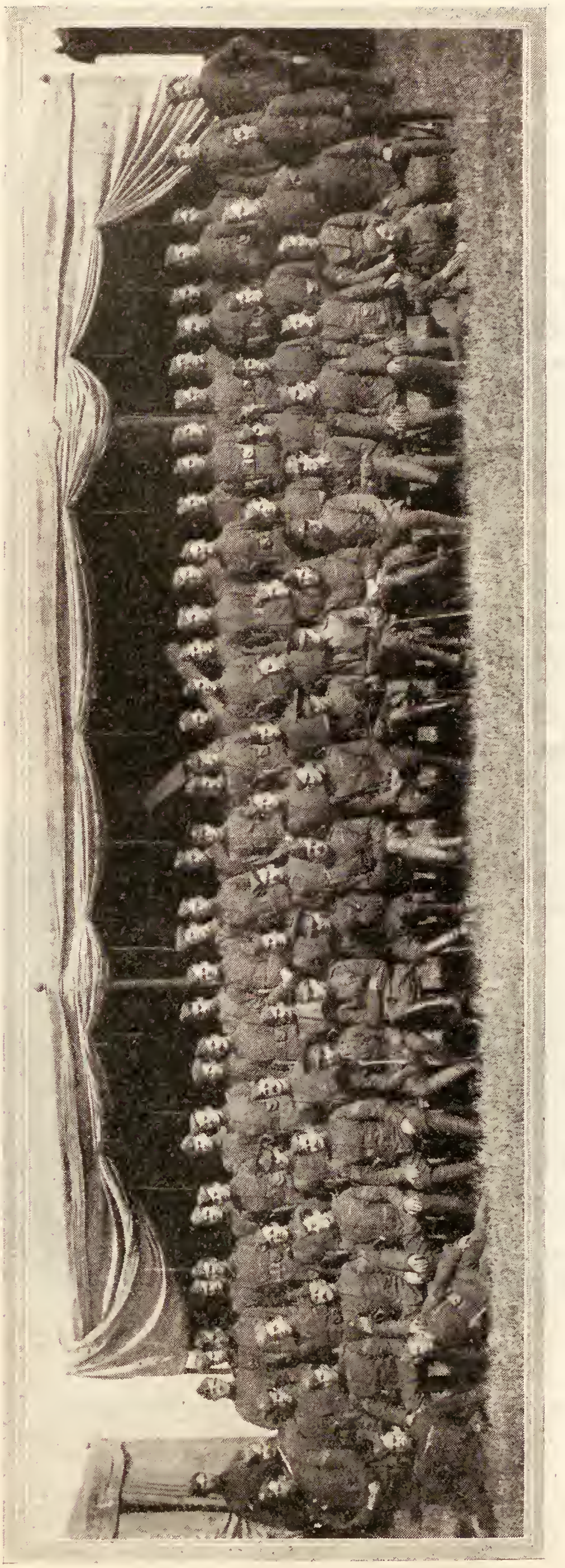
SOUTHAMPTON, ENGLAND.



Officers, W.Os., N.C.Os. and men of Nos 2 (top) and 3 (bottom) Squadrons of the Royal Flying Corps at Netheravon.



Officers, W.Os., N.C.Os. and men of Nos. 4 (top) and 5 (bottom) Squadrons of the Royal Flying Corps at Netheravon.



Officers, W.Os., N.C.Os. and men of No. 6 Squadron of the Royal Flying Corps at Netheravon.

day to indulge in various games—tennis, cricket, football, &c.—and to prepare for the sports that were held on Saturday last and in which several officers competed.

The general arrangement of the Camp may be seen on reference to one of the accompanying photographs, which was taken on Friday last from an aeroplane at a height of 2,000 ft. In the lower middle portion of the picture are the permanent quarters of the officers of Nos. 3 and 4 Squadrons—one-storey buildings arranged around an open square, the men's quarters being immediately beyond them in the photograph; while the bell tents seen directly in front of these two sets of buildings are the temporary quarters of the officers and of the men, respectively, of the visiting squadrons. The permanent aeroplane sheds, which are fitted with a system of hot water heating, are shown at the top middle portion of the photograph; while the temporary tents, which are of the Piggott, Hervieu, and Factory types—the last-mentioned being exceptionally substantial in construction, and capable of being greatly improved without much trouble—are seen arranged in a long line between the aeroplane sheds and the men's quarters of Nos. 3 and 4 Squadrons. The fine Piggott marquee at the extreme end of the line, which shelters the whole of the B.Es. of No. 2 Squadron, is extremely large and lofty, and is well lighted with the side curtains drawn, so that work may be carried on under the most adverse weather conditions. The other tents contain one machine apiece, and are much more portable and more readily erected. The question of the time taken in the erection of these tents, however, depends largely upon the previous experience of the erectors, as, for example, the last tent was erected in about one-fifth of the time that it took to set up the first aeroplane tent. In this particular branch of work much useful information has been obtained that should prove of service on future occasions. It is interesting to learn that one man sleeps in each of the smaller aeroplane sheds and two men in the large Piggott tent.

At the back of the permanent aeroplane sheds of Nos. 3 and 4 Squadrons are the repair shops—fitters, carpenters, blacksmiths, &c.—fully equipped with the plant required for dealing with any such work as may be rightly considered as coming under the heading of repairs—stores, transport and repair wagons, a meteorological office, and a photographic room, for the use of these two squadrons, the shops and other buildings for each being quite separate. Tents have been erected to "house" the staff and equipment necessary for the remaining squadrons. Some of these are located in the vicinity of the foregoing, but the majority are placed behind the temporary aeroplane sheds, between them and the road, where there is also the wireless station of the Headquarters Flight, the permanent wireless station being situated at some distance in front of the officers' quarters. It was very satisfactory to note the matter-of-fact way in which work was proceeding—the men going about their duties as though they were in their permanent buildings. Here were mechanics and smiths engaged on various repairs; there, men and boys were busy stitching wing and body coverings, whilst further on a flight-sergeant was lecturing on the mechanism of the Gnome engine, and a wireless operator was receiving a message from an aeroplane miles away. In front of the permanent shed is a wide asphalte road which is used in starting and handling machines during wet and bad weather. Here also a flagstaff has been erected upon which the flags and streamers are hoisted for indicating—according to the colour and position of the flag or streamer—that flying is in progress, the direction of the wind and the direction in which a pilot should rise and land. From the road at the back of the aeroplane sheds the ground slopes downwards towards the north, and at the foot of the incline a portion of the Kite Section with horses is quartered, another portion with balloons being at present at Lark Hill, a few miles away. In every respect the Camp is complete, and one realises after making a tour of the sheds that all which is essential for efficiency has been brought together, while that which can be dispensed with has been left behind.

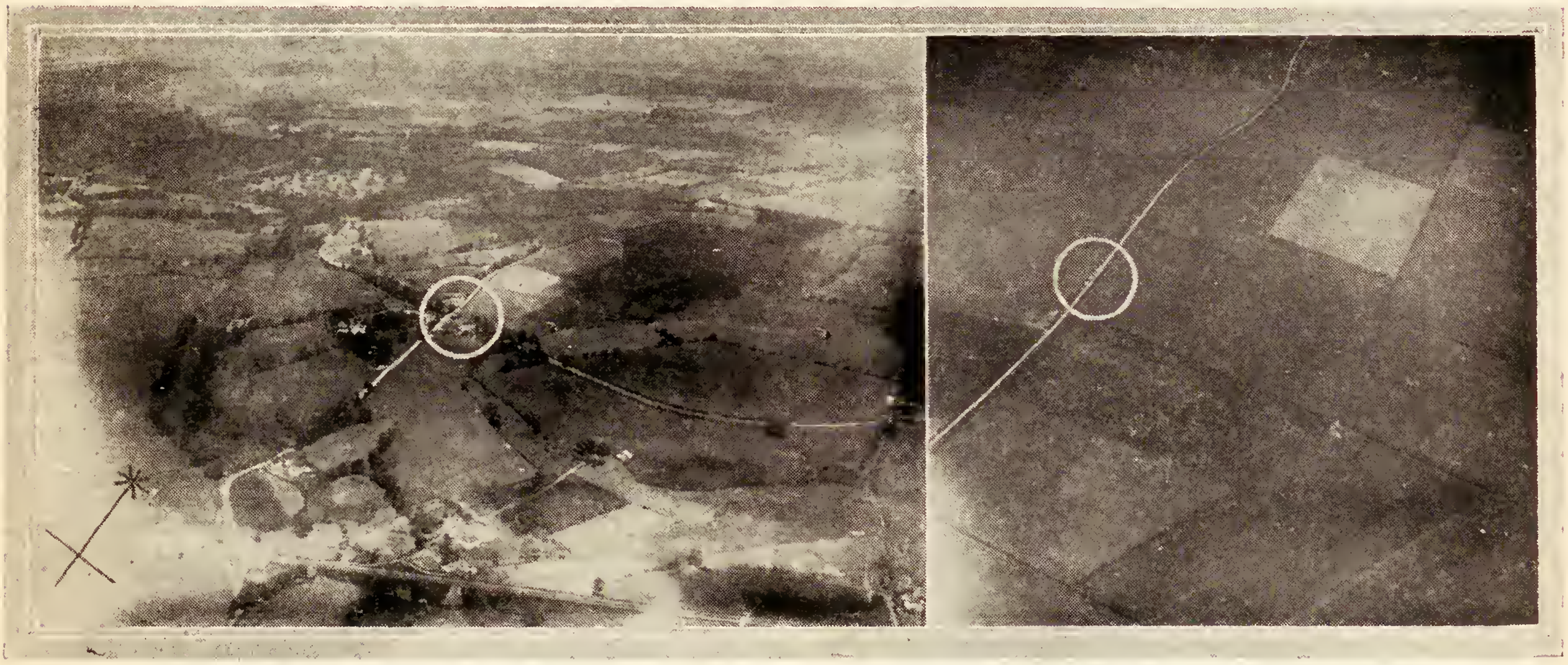
Reconnaissance.—From the fact that it is *the* class of work in which aeroplanes will be principally engaged in actual warfare, reconnaissance has constituted the major portion of the work upon which the machines have been engaged since the formation of the camp. These reconnaissances have been almost entirely carried out in the morning as part of a regular scheme of training with a prearranged object in view, as the afternoons, with the exception of Wednesday and Saturday afternoons which are half-holidays, have been in the main devoted to the performance of committee work and the attendance at the lectures delivered by various members of the corps, which are referred to later. But when the period of training is passed and an officer has become a skilled pilot, flying merely for the sake of flying and piling up the mileage flown has, comparatively speaking, little educational value, so that very few pilots now go up without some definite reason for so doing, and there is a general tendency to discourage promiscuous flying. Hence it will be evident, from the enormous mileage which has been covered by Army pilots and observers, that much real progress has been and is now being made towards military efficiency, and the keenness that is general throughout the corps is evidenced by the fact that machines are often taken out on occasions other than those which form part of the organised scheme of training.

"Flight" Copyright.

A group of Transport wagons at the rear of the temporary aeroplane sheds, showing the water-tower in the distance.

In general, each regular pilot is attached to one machine, since by so doing he becomes more conversant with its possibilities, and, therefore, more proficient in handling it; while, in addition, all pilots do not like the same adjustment of the control wires.

During the first three days after the establishment of the Camp, no regular system of observation was instituted, as the men were more or less occupied in settling down to their duties; but since that time, so sound has been the scheme originally devised that the programme set out has been followed practically without exception. The reconnaissances have progressed by steps. In the first instance, the observers of the machines, which included B.Es., R.Es., Maurice and Henry Farmans, Avros and Sopwiths—some of which were fitted with dual control—were instructed that troops of an assumed hostile force were operating within a certain area, limited by the position of certain named towns. The troops were supposed to be stationary on, or close beside roads, and were represented by mechanical transport vehicles, and small groups of N.C.Os. and men of the R.F.C. The observers were required to reconnoitre and report on the area indicated with a view to discovering the location of the enemy.


Two photographs taken from an aeroplane during reconnaissances made by the R F.C. on the 8th and 9th inst., the object of which information was desired being discernible within the small circles. The photograph on the left was taken from a height of 2,100 ft., and that on the right at 2,500 ft.

Next, it was assumed that an army marching on Devizes had billeted for the night at a certain town, with the heads of columns headed in a definite direction. The opposing force represented by the aircraft of the R.F.C. at, say, Devizes had despatched aircraft to reconnoitre the enemy's position and the possible lines of advance, in order to discover the direction in which he (represented by R.F.C. lorries) was moving. Then, it was required that the headquarters of an army, which were represented by lorries, a few horses, a flagstaff with flag, bivouac shelters and a few men, holding the portion of the country within a certain defined area, should be located. They had also to determine the position of two pairs of M.T. vehicles travelling on a certain road, and to estimate the distance between them. In the succeeding experiment, a free balloon carrying Majors Hon. C. Brabazon and Musgrave as pilot and passenger respectively, ascended from a point within an area defined by the position of various towns as on previous days. This balloon was intended to represent an airship with its engines disabled, which had been seen drifting in this area, and the airship pilot was permitted to fly at any elevation he chose until a certain time, after which he must maintain a height of 2,000 ft. To stimulate interest in the object of this particular reconnaissance—to discover the position of the balloon—the work was regarded in the nature of a contest between squadrons, and marks were awarded to the machines discovering the position of the balloon within two hours from starting, suitable time allowances being made according to the type and speed of the machines. The first machine to discover the balloon was awarded 30 marks, the second 29 marks and so on—the aggregate marks so obtained by the several machines of a squadron being divided by the number of machines of a squadron in order to obtain the average marks earned. That squadron having the highest average was adjudged the winner of the reconnaissance.

The reconnaissances we have just outlined are those which have formed part of the scheme of combined training between the units of the R.F.C., but additional work has also been carried out in conjunction with and independently of troops upon the ground with marked success, and since these manœuvres have been completed under, in some cases, extremely adverse weather conditions, exactly as would be the case in actual warfare, the results are highly satisfactory. It may be added that the reconnaissances were made at a height of not less than 2,000 ft., as, though special anti-aircraft guns are in existence, they have not yet reached the stage of perfection when immediate danger may be apprehended by a pilot flying at much above this elevation.

It will be readily admitted that the graded character of the exercises greatly enhances their value as a training for observers, and on the conclusion of a reconnaissance the observers were required to sit down and write a report upon what they had seen in the area under observation; so that the fact that the schemes were satisfactorily carried out in every case, in some instances reports being received under an hour and a half reflects great credit upon all concerned. We are enabled by the courtesy of Col. Sykes and Major Musgrave to reproduce photographs of the object of several of these reconnaissances, which were taken from an aeroplane at a height ranging between 2,000 and 2,500 feet. From these, the microscopic appearance of the object sought at this elevation will be seen; and seeing, the reader should be able to appreciate the reason why the training of observers is a lengthy and, of necessity, a continuous process.

Landing of Aeroplanes.—These reconnaissances were succeeded by a series of flights, in the course of which it was necessary for the pilot to land on temporary landing grounds. The military pilot, unlike his civilian counterpart, does not fly between two definite recognised landing grounds, but, particularly when operating on foreign soil, may often have, at short notice, to effect a landing in an entirely unknown country during a cross-country flight; and since the problem of flight at the present day is largely one of landing safely, and involves not only a knowledge of how to land but also the ability to readily choose a landing ground of a suitable character and size with expedition whilst flying, practice in this direction has been indulged in. On the first day of these exercises, the pilot was required to land on one temporary landing ground, and after this was successfully accomplished each squadron was ordered to land on two temporary landing grounds successively during flight.

But in effecting a landing it is most important that a pilot should know in what distance it is possible for his machine to come to rest on the ground after passing over an obstacle of a given height, say, a hedge or a clump of trees; and hence, prior to the experiments in landing just indicated, tests were carried out to determine what this is, for different machines. A fine cord, to which small flags or streamers were attached so as to render it visible to the pilot, was suspended between two poles at a definite height above the ground, and the pilots were required to land their machines as soon as possible after flying over this cord.

So far the landing tests which have been referred to have been carried out during the day; but one, if not the only, difficulty encountered in night flying, especially in cross-country work—and night flying will probably be an important section of the work on active service—is that of knowing where and when to land with safety, that is, the location of a suitable landing ground and a knowledge of the proximity of that ground relative to the machine. Hence, experiments have been conducted in this direction. At first they were confined to landing within a given known area, that is, one of which previous experience had been gained.

For indicating the exact position of the place where the pilot should land, various forms of lights, such as special designs of paraffin flares, magnesium lamps, petrol in buckets, &c., have been tried; and to enable the approach of the aeroplane to be observed, a headlight was mounted on the machine. With the assistance of a predetermined system of signals, communications passed between the machine and the ground, when the pilot was ready to descend; whereupon the flares were lighted and the pilot made a successful landing without difficulty. It will be clear, however, that although such a procedure is possible when the landing ground is already well known and the ground staff is available to respond to the signals from a machine there are many circumstances under which a pilot may be compelled to land without assistance from the ground and where he must also find a suitable spot with external aid. For this reason attempts were subsequently made to land without ground assistance, but the difficulties encountered, however, particularly as regards the production of a beam of light of sufficient intensity and adequate carrying power, yet which is capable of covering a wide area upon the ground, show the need for still further experiment, although so far as the tests have proceeded, much valuable information as to the possibilities in this direction have been gained.

(*To be concluded.*)

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Group of officers, including Col. Sykes, Majors Brancker and Beck, and Mr. O'Brien Hubbard, in front of a Maurice Farman at Netheravon, prior to a flight.

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Military Aeronautics in Italy.

THE Italian Government is at present considering a scheme, prepared by the Minister of War, General Grandi, for the reorganisation of military aeronautics in Italy. It is proposed to nominate two commandants-in-chief of aeronautics, to create a battalion for dirigibles, another for balloons and a third for aeroplanes, to start an establishment for aeronautical construction, to organise a school for military pilots as well as a technical advisory department. It is also proposed to create an Institute for Aeronautics as well as a civilian technical staff comprising engineers, professors, pilots and mechanics. Should these proposals be approved the Government will increase their Budget by £19,000 to provide for them.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Diary of Events.

June 27 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
July 11 ...	International Correspondence Schools Race, London–Paris–London. Hendon Aerodrome.
July 11 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
Aug. 1–15	*Daily Mail* £5,000 Circuit of Britain Race. Starting from Southampton Water.
Aug. 22–29	Gordon-Bennett Eliminating Trials. Upavon, Salisbury Plain.
Sept. 19–28	Gordon-Bennett Aviation Race. Buc, France.

HENDON AERODROME.

Members of the Royal Aero Club are admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards. The Membership Card admits the Member only—motor cars must be paid for.

Daily Mail £5,000 Circuit of Britain Race.

The following entries have been received:—

Messrs. White and Thompson—
1. Curtiss Biplane. Two 100 h.p. Curtiss engines. Pilot: Mr. A. Loftus Bryan.
2. Curtiss Biplane. 125 h.p. Anzani engine. Pilot: Capt. Ernest C. Bass.

Sopwith Aviation Co., Ltd.—
1. Sopwith Biplane. 150 h.p. Sunbeam engine. Pilot: Mr. C. Howard Pixton.
2. Sopwith Biplane. 100 h.p. English *monosoupape* Gnome engine. Pilot: Mr. H. G. Hawker.

Grahame-White Aviation Co., Ltd.—Grahame-White Biplane. 100 h.p. English *monosoupape* Gnome engine.

Messrs. A. V. Roe and Co., Ltd.—Roe Biplane. 150 h.p. Sunbeam engine. Pilot: Mr. F. P. Raynham.

Eastbourne Aviation Co., Ltd.—Tractor Biplane. 120 h.p. Green engine. Pilot: Mr. F. B. Fowler.

Blackburn Aeroplane Co., Ltd. — Blackburn Hydro-Biplane. 130 h.p. Salmson engine. Pilot: Mr. Sydney Pickles.

Late entries will be received up to 12 noon, June 30th, 1914, in which case the Entrance Fee will be £150.

Mr. H. E. Perrin visited Scotland last week-end and discussed the arrangements for the Scottish Controls with the Scottish Aeronautical Society. He also visited Fort George, Nairn, and Lossiemouth in company with Lieut. D. A. Oliver, R.N., to ascertain their suitability for a Control in the Moray Firth.

Daily Mail £10,000 Prize, Cross-Atlantic Flight.

The Aero Club of America has notified the Royal Aero Club that the preparations for the Cross-Atlantic Flight by Lieut. J. C. Porte, R.N., are now well advanced, and in all probability a start will be made during the next two months.

Balloon Race at Hurlingham on Saturday, June 27th, 1914, at 3 p.m.

The Long-Distance Balloon Race for the Cup presented by Mr. A. Mortimer Singer will start from the Hurlingham Club, Fulham, S.W., to-morrow at 3 o'clock. The following are the Competitors in the order of start:—

Competitor.	Balloon.
1. Lionel H. Mander ...	"Meteor" (50,000 c.f.)
2. C. F. Pollock	"Polo" (50,000 c.f.)
3. Capt. Lionel L. Atherton...	"Thistledown" (12,000 c.f.)
4. Lieut. T. G. Hetherington	"Dunlop" (50,000 c.f.)
5. Mrs. John Dunville ...	"Banshee II" (80,000 c.f.)
6. Lieut.-Col. E. M. Maitland	"Pompadour" (50,000 c.f.)
7. Mrs. A. Mortimer Singer...	"Planet" (80,000 c.f.)

Members will be admitted free to the Hurlingham Club on presentation of their Club Membership Cards.

The late Mr. Gustav Hamel.

A Memorial Service to the late Mr. Gustav Hamel was held at the Grosvenor Chapel, South Audley Street, W., at noon on Wednesday, the 24th inst. The service was conducted by the Rev. H. R. L. Sheppard, who delivered a most impressive address to a large and representative congregation. The Club was represented by Mr. F. K. McClean, Mr. E. V. Sassoon, Mr. C. G. Grunhold, and Mr. H. E. Perrin (Secretary).

International Correspondence Schools Race. London–Paris–London.

(*Under the Competition Rules of the Royal Aero Club.*)

Organised by the Royal Aero Club and the Aero-Club de France.

Starting and finishing at the Hendon Aerodrome,
Hendon, N.W.
SATURDAY, JULY 11TH, 1914.

PRIZES.

Fastest Time...	1st Prize: £500. Presented by the International Correspondence Schools.
Handicap ..	1st Prize: £300. Presented by the Royal Aero Club. 2nd Prize: £150. Presented by the International Correspondence Schools. 3rd Prize: £50. Presented by the International Correspondence Schools.

The Entrance Fee is £5 per aircraft, and entries will be received up till 12 noon, Saturday, June 27th, 1914. Late entries will be received up to 12 noon, Saturday, July 4th, 1914, in which case the Entrance Fee will be £10.

The Entrance Fee will be returned to each competitor who completes the course by 10 p.m. on Saturday, July 11th, 1914.

The Entry Form, which must be accompanied by the Entrance Fee, must be sent to the Secretary of the Royal Aero Club, 166, Piccadilly, London, W.

Full particulars and entry forms can be obtained from the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

The Home Office has granted an exemption from Aerial Navigation Orders to all competitors taking part, permitting them to leave and enter England without alighting in a prescribed landing area. Exemption has also been granted permitting Foreign Competitors to fly direct to the starting point, Hendon Aerodrome, between July 8th and 11th, and also to return from England between July 11th and 14th without landing in prescribed areas. The course to be flown under this exemption is *via* Folkestone.

At the time of going to Press (Wednesday), the following entries have been notified:—

Lord Carbery.

Grahame-White Aviation Co., Ltd., three entries, pilots to be nominated later.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

A VISIT TO THE NATIONAL PHYSICAL LABORATORY.

A LARGE and distinguished company availed themselves of the privilege of inspecting the work at the National Physical Laboratory on Friday last, June 19th, in connection with the annual reception held by Sir William Crookes, O.M., President of the Royal Society and Chairman of the General Board of the National Physical Laboratory, Lord Rayleigh, O.M., Past President of the Royal Society, Chairman of the Executive Committee, and Dr. R. T. Glazebrook, Director of the Laboratory.

So much splendid work is carried out in the various departments that to mention everything would be impossible. In the department for aeronautics, the visitors were given an excellent opportunity of studying the method employed for testing aeroplane models and parts. The two older wind channels of three feet and four feet diameter respectively were shown in operation, whilst the new 7 ft. channel which is in the course of construction afforded an opportunity of examining the internal arrangement. The fan has in this channel been supplanted by a four-bladed propeller, somewhat similar to those employed on B.E. machines, driven direct off an electromotor. A demonstration was also given of how the eddies set up by a body placed in a current of water are photographed by projecting a strong arc light on to the portion of the water channel nearest the body under test, and by causing some coloured fluid to ooze out of a series of small holes in the body, thus rendering the eddies visible.

In another department an inspection was made of the Froude tank in which are carried out tests on ships models and hydro-aeroplane floats. A demonstration was given of how a model of a boat is tested, and its behaviour automatically shown on a large graph mounted on the carriage which propels the model and which travels the whole length of the tank. Visitors were allowed to take a ride on this carriage with the operator in charge, and thus had an excellent opportunity of seeing this extremely ingenious device at work.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—Monday, last week, No. 153 Bristol tractor, 43 Bristol tractor, 31 Henry Farman, 104 Sopwith, 49 B.E. Sub-Lieut. Beevor to Isle of Grain on 70 Maurice Farman.

Tuesday, No. 49 B.E., 45 Caudron, 64 Short, 31 Henry Farman to Isle of Grain, 150 Avro, 7 Deperdussin, 43 Bristol tractor.

Wednesday, Nos. 34, 64 and 1 Shorts, 103 Sopwith. Mr. Pixton from Calshot.

Thursday, 103 Sopwith.

Friday, 21 Short tractor. Sub-Lieut. Lowles from Isle of Grain.

Civilian Flying.—Friday, Mr. Alec Ogilvie made two short flights on his 50 h.p. N.E.C.-Wright biplane.

Lieut. Tennant, who obtained his certificate on a Vickers biplane at Brooklands School on June 9th.

Sunday, Mr. Geo. Jezzi made two flights, one solo about 15 mins. and one with passenger.

Brooklands Aerodrome.

On Monday morning, last week, the Blériot, Bristol and Vickers pupils out; in the afternoon to Farnborough: Mr. Hawker on the 100 h.p. Sopwith, Mr. Mahl on the 80 h.p. Sopwith, and Mr. Raynham on the 80 h.p. Avro; Mr. Alcock from Sunbury on the 100 h.p. Sunbeam; wind varied between zero and 28 m.p.h.

Mr. Hawker back from Farnborough Tuesday afternoon on 100 h.p. Sopwith, Messrs. Jullerot, Merriam and Stutt solo flying on Bristol biplanes, Mr. Mahl on the 80 h.p. Sopwith, Mr. Gower on the 50 h.p. Blériot, and Mr. Dukinfield Jones with lady passenger on the D.F.W. Fine "looping" exhibition by Mr. Hawker on 100 h.p. Sopwith. Vickers, Bristol and Blériot pupils at work. Wind variation 0–21.

Wednesday, arrival of new Bristol armoured "Scout," also of Lord Carbery's Bristol "Scout," Messrs. Jullerot and Stutt on Bristol biplanes; in the afternoon, Mr. Mahl on 80 h.p. Sopwith, Mr. Dukinfield Jones solo and with lady passenger on D.F.W., Mr. Serge de Bolotoff taxying his triplane, Mr. Busteed on the new Bristol armoured "Scout," another fine looping display (12 loops) by Mr. Hawker on 100 h.p. Sopwith, Bristol and Vickers pupils out. Wind variation 0–14 m.p.h.

Vickers, Blériot and Bristol pupils out Thursday morning, Mr. Merriam on Bristol biplane, Mr. Barnwell on Vickers gun 'bus, and afterwards on same machine to Dartford with Mr. Knight as passenger.

Thursday afternoon an even finer looping display by Mr. Hawker on 100 h.p. Sopwith, both with engine shut off and with engine full on; Mr. Barnwell, with Mr. Knight as passenger, arrived back from Dartford on 100 h.p. Vickers gun 'bus; Messrs. Jullerot, Merriam and Stutt out on Bristol biplanes; Lord Carbery on his Bristol "Scout"; Mr. Mahl on the 80 h.p. Sopwith; Mr. Wilberforce on the 45 h.p. Anzani-Blériot; Mr. Serge de Bolotoff testing engine and propeller of his triplane; Bristol, Vickers and Blériot pupils out; *brevet* tests in good style by Mr. J. L. Parker (Vickers, altitude 1,400 ft.) and Mr. Chambers (Bristol, altitude 900 ft.). Wind variation 0–17 m.p.h.

On Friday, Vickers, Bristol, and Blériot pupils out. Brevet tests in good style on Bristol biplanes by Messrs. L. Gresley (altitude 450 ft.), and Lieut. B. E. Smithies (altitude 700 ft.; this pupil of Mr. Merriman's came back from Salisbury specially to take ticket). Mr. Jones on D.F.W., Mr. Alcock for two cross-country trips on 100 h.p. Sunbeam, Messrs. Barnwell and Knight on Vickers biplanes, Mr. Busteed on new Bristol armoured "Scout," engine test of Martinsyde monoplane, on which Mr. Skene, its new pilot, afterwards made a flight; in the afternoon, Lord Carbery on his Bristol "Scout" to Hendon, followed by Mr. Alcock on the 100 h.p. Sunbeam, Mr. Mahl giving instructions to his pupil, Mr. MacGordon, on the 80 h.p. Sopwith, the pupil having sole control of machine and doing good banked turns and landings, Mr. Serge de Bolotoff taxying his triplane, Mr. Hawker on the 100 h.p. Sopwith, and Mr. Wilberforce on the 45 h.p. Anzani-Blériot. Vickers, Bristol, and Blériot pupils out. Wind variation 0–17 m.p.h.

Bristol, Blériot and Vickers pupils out on Saturday morning. Mr. Skene on Martinsyde, Mr. MacGordon taxying on the 80 h.p. Sopwith, Mr. Mahl with passenger on the 80 h.p. Sopwith, Mr. Gower on 50 h.p. Blériot, Mr. Hawker to Hendon on 100 h.p. Sopwith, Mr. Merriam on the Bristol biplane, Mr. Mahl to Hendon on 80 h.p. Sopwith, returning with two passengers, arrival of another Sopwith "Scout." In the afternoon scouting operations in connection with the great Red Cross demonstration were carried out by Messrs. Barnwell (Vickers gun 'bus), whose gunner helped to demoralise the "enemy," Messrs. Gower and Wilberforce (Blériot monoplanes), and Mr. Mahl on the 80 h.p. two-seater Sopwith biplane. Mr. Barnwell flew to Elstree and back *via* Hendon, giving gun-firing demonstrations at each place. Mr. Hawker returned from Hendon, and gave a very fine looping display which was much appreciated and heartily applauded by the many thousands gathered at Brooklands for the Red Cross demonstration.

On Sunday, Mr. Alcock back from Hendon in 35 mins. against wind, on the 100 Sunbeam, Mr. Goodden on the looping Morane, Mr. Barnwell with passenger on Vickers gun 'bus, Mr. Mahl passenger carrying on 80 Sopwith, including the winner of the ballot for the free passenger flight, Mr. C. Rowe, of Willey Park, Broseley, Salop, who is at present a patient at Woking Hospital after a recent motor smash! Another magnificent looping demonstration by Mr. Hawker on the 100 Sopwith.

Lieut. Gerald G. Carpenter, 1st Suffolk Regiment, who recently took his *brevet* at the Grahame-White School at Hendon.

For the June Aeroplane Handicap on Saturday a large entry has been received, amongst the competitors being Mr. Hawker (100 h.p. Sopwith, Mr. Pixton (80 h.p. Sopwith "Scout"), Mr. Barnwell (100 h.p. Vickers gun 'bus), Mr. Knight (100 h.p. Vickers gun 'bus), Mr. Skene (Martinsyde monoplane), Mr. Gower (50 h.p.

Blériot), Mr. Alcock (100 h.p. Sunbeam), Mr. Elsdon (70 h.p. Vickers biplane), Mr. Webb (50 h.p. Vickers biplane), Mr. Stutt (50 h.p. Bristol biplane), Mr. Glew (45 h.p. Perry-Beadle biplane).

Mr. Kny, accompanied by Mr. Dukinfield Jones, has gone over to Germany, for the purpose of testing a number of D.F.W. machines and selecting some for dispatch to Brooklands.

Arrangements have been made for Mr. Hawker to give a looping display during the afternoon next Saturday.

Bristol School.—Monday, last week, as passengers: Mr. Treloar (3 flights), Mr. Charlesworth, Mr. Rutledge and Mr. Adamson. Solos by Mr. Gresley (2), Mr. Chambers and Lieut. Nugent.

Tuesday, passenger tuition to: Lieut. Nugent (3), Capt. Napier (3), Mr. Lucas (2), Capt. Bernard (2), Lieut. Richards (2), Mr. Godwin (5), Mr. Adamson (4), Mr. Rutledge (2), Mr. Charlesworth (2), and Mr. Treloar (5). Solos were made by Lieut. Richard, Lieut. Nugent, Mr. Chambers (2) and Mr. Gresley (2).

Wednesday, as passengers: Capt. Bernard, Capt. Napier (4), Lieut. Nugent (2), Mr. Lucas (4), Lieut. Coles (6), Mr. Treloar (9), Mr. Charlesworth (6), Mr. Rutledge (6), Mr. Adamson (7), Mr. Godwin (9). Solos by Mr. Gresley (2), Mr. Chambers (2), Lieut. Nugent and Lieut. Richard.

Thursday, passenger tuition to: Mr. Treloar (5), Capt. Bernard, Mr. Charlesworth (2), Mr. Rutledge (2), Lieut. Smythies, Mr. Adamson (3), Mr. Goodwin (5).

Friday, as passengers: Capt. Bernard (3), Capt. Napier (3), Mr. Lucas (2), Lieut. Coles (2), Mr. Goodwin (6), Mr. Adamson (7), Mr. Rutledge (4), Mr. Charlesworth (3), Mr. Treloar (8). Solos were made by: Lieut. Nugent (3), Lieut. Richard (3), Mr. Rutledge, Mr. Adamson and Mr. Charlesworth.

Saturday, passenger tuition to: Mr. Adamson (3) and Mr. Goodwin (4).

Vickers School.—Monday, last week, with instructor, Capt. Kane, Lieuts. Clemson and Warrand. Mr. J. Parker solo.

Tuesday, with instructor, Capt. Kane, Lieuts. Clemson and Warrand, and Mr. Klingenstein. Lieut. Eberli and Messrs. Miller and Parker solos; Mr. Klingenstein solo.

Wednesday, with instructor, Lieuts. Warrand and Clemson and Capt. Kane, Lieut. Gillman and Mr. Klingenstein. Lieut. Eberli and Messrs. Miller and Parker solos.

Thursday, with instructor, Capt. Kane, Lieuts. Gillman, Warrand and Clemson. Mr. Parker solo, and for *brevet* in excellent style.

Friday, with instructor, Lieuts. Clemson, Warrand and Eberli; Capt. Kane, Lieut. Eberli and Mr. Miller solos. Lieut. Gillman with instructor.

Saturday, with instructor, Capt. Kane, and Lieuts. Clemson and Gillman.

Liverpool Aviation School, Waterloo.

ON June 13th and 16th, Osborn-Groves rolling. On the Tuesday Melly tried Isaacson engine on the two-seater, but found weather tricky and came in.

Wednesday, Groves rolling. Later, Melly made three flights of 10 mins. each to Altcar and back, taking Groves and Isaacson on the last two flights respectively, and reaching 1,200 ft. in 5 mins.

Thursday, Groves was out rolling long straights of a mile each in perfect style, and on Saturday last Groves again doing excellent rolls, and put in a couple of perfectly correct hops of over 20 yards each. A strong N.W. wind has prevailed since Sunday.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Tuesday, last week, Messrs. Shepherd, Palmer and Courtney straights with Instructor Lillywhite.

Wednesday, Messrs. Liu, Wyles, Palmer, Shepherd, Courtney, North and Gruning straights with Instructors Birchenough, Howarth and Lillywhite. Messrs. Dunne, Lowe and Robinson solo circuits and figures of eight.

Thursday, Messrs. Robinson, North and Dunne figures of eight, &c., Messrs. Palmer, Liu, Gruning, Courtney and Shepherd straights with Instructors Barrs and Lillywhite.

British Caudron School.—Monday and Tuesday last week, too windy for the school to go out.

Wednesday, school out at 5.30 a.m. under the instruction of W. T. Warren and Rene Desoutter. W. T. Warren tested new machine, finding same in good trim. R. Desoutter flight, Mrs. Buller flight. Mr. Macgregor two straights on new machine. W. T. Warren gave Mr. T. W. Abbott his first lesson; after being on machine for one hour Mr. Abbott succeeded in getting straight across to mark and back. At 6.30 p.m. W. T. Warren flight. Rene Desoutter flight, reaching to a height of 1,200 ft. on 35 h.p. new machine.

Thursday, at 4.30 a.m. under the instruction of W. T. Warren and R. Desoutter. Had to wait for fog. Mr. Abbott rolling and progressing favourably, getting in good hour's practice. Too foggy for other work.

Friday, school out at 7 o'clock, having to wait owing to fog. W. T. Warren test flight. R. Desoutter flight. Mrs. Buller two flights, Mr. Abbott had good practice in rolling, will soon be ready for flights.

Hall School.—Tuesday, last week, A. F. Arcier, H. Gearing, and A. L. Brookes on Caudron. J. L. Hall on Avro.

Wednesday, H. Gearing, A. F. Arcier and A. L. Brookes eight straights each on Caudron, too windy for circuits. Messrs. Gibson and Charig straights on Deperdussin monoplane. Miss D. Clifford on Avro with dual control.

Thursday, Messrs. A. L. Brookes, A. F. Arcier circuits and figure eights on dual control Avro. Later, Mr. Hall took up Messrs. Haines and Gibson as passengers, 10 mins. each.

Friday, Messrs. A. F. Arcier and A. L. Brookes on No. 1 Caudron in morning and evening. Owing to terrific thunderstorms during day flights were compelled to be brief.

Saturday, windy, J. L. Hall exhibitions and passenger carrying on Avro.

Mr. J. L. Hall takes Miss Elsie Spencer, who is so successfully appearing in the "Marriage Market" at Daly's Theatre, for a flight at Hendon on his 50 h.p. Avro.

LONDON–MANCHESTER–LONDON AIR RACE.

Despite the fact that out of eight starters in last Saturday's race from London to Manchester and back only three finished, it was nevertheless an interesting and historic race. There was a little of the sensational about it, too, for it was won by the winner of the recent Aerial Derby, W. L. Brock, the popular hero of the race whom many hoped would win. Excellent as Brock's performance was, as will be seen later, Carr and Alcock, who finished second and third respectively, also put up most creditable attempts to win the race, the former because he was making his first big flight on a fast monoplane—the Morane-Saulnier—and the latter on account of his being delayed nearly an hour at the start by slight engine trouble and encountering a storm on his return which the others missed.

"Flight" Copyright.

LONDON-MANCHESTER-LONDON RACE.—Finish by Brock on his Morane-Saulnier machine on Saturday last, when he won this race in magnificent time. The time estimated by the handicapper for him to arrive back at Hendon was 5.50 p.m., and within ten seconds of that time Mr. Brock passed the winning post. Note the clock in our photograph, which points exactly to the 5.50.

On the day before the race, Friday, several of the competitors made speed trials at Hendon in order to provide the necessary data for the handicappers, Mr. George Reynolds and Mr. J. H. Ledeboer. The pilots were J. Alcock, W. Birchenough, P. Bjorklund, W. L. Brock, Lord Carbery, R. H. Carr and Louis Noel, and each flew three times each way over a distance of about a quarter of a mile. Lord Carbery on his 80 h.p. Bristol scout attained a speed of over 100 m.p.h.

Early on the Saturday morning at Hendon, prospects looked far from favourable, for a thick mist rendered it impossible to see further than half a mile or so away, and as the time for the start approached, matters did not improve very much. As, however, reports of clear weather were received from points all along the route beyond St. Albans, it was decided to dispatch the first competitor at 9.30 a.m. At this hour, therefore, the limit man, W. Birchenough, on the 70 h.p. Maurice Farman, started off on the first stage of 91 miles to Birmingham, with a mechanic as passenger, and was soon lost to view in the mist. The next pilot to start should have been Bjorklund on the 50 h.p. Blériot, but he was unable to do so owing to indisposition. Shortly before his time to start, J. Alcock made a test flight on the 100 h.p. Sunbeam-Maurice Farman, but he had not made more than half a circuit when the engine stopped suddenly, and he had to descend at the far end of the aerodrome eight minutes before he was due to start. A hole in the carburettor float was the cause of the trouble, so the float was taken to the Grahame-White works to be set right. In the meanwhile L. A. Strange was sent off on the 80 h.p. Blériot, and he also soon disappeared in the mist. Lord Carbery then made a test flight on his 80 h.p. Bristol, during which he flew into a fog bank about 500 ft. up. By this time Alcock's engine was got going again, and at 10.55.40 he started off, carrying Harold Lane as passenger and course finder. Conditions were then improving somewhat, and it was hoped that Hawker on the 100 h.p. Sopwith, R. Skene on the Martinsyde, and perhaps Gordon Bell on the Avro would be able to come over from Brooklands, where it was stated the weather was very bad. Louis Noel, W. L. Brock, and R. H. Carr were then dispatched at short intervals on the three Morane-Saulniers, each getting away in fine style. They had not been gone long when a machine was seen returning, which proved to be Birchenough's Maurice Farman. On landing he stated that he had covered about 50 miles, but had to return owing to the petrol tank leaking very badly. He reported the weather as being quite good 20 miles out. Shortly after Birchenough's return, Victor Mahl arrived from Brooklands with a passenger on the 80 h.p. Sopwith "family 'bus," and reported that conditions were very bad all the way from Brooklands, and that Hawker, on the 100 h.p. Sopwith Tabloid, had ascended to see what the prospects of coming over were like as he left. Hawker arrived a few minutes later with news that Skene was not coming.

Lord Carbery got away next, Hawker following some 25 mins. after, so that out of the fourteen entrants eight had started—one had already returned—leaving six non-starters, viz.:—Bjorklund, R. J. Lillywhite on the G.-W. tractor, P. Verrier, who flew to Manchester on the Maurice Farman the day before in order to give exhibitions at that place, R. Skene on the Martinsyde, and the Avro and Henry Farman biplanes. Now that all the competitors were away, news was anxiously awaited for their arrivals at Birmingham and Manchester, and one's fancy turned to thoughts of lunch.

During the latter, J. L. Hall ascended on his 50 h.p. Avro—with "Pratts" written as large as life on the under side of the lower planes—and Mahl returned to Brooklands. At 1.40 p.m. Hawker returned to the aerodrome, much to everyone's surprise, and got out of his machine in a very dazed condition. He stated that he got as far as Coventry, where he lost his bearings in a fog, and, feeling ill, decided to return to Hendon.

How he found his way back he did not know, he said, and then feeling bad again he was taken to the aerodrome offices to rest. This was, perhaps, the one tragedy of the race, for he was the favourite, and stood an excellent chance to win. News of the other competitors then came trickling in. Strange had arrived at

"Flight" Copyright.

Mr. Winston Churchill with Mrs. Churchill visited Hendon on Saturday last in connection with the London–Manchester–London Race. Our photograph shows Mr. Churchill in conversation with Mr. Richard T. Gates, the General Manager of the London Aerodrome.

and departed from Birmingham, and Carr, Brock, Alcock, and Lord Carbery had also arrived at this control, but no news of Noel came to hand until some time after, when it was reported that he had landed on Birmingham racecourse instead of the Castle Bromwich Playing Fields, and had damaged his machine.

By now it was 3 o'clock, and for the rest of the afternoon exhibition and passenger flights were made by the Hendon pilots. A. E. Barrs made numerous flights on the G.-W. bi-rudder 'bus, and N. Howarth and R. J. Lillywhite flew the same machine as well. Lillywhite also made a flight on the G.-W. tractor "Lizzie," on which he seemed to be as much at home as on one of the 'buses. The petrol tank of the Maurice Farman having been mended, Birchenough made several passenger flights on this machine, whilst E. F. Norris came out on 'bus No. 107. J. L. Hall put up a fine high flight on his Avro, ascending to an altitude of about 5,000 ft., where he disappeared amongst the clouds from time to time. During these flights H. Barnwell passed over the aerodrome on the 100 h.p. Vickers gun-biplane on his way from Brooklands to Elstree, passing over again a little later on and returning to Brooklands. At 5 o'clock a speed contest for a trophy presented by Mr. A. Oddenino was flown in a single heat over six laps of the aerodrome. There were four starters, as follows:—E. Baumann on the 50 h.p. Gyro-Wright (2 mins. 26 secs.); N. Howarth on a 50 h.p. G.-W. 'bus (2 mins. 6 secs.); R. J. Lillywhite on the 50 h.p. G.-W. bi-rudder 'bus (1 min. 20 secs.); and W. Birchenough on the 70 h.p. Maurice Farman (scratch). Howarth and Lillywhite retired after completing four laps, leaving Baumann and Birchenough to finish. Baumann kept ahead until the end of the last lap, when he was overhauled by Birchenough, who crossed the line three seconds in front. Birchenough completed the course in 13 mins. 32 secs. and Baumann in 13 mins. 35 secs. Immediately after the race Barnwell passed overhead once more, and returning shortly after swooped down into the aerodrome and flew past the enclosures, the gunner firing several rounds of "blank" from the quick-firer, much to the astonishment of the spectators. Mr. Winston Churchill, who was busy examining the various machines, also witnessed this performance.

In the meanwhile news was received that Brock, Carr, and Alcock had arrived at and departed from Manchester, and that Strange, who was the first to arrive at this control, had smashed his propeller and a chassis strut when starting on the homeward journey and had been compelled to retire, whilst Lord Carbery had damaged his machine on landing at Birmingham and had also retired. Shortly after 5 o'clock it was announced that Brock had left Birmingham for Hendon and might be expected at about 6 o'clock, and sure enough, at a quarter to, a machine was seen above the trees in the north-west, followed by a cry of "there he is." There was no doubt about it being a Morane-Saulnier, but it was not until it arrived over the aerodrome that we saw it was Brock's. He crossed the line at 5.49.6, 10 seconds sooner than the time calculated for his arrival by the handicappers. Needless to say he was given an enthusiastic reception, and was chaired to a car which carried him past the various enclosures to "exhibit" him to the spectators.

His progress throughout the race was without incident except that he ran into fog on the last part of the first stage, when he landed in a field and ascertained from some farm hands that he was only some 14 miles from Birmingham. He got one of the farm hands to swing the propeller, and was soon on his way to Birmingham,

RESULTS OF LONDON-MANCHESTER AND BACK AIR RACE.

Daily Mail Gold Trophy and "Pratt's" £400.

W. L. Brock (80 h.p. Morane-Saulnier monoplane).

Handicap for 1st Prize (£250) and 2nd Prize (£100).

Presented by the Anglo-American Oil Company.

	Handicap Time.	Flying Time.	Average Speed.
	h. m. s.	h. m. s.	m.p.h.
1. W. L. Brock ...	6 19 6	4 42 26	69
2. R. H. Carr ...	7 35 54	5 56 12	54
3. J. Alcock	8 32 11	7 56 17	45

Flying Times Between Controls.

	Hendon–Birmingham.	Birmingham–Manchester.	Manchester–Birmingham.	Birmingham–Hendon.	Total.
	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
W. L. Brock	1 36 59	0 48 39	1 6 12	1 10 36	4 42 26
R. H. Carr...	1 29 30	1 19 36	1 50 40	1 16 26	5 56 12
J. Alcock ...	2 50 49*	1 7 22	2 9 17	1 48 49	7 56 17

* Including delay at Hendon.

LONDON-MANCHESTER AND BACK AIR RACE, JUNE 20th.—Handicaps and Times of Competitors.

Pilot.	Machine. bi = biplane. m = monoplane.	Engine.	Handicap.	Starting Time.	BIRMINGHAM.		MANCHESTER.		BIRMINGHAM.		HENDON
					Arrive.	Depart.	Arrive.	Depart.	Arrive.	Depart.	Arrive.
		h.p.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
W. Birchenough	Maurice Farman bi.	70 Renault	2 50 32	9 30 0	Returned after completing 50 miles owing to leak in petrol tank.						
P. Bjorklund ..	Blériot m.	50 Gnome...	2 30 22	9 50 10	Did not start owing to indisposition.						
J. Alcock ...	Maurice Farman bi.	100 Sunbeam	2 14 38	10 5 54*	12 56 43	1 26 43	2 34 5	3 34 5	5 43 22	6 13 22	8 2 11
L. A. Strange...	Blériot m.	80 Gnome...	1 51 44	10 28 48	12 7 49	12 37 49	1 50 0	Damaged machine on leaving Manchester.			
Louis Noel ...	Morane-Saulnier m.	80 ,,	1 17 10	11 3 22	Landed on B'ham racecourse by mistake and damaged machine.						
W. L. Brock ...	,, ,,	80 ,, ...	1 13 52	11 6 40	12 43 39	1 13 39	2 2 18	3 2 18	4 8 30	4 38 30	5 49 6
R. H. Carr ...	,, ,,	80 ,, ...	1 10 50	11 9 42	12 39 12	1 9 12	2 28 48	3 28 48	5 19 28	5 49 28	7 5 54
Lord Carbery ...	Bristol bi.	80 Le Rhone	0 24 42	11 55 50	12 57 20	Damaged machine on landing at Birmingham.					
H. G. Hawker	Sopwith bi.	100 Gnome...	scratch	12 20 32	Got as far as Coventry and returned to Hendon.						

* Actually started at 10 h. 55 m. 40 s.

which he reached safely. After a stop of exactly the half hour, he resumed his journey to Manchester, completing the distance of 70 miles in 48 mins. 39 secs. At Manchester he stayed no more than the necessary hour, and the homeward journey was accomplished without difficulty—to use his own words, the last half of the journey was a joy ride. He did not see any of the other competitors whilst in the air, and throughout the race he maintained an average altitude of from 1,000 to 1,500 ft. It is rumoured that he owed his success to his chewing gum.

The next man home was Carr, who, it will be remembered, also scored in the Aerial Derby, he being second. He crossed the line at 7.5.54, just over an hour after Brock. Carr was less fortunate than Brock in finding his way, and had to land at Aylesbury to ascertain the direction of Birmingham, which he eventually reached a few minutes in front of Brock. He also missed his way just outside Manchester, mistaking the Bridgwater Canal for the Manchester Ship Canal, and he was seen by the observers at Trafford Park hovering about for some time before he at last located his correct direction. Carr received an equally warm reception on landing at Hendon, and after shaking off the numerous interviewers and well-wishers he retired to the tea pavilion with a small party of Hendonites there to partake of a well-earned meal. Shortly after 8 o'clock Alcock arrived on the Maurice Farman propelled by the only British engine in the race—a Sunbeam. Alcock and his passenger had plenty of excitement throughout the race, especially during the stages between Birmingham and Manchester where they experienced very bumpy weather, whilst on the homeward journey they got into the thick of a storm. It was indeed hard luck on Strange to be put out of the race in the way he was, for he made excellent progress as far as he got. Except that he could not locate the Birmingham control, to which he was guided by Claude Grahame-White, who ascended from the ground on the Henry Farman on which he had been giving exhibitions, he steered an absolutely true course throughout, and did not lose a second at the controls.

Large crowds witnessed the arrivals and departures of the competitors at Birmingham and Manchester. At the former control C. Grahame-White made numerous exhibition and passenger flights on the 80 h.p. Henry Farman, and after Noel, with his usual bad luck, was put out of the race, this pilot also amused the crowd on the same machine. The crowd at Manchester was kept amused during the long waits in a similar manner, for P. Verrier made many flights on the 70 h.p. Maurice Farman, which he had flown over the day previous. He took up no fewer than 22 passengers, including the Lord Mayor of Manchester, in addition to executing many of his daring stunts. At 5 o'clock he left, with his mechanic as passenger, for Hendon *viâ* Birmingham, arriving at the latter place at 6.30 p.m., and leaving 20 minutes later he arrived at Hendon at 8.45 p.m. His arrival was extremely picturesque, for he was at an altitude of about 2,000 feet, from which height he made a fine spiral *vol plané*, the machine standing out prominently against the beautiful sunset sky: it was indeed a peaceful and grand finish to a long and exciting day.

FLYING AT HENDON.

THURSDAY afternoon of last week was fine and sunny, and some good flying was witnessed by an appreciative gathering. The proceedings opened shortly before 3.30 p.m. with a passenger flight by W. Birchenough on the Maurice Farman, R. J. Lillywhite on the 50 h.p. G.-W. bi-rudder 'bus, and Rene Desoutter on a re-built 35 h.p. Caudron. Lillywhite terminated his flight with several pretty spirals with the engine stopped. Rene Desoutter made the little Caudron climb at an astonishing rate considering the small power.

Birchenough on the Maurice Farman, Lillywhite on the bi-rudder 'bus, and R. H. Carr on the 80 h.p. Blériot then started a series of passenger flights, taking up between them about ten. N. Howarth also gave exhibitions on the bi-rudder 'bus, on one occasion executing some "zig-zags" to the alarm of some of the spectators who thought that the machine was out of control. J. L. Hall made several flights on his 50 h.p. Avro, and P. Bjorklund and Louis Noel, two of the competitors in the London–Manchester race, made test flights on the 50 h.p. Blériot and 80 h.p. Morane-Saulnier monoplanes respectively. Pierre Verrier apparently "went mad" on a 70 h.p. Maurice Farman, and performed all kinds of stunts, including flying up and down the enclosures standing on the seat with one arm resting on the top plane! Later in the afternoon Carr gave a looping demonstration on the 50 h.p. G.-W. tractor biplane "Lizzie," making two loops, each at a height of about 800 ft. Other flyers out during the afternoon were E. Baumann on the 50 h.p. Wright, W. L. Brock on the 80 h.p. Blériot, and Louis Noel on the Maurice Farman.

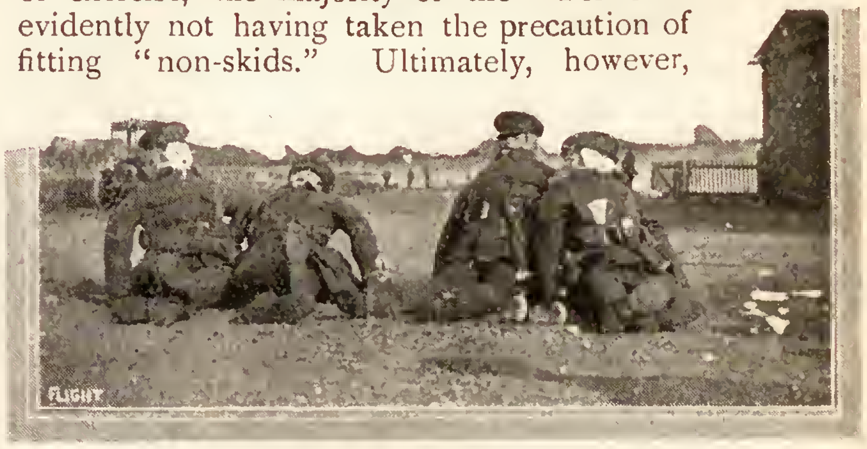
Ascot Sunday at Hendon was, as it should be, quite bright and gay, and a large attendance witnessed some excellent flying. The winner of the previous day's race, W. L. Brock, made a magnificent altitude flight above the clouds, on his Morane-Saulnier, reaching a height of 9,000 feet. R. H. Carr gave two looping demonstrations, executing two loops each time at about 1,000 feet. Claude Grahame-White took up Lady Muir-Mackenzie on the Maurice Farman, and W. Birchenough and Louis Noel also carried several passengers on the same machine. Other Hendon pilots, J. L. Hall on his Avro, A. E. Barrs on the G.-W. 'bus, &c., also contributed towards the afternoon's amusement.

EDDIES.

BROOKLANDS was the scene, on Saturday last, of great activity, though of a different kind from that which usually takes place there. Posters along the footpath from Weybridge station to the entrance gates announced a Red Cross Field Day, and a Red Cross Field Day it was. The slopes around the paddock and test hill were covered with Red Cross hospitals and tents, whilst Territorial troops livened things up by conducting a fierce "battle." It was amusing to watch a division of the defending Army scramble up the steep parts of the race track, the surface of which was obviously not designed for this sort of exercise, the majority of the "Terriers" evidently not having taken the precaution of fitting "non-skids." Ultimately, however, the top of the track was reached and from here a deadly hail of wax bullets were rained down on an imaginary enemy.

"Flight" Copyright.

The ambulance off to pick up "wounded" soldiers on Red Cross Day at Brooklands.



"Flight" Copyright.

"Wounded warriors" awaiting the arrival of the ambulance on Red Cross Day at Brooklands. These straw dummies were left lying on the grass and aeroplanes sent out to locate them and bring back reports as to their whereabouts.

Mr. Barnwell, on the Vickers gun-carrying biplane, went out over the surrounding country to locate the enemy, and his passenger did his level best to kill off as many of the "invaders" as possible with the machine gun which was mounted in the nose of the *nacelle*. Later Barnwell must have regretted his part of the manslaughter for he went out again to look for "wounded," and after locating them brought back information as to their whereabouts, and thus probably saved many lives by enabling the field ambulance to render prompt assistance. Among the large and distinguished company which watched the proceedings during the afternoon were H.M. Queen Alexandra and the Dowager Empress of Russia, this being the first visit of a member of the British Royal Family to the track. Numerous flights were also made during the afternoon by Messrs. Mahl, Gower, Wilberforce, and several other pilots. In the evening Hawker arrived from Hendon, and delighted everybody by looping in excellent style.

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Waterplaning is not, evidently, to be regarded as the sport of the well-to-do, as I hear that the three brothers Mitchell are having an excellent time at Gillingham in Kent, with a machine which they have constructed from their own designs. This machine is a biplane having a span of 37 ft. and 34 ft. for the upper and lower planes respectively—the chord being 4 ft. 6 ins. and the gap 6 ft. At present a 100 h.p. Mors engine is fitted, and the machine when empty weighs 1,050 lbs. Three floats are employed—two main and one tail float—the former, which weigh 50 lbs. each, being rigidly attached to the struts from the body, and tied together by the cross-member seen in the photograph. *Ailerons* are fitted between the main planes.

The machine has not yet been flown, owing to the fact that the locality is within one of the restricted areas, but "taxying" has been freely indulged in. On the last occasion, however, misfortune awaited them, happily without serious results, as the crowd, holding on to the tail, let go before the pilot was ready, with the result depicted in the photograph.

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The Perry Beadle tractor biplane is now erected at Brooklands and has been out for a short "straight." This machine, which is quite a likely looking little 'bus, will be more thoroughly tested as soon as weather conditions permit, and should prove attractive to the amateur pilot as the selling price is to be very reasonable indeed. The flying boat exhibited at Olympia by this firm is practically finished and will, it is expected, be tested shortly, probably at Cowes.

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As a result of his exhibition flights at Scunthorpe, Lincs., Manton's collection of mascots has received two interesting additions. One is a silver-mounted hazel nut, the nut having been discovered 70 ft. below the bed of the River Trent whilst laying the foundations of a new railway bridge. The only speech made by the donor in handing over the gift was: "A nut from a knut to a knut." The other is a miniature silver replica of the famous Lincoln Imp.

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Whilst at Scunthorpe Manton, after some difficulty, obtained permission to inspect some of the local ironworks, and impressed by the heat from the furnaces, the thought occurred to him that it would be interesting to try a flight over the works in order to watch the behaviour of the machine in the heated air. Next morning he went up for the purpose, and as he was passing over the works the Blériot rose up about 50 ft., according to his barograph, in a distance of about 300 yds., and on flying into cold air again it dropped a similar distance. Although it was more or less what he expected, Manton tells us it was an uncanny experience, as it felt as though the machine was being lifted by an invisible crane.

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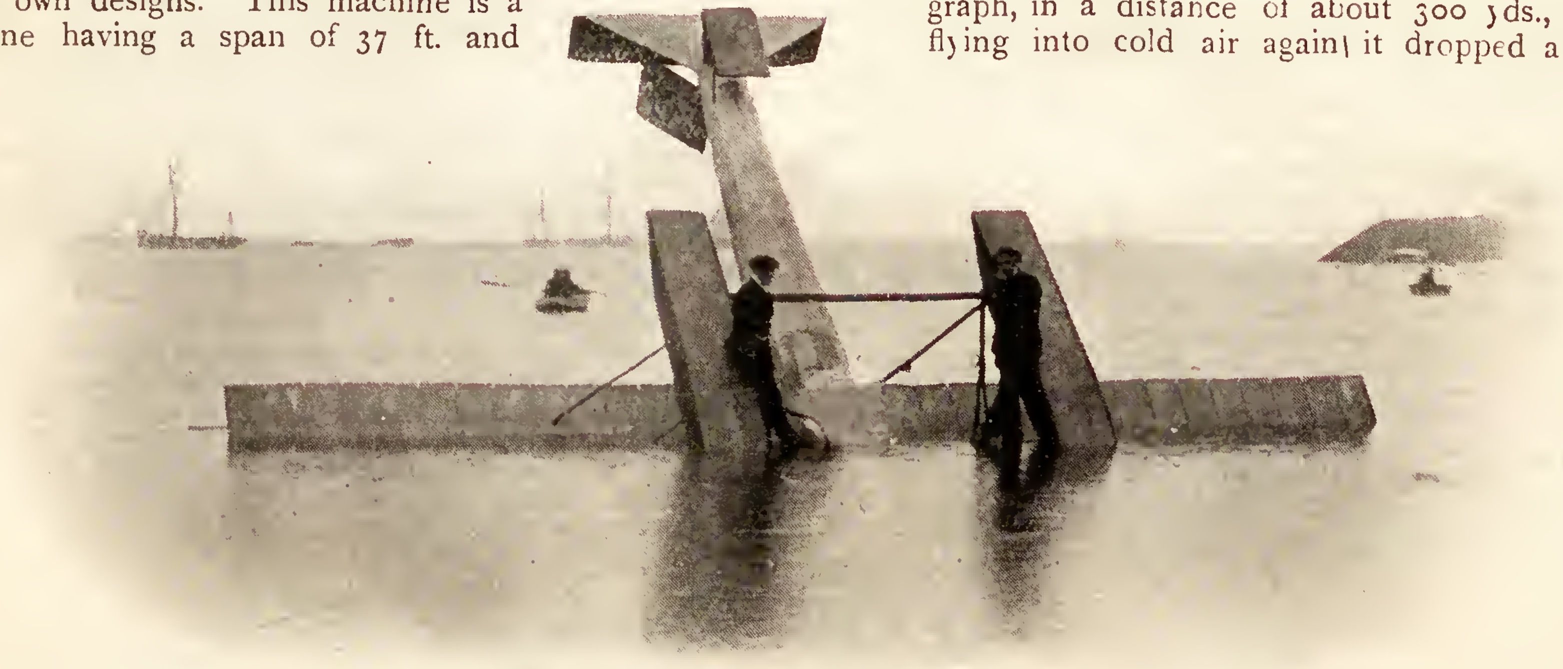
One amusing experience befell Manton on the first day at Scunthorpe. On landing from a flight he was approached by a gentleman who asked in German if he spoke that language. In the same language Mr. Manton just managed to inform him that he did not. The stranger then tried French. Again Mr. Manton had to express his regrets for a limited knowledge of that tongue. The man next tried Spanish, and finally in desperation spoke some English, and was considerably surprised to learn that the young airman who had been giving such clever demonstrations was just an Englishman.

Manton also tells me, with a twinkle in his eye, of the comment of one of the crowd who evidently knew that his father is a doctor. When Manton disappeared among the clouds and someone asked where he had gone the answer came back, "I suppose he has gone to see some of his father's old patients."



The Mitchell hydro-aeroplane after overturning in the Medway at Gillingham.

Mr. Oswald Watt, writing from the Blériot Aerodrome at Buc, reminds me that two old friends are over there at present. Maurice Tetard (ex Bristol) is flying the biplane fitted with a Doutre stabilizer in the stability competition, while Sabelli is taking delivery of three tandem Blériots for the Bulgarian Army. Tetard hopes to be in England in a few weeks, demonstrating a Bathiat-Sanchez biplane.

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Mr. Summerfield, of Melton Mowbray, who has recently been flying the Watson rocking wing machine at Buc, had a narrow escape whilst flying his Blériot monoplane recently. He was coming down in a steep spiral, and, when trying to flatten out at a height of about 50 ft., found that one of his rudder control wires had come adrift, thus rendering the rudder useless. Taking his feet off the rudder bar and placing them on the tank he awaited the smash. The machine struck the ground with great force and was totally wrecked, but Mr. Summerfield escaped practically unhurt. He is of the opinion that had he kept his feet on the rudder bar he would have broken his legs.

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First the Derby and now the London–Manchester flight! Hearty congratulations, Brock! But if you persist in this sort of thing we shall have all the other pilots retiring from racing. Nevertheless, I don't think anybody begrudges you your victory, for we all know that you have worked hard and persistingly.

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Mr. V. Waterfall, who has for some time past been piloting the Martinsyde monoplane at Brooklands, has now joined the Royal Flying Corps. The Martinsyde firm have secured the services of Mr. R. R. Skene, who will in the future pilot their machines.

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It is probable that more will be heard of the Shoreham aerodrome in the future than has been the case in the past, for I learn that it is now under new management, and gather that it is intended to make an endeavour to hold weekly race meetings, including cross-country races and pylon races, as well as other exhibition flights. Several well-known pilots have promised to lend assistance by taking their machines down to Shoreham, either permanently or on race days. I wish the management the best of luck in their undertaking.

Mr. Dukinfield Jones left for Germany on Saturday last and will bring back with him one of the new small fast D.F.W. scouting biplanes. It will be interesting to see how this machine compares with the other fast scouts.

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Congratulations to Prof. G. H. Bryan, Sc.D., F.R.S., to whom the Council of the Aeronautical Society of Great Britain announce that they have awarded the gold medal of the Society for the great services he has rendered to aeronautics by his development of the theory of the stability of aeroplanes. As long ago as 1903 Prof. Bryan, in conjunction with Mr. Ellis Williams, communicated to the Society a paper on "The Longitudinal Stability of Aeroplane Gliders." The previous recipients of the gold medal of the Society were Wilbur and Orville Wright, 1909, and Octave Chanute, 1910.

"Flight" Copyright.

Mr. Barnwell testing his engine before making a flight in the Vickers gun-carrying biplane at Brooklands.

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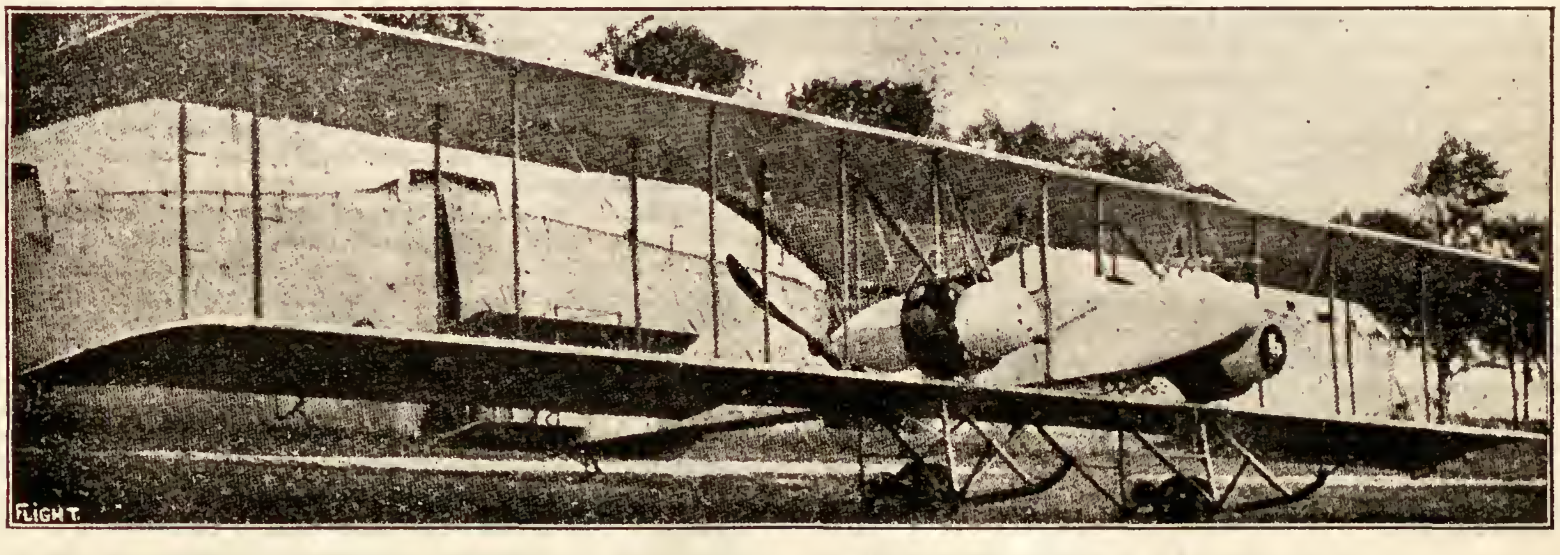
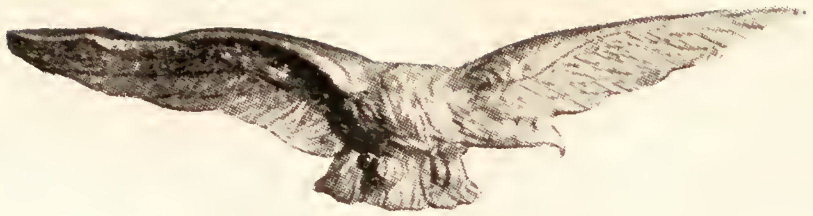
The visit of B. C. Hucks to Cardiff last week-end was not without its incidents, and one of them, which occurred on Thursday, was none too pleasant. He was spiralling down from a good height on the two-seater, and had reached about 500 ft., when his foot slipped on the rudder bar. The machine started side-slipping, then nose-dived, and dropped 300 ft. before Hucks regained control. On Saturday whilst starting out of the ground on one occasion Hucks flew clean through two telephone wires, but fortunately the only damage done was a few scratches on the propeller. Later in the afternoon Hucks took a lady to Caerphilly Mountains, and had the novel experience of watching his altimeter registering 2,000 ft. whilst the ground was only a couple of hundred feet below.

"Æolus."



FRENCH ARMOURED BIPLANE BUILT AT CHALAIS-MEUDON.—This new product of the French military aircraft factory has a tractor type *fuselage*, but is a propeller biplane having two 160 h.p. Gnome engines mounted in streamline casings in the manner shown in the accompanying photograph, and each driving a separate propeller. The front portion of the *fuselage* is armoured with 3 mm. thick steel plates, and a Hotchkiss machine gun is mounted in the extreme nose of the *fuselage*, a position which provides a very wide angle of action.

ROYAL NAVAL AIR SERVICE.



The new badge.

THE RE-ORGANISATION SCHEME.

The following regulations have been issued by the Admiralty which take the place of those provisionally issued in Admiralty Circular Letter No. 22 of July 15th, 1912. The Royal Naval Air Service will form part of the Military Branch of the Royal Navy, and the various ranks will be added to the list of officers of the Military Branch in Art. 169 of the King's Regulations. They will not, however, be entitled to assume the charge and command of a ship unless they belong to one of the existing ranks in the Military Branch and are expressly authorised to do so by superior authority.

A.—General Administration.

The Royal Naval Air Service, forming the Naval Wing of the Royal Flying Corps, will comprise all naval aircraft and personnel, either for active or reserve service, and will be administered by the Admiralty. It will consist of—

- The Air Department, Admiralty.
- The Central Air Office.
- The Royal Naval Flying School.
- The Royal Naval Air Stations.
- All seaplanes, aeroplanes, airships, seaplane ships, balloons, kites, and any other type of aircraft that may from time to time be employed for naval purposes.

When Naval Air Stations are established at places on the coast where Coast Guard Stations exist, the Coast Guard duties will be taken over and performed by the officers and men of the Royal Naval Air Service. Until the Royal Naval Air Service is more fully developed such ratings as are necessary will be lent from the Coast Guard for these duties. All ranks and ratings of the Royal Naval Air Service will be borne on the books of one of H.M. Ships, and will serve under the provisions of the Naval Discipline Act accordingly. The Military Wing and its Reserve and the Central Flying School will be administered by the War Office. A portion of the staff of the Central Flying School will be drawn from the Naval Wing.

B.—Officers.

Applications for Enrolment.—Officers serving afloat who desire to join the Royal Naval Air Service should forward their applications through the usual Service channels. Officers of the Royal Marines serving at Headquarters will forward their applications through their Commandant. Officers of the Royal Naval Reserve or the Royal Naval Volunteer Reserve, when not serving afloat, should forward their applications through the Admiral Commanding Coast Guard and Reserves. Officers on the Retired and Emergency Lists, or on Half-Pay, should communicate direct with the Secretary of the Admiralty. The application must contain the following details:—(*a*) Age. (*b*) Whether married. (*c*) Whether desirous of joining for continuous or reserve service. (*d*) Any special qualifications. In all cases of application by officers serving afloat or at the Royal Marine Headquarters, the application must be accompanied by a recommendation from their Commanding Officer and by a medical certificate certifying as to their general medical fitness, especially with regard to eyesight and heart.

Applications for Enrolment by Civilians.—Civilians will be eligible for direct entry into the Naval Wing as officers under the terms of the special regulations on the subject. All such officers will be appointed as Flight Sub-Lieutenants, Royal Navy, on entry, but they will be on probation until they have qualified in all respects.

Selection.—Selections will be made by the Admiralty from time to time from the roster kept by the Air Department. Officers of the Royal Navy on the active list will not be eligible for selection until they have completed one year's service as commissioned officers, or in the case of warrant officers until they have received confirmation in their rank. Sub-Lieutenants will be required to possess their watch-keeping and engine-room certificates. Officers of the Royal Marines will not be selected until they have completed their courses.

Conditions of Service.—An officer* appointed to the Royal Naval Air Service, who has obtained or subsequently obtains the airship or aeroplane pilot's certificate of the Royal Aero Club at his own expense, will be refunded the sum of £75, or such lesser fee as he has been charged for his tuition. Such payment will not be made until after a reasonable period of probation, and will depend upon a satisfactory report being received from the Commanding Officer under whom the officer is serving. Should he resign or retire within four years of the date on which he was selected, he will be liable to refund this sum, less one quarter such sum for every completed year of service. Full pay, with lodging allowance, &c., will be allowed to an officer already serving in the Royal Navy whilst obtaining his certificate at his own expense, provided that he has received permission from the Admiralty. All applicants who are selected will, as a rule, be required to graduate at one of the Royal Flying Corps Instructional Establishments before being appointed to the Royal Naval Air Service, and if there is no vacancy for them for active service after completing their course they may be placed in the reserve until a vacancy occurs. All officers in the Royal Naval Air Service will be liable to be detailed for any branch of the Service, *i.e.*, Seaplane, Aeroplane, Airship, Seaplane Ship, or Kite work, or for constructional or administrative work in connection with aircraft in general, and they may be required to serve either afloat or on shore at home or abroad. In time of war they are liable to serve for either naval or military purposes. Every encouragement will be given to officers to make themselves acquainted with all branches of Air work. As soon as circumstances permit, it will be a general principle that airship officers are taken from those who have served in the other branches of the Royal Naval Air Service. The period of service in the Royal Naval Air Service for officers drawn from the active list, Royal Navy, must be limited by their flying efficiency, and will not, as a general rule, according to present experience, exceed a duration of four years, dating from the time of selection. A certain number will, however, be selected to fill the higher posts in the Air Service. Those officers who are not selected for these higher posts will return to their ordinary duties in the Fleet after the above period, but may be reappointed subsequently for further duty in the Air Service at the discretion of the Admiralty. Other officers will pass into the Reserve at the expiration of four years, unless their term of service is extended or renewed. On the completion of one year's service they may, if considered suitable, be permitted to extend their original engagement to a total of six years; after 4 years' service to 8 years; and after 6 years' service to 10 years; or alternatively they may be permitted to renew their engagement on its completion in the ordinary course. Any officer who at any time is found to be unfitted for the duties of the Royal Naval Air Service will be liable to discharge therefrom, and those officers who belong to other branches of the Royal Naval Forces may be required to revert to their ordinary duties. This will not necessarily indicate that any blame is attributable to the officer. Service of Naval Officers in the Royal Naval Air Service (not including the Reserve) will count in all respects as service in a ship of war at sea.

Rank in the Royal Naval Air Service.—Officers of the Royal Naval Air Service will be graded in the following ranks, and will take rank and command accordingly:—Wing Captain, with relative rank of Captain, R.N. Wing Commander, as Commander, R.N. Squadron Commander (when in command), as Lieutenant-Commander. Squadron Commander (when not in command), as Lieutenant over 4 years' seniority (but senior to all Flight Commanders). On attaining 8 years' seniority in the relative rank of Lieutenant these Officers will rank with Lieutenant-Commanders, R.N. Flight Commander, with relative rank of Lieutenant, R.N., over 4 years' seniority. Flight Lieutenant as Lieutenant, R.N. Flight Sub-Lieutenant, as Sub-Lieutenant, R.N. Warrant Officer, 1st Grade, as Commissioned Warrant Officer, R.N. Warrant Officer, 2nd Grade, as Warrant Officer, R.N.

Specialist Officers.—Officers employed on specialist duties, particularly gunnery, torpedo, or engineering, will be graded in the above ranks, and will be instructed in the special air work which concerns them, and will be denoted by the letter (G), (T), (N), or (E), &c. As far as practicable officers in the Royal Naval Air Service will be selected to go through the specialist courses with a view to filling these posts. Specialist Officers will not draw their specialist allowances. In the initial stages it is necessary to form an arbitrary seniority list. Officers are to rank in accordance with this list, which has been, as far as possible, based on air experience. Some exceptions have been made on account of the relative age and seniority of officers prior to their entry into the Naval Wing.

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* Note.—In cases where *men* of the Royal Naval Air Service have been granted permission to obtain their Royal Aero Club certificates privately, the above regulations will be applicable to them also.

Subsequent to the date of this letter all entries to the Royal Naval Air Service will be graded from date of transfer or appointment to the rank of Flight Lieutenant or Flight Sub-Lieutenant. All promotions will be by selection, but as a rule no Flight Lieutenant will be promoted to Flight Commander unless he has served for at least two years as Flight Lieutenant, and no Flight Commander will be promoted to Squadron Commander unless he has served at least one year as Flight Commander. As regards discipline, officers on the Official List of the Royal Naval Air Service shall rank with each other and command in the order in which they stand on that List, and each officer, as long as he remains on that List, shall be subordinate to every officer whose name stands higher than his own, whatever may be their respective positions in other branches of the Royal Navy. Further, no officer (except those holding executive rank in the Royal Navy) shall ever assume any charge or command whatsoever except that which may appertain to the Air Service, or relate to the officers or men thereof, unless he receives express authority to assume such charge or command either from the Admiralty, or, in case of emergency, from the Senior Naval Officer present. In exercising charge or command outside the Air Service, Officers in the Royal Navy and Royal Marines shall rank and command in the order in which their names stand in the Official List of officers of their original Branch in the Royal Navy. The names of officers of the Royal Navy who are selected for employment in the Royal Naval Air Service will be shown in the Official Navy List in italics in the Seniority List of the Branch to which they belong, and similarly when they revert to their original Branch their names will be shown in italics in the list of officers of the Royal Naval Air Service in the Navy List. Officers entered direct from civil life will hold a position of entire equality in the Royal Naval Air Service in every respect with officers of the Royal Navy or Royal Marines who are of the same grade and seniority. In order to identify them closely with the Royal Navy and for their general instruction they will be embarked in a ship of war for a definite period in each year. Their rates of pay will not be affected during this period, except that they will not receive flying pay. Medical officers who may be employed in the Naval Wing will not be graded, but will be subject to the special instructions which have been issued. Officers of the non-military branches of the Royal Navy and officers of the Army who may be selected for the Royal Naval Air Service will be granted commissions or warrants in the Royal Naval Air Service ranks on being graded.

C.—Men.

Applications for Enrolment.—All classes of ratings on the active list are eligible for selection for the Royal Naval Air Service. Men holding higher non-substantive ratings or who are qualified artificer-divers will not be selected. Preference will be given to young men who have not yet specialised in any particular non-substantive rating. Ratings who desire to volunteer are to apply to their Commanding Officers. Applicants must have had an assessment not less than V.G. for character during the five years' previous service; or if their total service is less than five years this standard must have been maintained during the whole period. Before forwarding the names of volunteers Commanding Officers are to satisfy themselves that the men are likely to prove suitable, regard being paid to general intelligence, education, and quickness. If the volunteers are recommended, their names, accompanied by a copy of their Service Certificates and with a statement of any special qualifications they may possess, should be forwarded to the Commodore of their Port Division (or to the Commandant in the case of the Royal Marines). These officers will forward the applications to the Director of the Air Department, Admiralty, for selection as required. Men belonging to the Reserve Forces should apply to their respective registrars (through their Commanding Officers if serving afloat). Civilians are also eligible for direct entry into the Naval Air Service as mechanics, &c., as laid down in the special regulations on this subject.

Conditions of Service.—Men from the active list will be required to remain for four years in the Royal Naval Air Service. After this period of service they will as a general rule revert to their ordinary duties in the Fleet, but are subsequently eligible for re-selection at the discretion of the Admiralty. Men who have completed more than eight years' service in a man's rating will be required to re-engage to complete time for pension in the Royal Navy before selection or re-selection for service in the Royal Naval Air Service. These regulations in regard to re-engagement do not apply to ratings already in the Naval Air Service. Men who may volunteer whilst upon Foreign Service will not be selected until they return to home waters. Any Special Service ratings who may be selected will be required to transfer to continuous service and to volunteer under the conditions for continuous service ratings. Men from Civil Life will be required to sign an engagement to serve four years in the Royal Naval Air Service, to be followed by four years in the Royal Naval Air Service Reserve. Men of the Reserve Forces who may be selected will be required to sign an engagement to serve for four years in the Royal Naval Air Service, to be followed by four years in the Royal Naval Air Service Reserve. In special circumstances they may, at the discretion of the Admiralty, be permitted to re-engage to extend their period of active service before discharge to the Reserve. Whilst in the Royal Naval Air Service they will cease to belong to the R.N.R., R.N.V.R., or R.F.R. Forces, the R.N.R. and R.F.R. retainers will not be paid nor will the rules as to drills be applicable, but the time both in Active Service and Reserve will count as service towards gratuity, and, in the case of the Royal Naval Reserve, towards the medal. In the case of men from the R.N.V.R., their time will count for the medal under the conditions applicable. All ratings in the Royal Naval Air Service will be liable to be detailed for any branch of the Service, *i.e.*, Seaplane, Aeroplane, Airship, Seaplaneship, or Kite work either afloat or ashore, at home or abroad. In time of war they may be required for either naval or military purposes. The selection of a man for service in the Royal Naval Air Service does not necessarily imply that the man will be trained as a pilot. Men to be trained as pilots will be specially selected from those who have joined the Air Service. This regulation is to be explained to men who may volunteer by their Commanding Officers before their applications are forwarded. Any rating who is at any time found to be unfitted for the duties of the Royal Naval Air Service will be discharged, and those who previously belonged to the Royal Naval Forces will revert to their position therein. This will not necessarily imply that any blame is attributable to the man.

Grades.—All ratings enrolled in the Royal Naval Air Service will be graded in one of the following ratings. Men who, for special reasons may not be so graded, will continue in all respects under the conditions of the general naval service as regards pay, advancement, &c. :—

General Branch.	Engine Branch.	Artisan Branch.	Relative Naval Rating.
C.P.O. Mechanic—	C.P.O. Mechanic (E)	C.P.O. Mechanic (C)	
1st Grade* ...	1st Grade* ...	1st Grade*	C.P.O.
2nd Grade ...	2nd Grade ...	2nd Grade .	C.P.O.
3rd Grade ...	3rd Grade... ...	3rd Grade... ...	C.P.O.
P.O. Mechanic ...	P.O. Mechanic (E) ...	P.O. Mechanic (C) ...	P.O.
Leading Mechanic...	Leading Mechanic (E)	Leading Mechanic (C)	Leading Seaman
Air Mechanic—	Air Mechanic (E)—	Air Mechanic (C)—	
1st Grade ...	1st Grade	1st Grade	A.B.
1st Grade (acting)*	1st Grade (acting)*	1st Grade (acting)*	A.B.
2nd Grade ...	2nd Grade ...	2nd Grade ...	A.B.

Ratings transferred from the general naval service or entered direct from the shore or from the Reserve forces will be selected to join one or other of these branches in accordance with their attainments and qualifications. Ratings will rank and take command within the Royal Naval Air Service according to their grade and their seniority in that grade. Outside the Royal Naval Air Service their authority will be regulated by their naval or military rank.

Conditions in regard to Selection and Advancement.—The general conditions in regard to selection and advancement are contained in Appendix IV to this letter.

D.—Pay.

Officers.—The pay of the various ranks will be as follows:—Wing Captain, £2 10*s.* per diem. Wing Commander, £2 per diem. Squadron Commander, £1 5*s.* per diem. Flight Commander, 17*s.* and 2*s.* per diem in addition for each year's service as Flight Commander (maximum, 23*s.*). Flight Lieutenant, 12*s.* and 1*s.* per diem in addition for each year's service as Flight Lieutenant (maximum, 16*s.* Flight Sub-Lieutenant, 10*s.* Flying Pay for Squadron Commanders, Flight Commanders, Flight Lieutenants, and Flight Sub-Lieutenants, 8*s.* per diem. Warrant Officers—1st Grade, 12*s.* per diem. 2nd Grade, 11*s.* per diem. Warrant Officers when in charge of stores will be eligible for store allowance on the following scale:—Store allowance for main stations, 1*s.* per diem. Store allowance for subsidiary stations, 6*d.* per diem. Store allowance for Coast Guard stores, 3*d.* per diem. Warrant Officers who qualify as pilots will be paid flying pay 4*s.* per diem, if they obtain a first-class flying certificate, and 2*s.* per diem if they obtain a second-class flying certificate. Warrant Officers when graded will discontinue their Specialist Allowances.

Observers and Casual Passengers.—Officers and men who do not belong to the Royal Naval Air Service, but who may be required to ascend on duty, will be granted the following allowances in addition to their naval pay :—Commissioned Officers, 5*s.*, Warrant Officers, 3*s.*, Men, 2*s.* flying pay for each day of such ascent. Whilst under instruction as Observers, officers will be paid an allowance of 3*s.* per diem for each day of ascent instead of flying pay at the above rate.

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* These ratings are only applicable to men drawn from the Royal Navy and Royal Marines.

Meteorological Duties.—Officers who are not graded in the Royal Naval Air Service and who may be employed on meteorological duties at Royal Naval Air Stations may be granted an allowance of 2*s.* per diem.

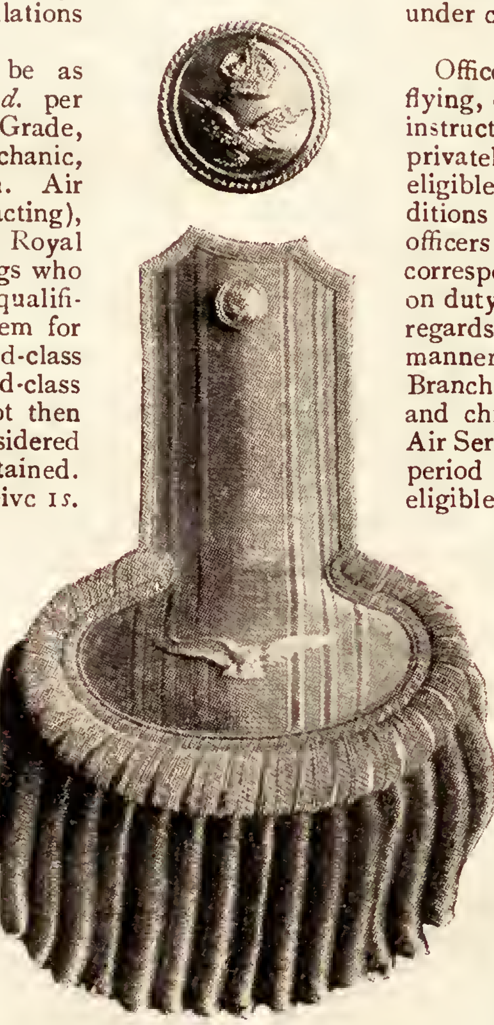
Commissioned Officers whilst under Instruction will receive the pay of their acting flying rank, and an allowance of half the Flying Pay to which they are entitled on the above scale.

Warrant Officers whilst under Instruction for Pilot will receive 1*s.* per diem flying pay continuously, in addition to the pay of their substantive rank.

Messing Allowances.—Whenever attached for duty to a Military Mess officers will be granted an allowance of 2*s.* per diem difference of Mess Subscription. This allowance will not be payable in the case of Probationary Flight Sub-Lieutenants.

Pay whilst Sick, &c.—As regards both officers and men in case of illness or accident the pay of their Air Service Ranks will be continued under the same regulations as Naval Pay. Flying Pay will be continued under the same regulations as submarine allowance.

Men.—The pay of the various grades will be as follows :—C.P.O. Mechanic : 1st Grade, 10*s.* 6*d.* per diem (this rate is for exceptional cases only). 2nd Grade, 9*s.* per diem. 3rd Grade, 7*s.* per diem. P.O. Mechanic, 6*s.* per diem. Leading Mechanic, 5*s.* per diem. Air Mechanic : 1st Grade, 4*s.* per diem. 1st Grade (acting), 3*s.* per diem (for men drawn from Royal Navy or Royal Marines only). 2nd Grade, 2*s.* per diem. Ratings who qualify as pilots will be eligible from the date of qualification for additional pay at the rate of 4*s.* per diem for first-class certificates, and 2*s.* per diem for second-class certificates. Men will be allowed to hold second-class certificates for 12 months only. If they have not then qualified for first-class certificates it will be considered whether their second-class certificate should be retained. Men whilst under instruction for Pilot will receive 1*s.* per diem flying pay continuously in addition to the Naval Air Service Rate which they may be receiving at the time. The selection of men to qualify as Pilot will be made at the Admiralty from time to time, and no ratings are to be so trained without authority. All ratings will receive good conduct badges under the present Naval Regulations, and they will receive pay at the rate of 1*d.* per diem for each good-conduct badge they possess. Re-engage pay will be payable where applicable under Naval Regulations. Service in the Royal Naval Air Service will count towards medal gratuity, and pension under the regulations applicable. Ratings qualified and employed as pilots of airships will receive Airship Coxswain Allowance at the rate of 4*s.* per diem continuously, whilst so employed. Ratings qualified and employed as crews of airships will receive flying pay at the rate of 2*s.* continuously whilst so employed. These airship allowances will be applicable to permanent crews of any large " heavier than air " craft.



The epaulette and button of the new Royal Naval Air Service.

E.—Uniform.

Naval Officers who already belong to the Military Branch will wear the uniform of their rank with the addition of an eagle on the left sleeve above the distinctive lace. Other Naval Officers who join the Royal Naval Air Service will wear naval uniform with the distinctive lace of their relative rank in the Military Branch, and an eagle on the left sleeve above the distinctive lace. Marine Officers will wear the uniform of the Royal Marines with the addition of an eagle on the left sleeve above the cuff. Others who join the Royal Naval Air Service will wear the uniform of their corresponding rank in the Military Branch of the Royal Navy with the exception that the anchor on buttons, cap badge, epaulettes, and sword belt will be replaced by an eagle. During preliminary courses of instruction whilst under training Officers will not be required to alter their uniform in any respect. Officers who may hold a higher rank in their original branch than that which they have been granted in the Naval Air Service will continue to wear the uniform of such higher rank or relative rank (modified as above), but this will not entitle them to any higher position in regard to the duties of the Royal Naval Air Service than that which they are entitled to by their position in the Air Service List of Seniority. The description of the flying dress and of the special working dress will be issued subsequently. The uniform for all men graded in the Royal Naval Air Service will be the naval uniform of their rating with the following alterations in regard to badges :—All men other than Chief Petty Officers will wear the Royal Naval Air Service Distinction Badges on the right arm. These badges will consist of a pair of wings in addition to a distinguishing mark showing their special air service qualifications, *i.e.*, Pilot or Coxswain, Carpentering, Engineering, &c. Chief Petty Officers will wear similar badges on the collar. On the left arm Petty Officer Mechanics and Leading Mechanics will wear the usual naval symbols of their authority, together with such naval good conduct badges as they may possess. Men below the grade of the Leading Mechanic will wear their naval good conduct badges on this arm. No other naval badges will be worn. Men drawn from the Royal Marines and from the Army will wear the uniform of their Corps for the present. Men specially entered from civil life will wear the naval uniform for Class III (ratings not dressed as Seamen) with similar badges to those described above.

F.—Training and Pay of the Reserve of the Royal Naval Air Service.

The details in connection with this are at present under consideration.

G.—Pensions.

Officers of the Royal Naval Air Service injured whilst flying, either on duty or when undergoing a course of instruction at one of the instructional establishments, or privately with the permission of the Admiralty, will be eligible for pensions and gratuities under the same conditions and on the same scales as in the case of other officers of the Military Branch of the Royal Navy of their corresponding rank wounded in action. Officers injured on duty, but not while actually flying, will be treated as regards Wounds Pensions and Gratuities in the same manner as officers of corresponding rank in the Military Branch injured on duty but not in action. The widows and children of officers dying whilst in the Royal Naval Air Service will, subject to the completion of the necessary period of commissioned service on the active list, be eligible for pensions and compassionate allowances under the same conditions and on the same scales as officers of corresponding rank in the Military Branch of the Royal Navy ; but in the event of an officer's death being attributable to an injury sustained whilst flying, either on duty or when undergoing a course of instruction at one of the instructional establishments, *and* occurring within seven years of the date of such injury, the award of pensions, gratuities, or compassionate allowances to the officer's widow and children or other relative will be made, irrespective of the length of service, under the conditions applicable to the case of officers of corresponding rank in the Military Branch of the Royal Navy killed in action. In the event of death resulting from an injury sustained on duty, but not whilst flying, any pensions and allowances awarded to dependant relatives will be on the scale and subject to the conditions laid down for officers of their corresponding rank in the Military Branch who deaths are attributable to injuries received on duty but not in action. Probationary Flight Sub-Lieutenants will, if injured whilst flying, either on duty or when undergoing a course of instruction at any of the instructional establishments, or privately with the permission of the Admiralty, be eligible for pensions and gratuities under the same conditions and on the same scales as Sub-Lieutenants, Royal Navy, wounded in action, and in the event of death occurring as the result of such injury within seven years, pensions, &c., will be awarded to the officer's widow and children or other relative under the conditions applicable in the case of Sub-Lieutenants, Royal Navy, killed in action or dying of wounds received in action. Probationary Flight Sub-Lieutenants, if injured on duty but not whilst flying, will be awarded pensions and gratuities on the scales and subject to the conditions laid down for Sub-Lieutenants, Royal Navy, injured on duty but not in action. In the event of death resulting from an injury sustained on duty but not whilst flying, any pensions and allowances awarded to dependant relatives will be on the scale and subject to the conditions laid down for Sub-Lieutenants, Royal Navy, whose deaths are attributable to injuries received on duty but not in action. In the event of a probationary Flight Sub-Lieutenant dying during his period of probation from natural causes, no pension or compassionate allowance will be granted to the widow, children, or other relatives of the officer. In any cases where the substantive rank of officers in their original branch is higher than

—: THE :—

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that which they are granted in the Royal Naval Air Service, Wounds Pensions and Gratuities, Widows' Pensions, Compassionate Allowances, &c., may be based on the original rank of such officers, if this is more advantageous to these officers or their dependent relatives. Officers of the Royal Navy and Royal Marines who do not belong to the Royal Naval Air Service who are injured or killed whilst flying on duty, or whose death, being attributable to injury whilst flying, takes place within seven years of the date of such injury will be regarded as injured or killed in action, and pensions or compassionate allowances awarded to themselves or to their dependent relatives accordingly. The Regulations in this section do not apply to Army Officers seconded for service in the Royal Naval Air Service whose rights as well as those of their widows and children are determined by Army Regulations.

Men.—In the case of men the conditions laid down in the event of their being killed in action or dying from wounds received in action will also be applicable, the present limit of two years being extended to seven years. Men invalided for injury received during employment in the Air Service will be awarded pensions, either temporary or permanent, at the rates prescribed in the Naval Regulations for men discharged on account of wounds or hurts sustained in action. These rates vary from 6*d.* to 2*s.* per diem (with additions for Petty Officer service, &c.), according to the nature of the injury and the degree of incapacity arising from it, or, at the discretion of the Admiralty, gratuities may be awarded in lieu.

Appendix I is as follows :—

Air Officers.

Whilst employed upon the duties of the Royal Naval Air Service, Officers whose names are upon this list rank and take command in the order that their names stand upon the list. Whilst Officers from the Royal Navy are so employed, their names are specially in *italics* on the list of their rank in the Royal Navy in order to indicate that their naval rank is in abeyance. The first Royal Naval Air Service Seniority List has been framed on an arbitrary basis. All Officers who may subsequently enter the Royal Naval Air Service will, on being first graded, be placed at the bottom of the list of Flight Lieutenants, with the exception that if any Officers are entered for some particular duty a temporary grade of a higher nature may be given to them to give them the necessary authority and precedence. Promotion from grade to grade will be by selection and not by seniority. The seniority in the Naval Air Service Grade, as regards Officers now on the list, will count as from the date of this Circular Letter. Time served previously in grades of the same name will not count as seniority. The following letters before an Officer's name serve to indicate that he holds an appointment for the following specialist duties : — (G) For Gunnery duties. (T) For Torpedo duties. (N) For Navigation duties. (W/T) For W/T duties. (E) For Engineering duties. (C) For Carpentering duties.

Seniority of Air Officers.

Director of the Air Department.—Capt. M. F. Sueter, C.B.

Wing Commanders.—O. Schwann, E. A. D. Masterman, F. R. Scarlett, E. M. Maitland, N. F. Usborne, C. R. Samson.

Squadron Commanders.—F. M. L. Boothby, E. L. Gerrard, R. Gregory, A. M. Longmore, R. Gordon, C. M. Waterlow, H. L. Woodcock, J. W. Seddon, (G) R. H. Clark-Hall, (E) G. W. S. Aldwell, (E) C. R. J. Randall, S. D. A. Grey, C. J. L'Estrange-Malone, P. A. Shepherd, R. B. Davies, (E) E. F. Briggs, I. T. Courtney, C. E. Risk, C. L. Courtney.

Flight Commanders.—C. E. Rathborne, R. Pigot, D. A. Oliver, W. R. Crocker, T. G. Hetherington, J. N. Fletcher, Hon. J. D. Boyle, J. D. Mackworth, (W/T) W. P. de C. Ireland, (E) J. L. Travers, J. T. Babington, F. E. T. Hewlett.

Flight Lieutenants—A. C. Barnby, H. Fawcett, H. D. Vernon, R. P. Ross, F. W. Bowhill, A. W. Bigsworth, A. B. Gaskell, C. E. Maude, F. G. Brodribb, E. T. R. Chambers, H. A. Williamson, C. R. Kilner, (E) W. Briggs, (E) T. R. Cave-Brown-Cave, (G) E. D. M. Robertson, (T) D. H. Hyde-Thomson, R. L. G. Marix, H. A. Littleton, A. J. Miley, W. C. Hicks, E. Osmond, W. G. Sitwell, C. R. Finch-Noyes, I. H. W. S. Dalrymple-Clark, C. H. Collet, R. J. Bone, C. H. K. Edmonds, (E) I. G. V. Fowler, (E) H. M. Cave-Brown-Cave, C. E. Robinson, J. T. Cull, (E) C. D. Breese, B. D. Ash, E. R. C. Nanson, E. H. Sparling, R. G. Lock, A. D. Cunningham, J. W. O. Dalgleish, R. H. Kershaw, T. A. Rainey, D. G. Young, R. E. C. Pierse, Lord Edward Grosvenor, C. F. Beevor, C. Draper, H. A. Busk, E. T. Newton-Clare. Acting Flight Lieutenants whilst undergoing flying course : G. W. W. Hooper, G. R. Bromet, L. Tomkinson, J. R. Smyth-Pigott.

Flight Sub-Lieutenants (*Probationary*).—C. Wilson, R. Wright, F. M. L. Barr, H. G. Wanklyn, J. M. R. Cripps, B. F. Bainsmith, L. B. Hay.

Warrant Officers, First Grade.—(E) H. Ellison, (E) F. H. Williams.

Warrant Officers, Second Grade.—(E) F. W. Scarff, (C) T. D. Jones, (C) J. G. Brownridge, H. C. Bobbett, F. Everett, (E) L. Killmayer, (C) W. A. Hancock, (E) H. Dearman, (E) W. F. Floyd, G. A. J. Blundell, C. King, (C) L. Staddon.

* * * *

THE TRANS-ATLANTIC FLIGHT.

LIEUTENANT PORTE'S NEW ROUTE.

The Curtiss flying boat, "America," on which Lieutenant J. C. Porte, R.N., proposes to attempt the flight across the Atlantic, is now finished, and has been erected at Hammondsport, N.Y. Preliminary tests are being made over Lake Keuka, the first, in which the machine carried Lieut. Porte, Mr. Hallett, the mechanic, and Mr. Glenn Curtiss, being made on Tuesday and giving the results expected. If the tests justify anticipations, the machine will be dismantled and sent to St. John's, Newfoundland, to await favourable weather, and it is hoped to start on July 15th or 16th. The original plan, it will be remembered, was to take the direct route from Newfoundland to the Irish coast, but this has now been abandoned, and Lieut. Porte and his companion will set their course for the Azores, whence they will proceed to the coast of Spain. Arrived here they will follow the steamship route as far north as Ushant, a small island off the cost of Normandy, and from here it is intended to set the course for England.

By adopting this route, the greatest distance to be covered is approximately 1,200 miles between Newfoundland and the Azores, and Lieut. Porte feels confident that the two Curtiss engines will be able to stand up to a run of sufficient duration to complete this distance. In their tests on the bench, under conditions approximating as near as possible to those of actual flight, the two motors have completed 30-hour non-stop runs.

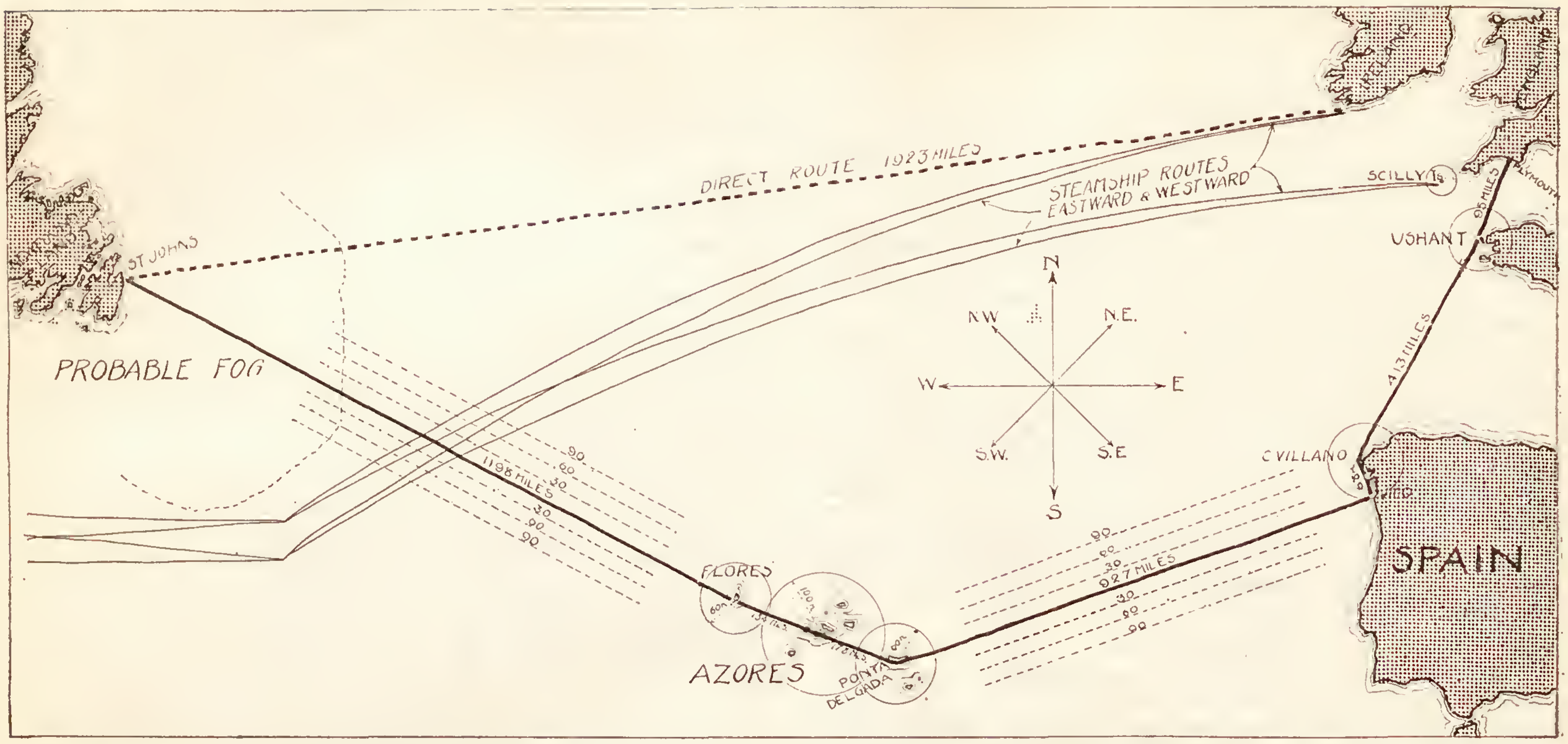
The principal difficulties which the trip presents are navigational ones, and to solve these Lieut. Porte has had the best expert assistance. It is understood that he may possibly have the advantage of the assistance of Capt. Creagh-Osborne, R.N., in the adjustment of his compasses and other navigational problems, as this officer, who is Superintendent of the Compass Department at the Admiralty, will be on leave of absence in Canada, and has accepted an invitation from Lieut. Porte to inspect the Curtiss flying-boat and witness the start at St. John's should his other engagements allow of it. It is hoped that the Washington Meteorological Office will render most valuable assistance in enabling the start to be made at the right moment, and all experts who have been consulted admit that Lieut. Porte, in choosing the route that he has selected, has adopted the course most likely to have the greatest number of factors in his favour.

A possible opportunity for a favourable start from Newfoundland would be afforded by a large high-pressure area south of latitude 40° N., and a constant succession of shallow cyclonic systems travelling eastwards north of that latitude, advantage being taken of the north-west wind in the rear of one of these, and the west wind on the north side of the high-pressure system to start for the Azores, trusting to a south-west wind to assist on the eastern side of the Atlantic, due to the presence of a low-pressure system in that section. A start cannot be made with any prospect of success unless some such conditions prevail.

The machine to be used for the trip will not, as originally intended, be a tractor biplane with a single 200 h.p. Curtiss engine, but a large flying boat somewhat similar in its general arrangement to the standard type Curtiss. Pilot and passenger will be accommodated in a roomy cockpit entirely covered in and fitted with sliding windows for purposes of observation and ventilation. Behind the two seats, which are arranged side by side, will be the sleeping quarters furnished with a mattress on which the pilot and his passenger may in turn lie down to have a rest, and which will moreover serve as a floating "raft" in case of accidents.

The dual control will be slightly different from the standard Curtiss control, which, it will be recalled, consists of a rotatable handwheel for steering, a to-and-fro movement for the elevator, and a shoulder yoke for the *ailerons*. As the trans-Atlantic machine has very large *ailerons*, it has been thought inadvisable to employ the yoke, which imposes a considerable strain on the pilot's shoulders, and in its stead a pivoted foot-bar is fitted, by means of which the *ailerons* are operated. Rudder and elevator are controlled by means of a rotatable wheel on a rocking column.

The boat itself is more or less of the usual Curtiss type, but has been more carefully streamlined in order to reduce head resistance. In spite of its large size—it has an overall length of 32 ft. and a beam of 4 ft.—the hull is very light, weighing only about 550 lbs. It is built up of a framework of ash and spruce covered with a



Map showing the route (in thick black line) which Lieut. J. C. Porte proposes to follow. The distances are in land miles. The dotted lines parallel to the course are 30, 60 and 90 miles to north and south of proposed course. The circles round the islands and mainland indicate the probable limits of vision from the machine. The direct route originally suggested is shown in a thick dotted line.

planking of cedar ¼ inch thick, which is coated with oiled canvas. The wings, in addition to being much larger than those of the standard type Curtiss—the span of the upper plane is 72 ft. and that of the lower plane 46 ft., whilst the chord is 7 ft.—are of a different section, being of a curvature similar to the N.P.L. section, which is expected to considerably increase the efficiency.

Instead of the single 200 h.p. engine which it was originally the intention to use and which was actually constructed, two Curtiss engines of the type known as the O.X., each of 100 h.p., will be employed. Each engine will drive a single propeller of 8 ft. diameter. The total weight of the machine in flying trim is stated to be 5,000 lbs., divided up in the following manner: Fuel, 2,000 lbs., made up of 300 gallons of petrol, and 25 gallons of oil; hull, 550 lbs.; pilot and passenger, 300 lbs.; engines, wings, tanks, and supplies, 2,150 lbs.

In the accompanying map is shown the route which will be followed, and the various distances that have to be covered. It will be noticed that for a considerable portion of the first stage, from Newfoundland to the Azores, the route will intercept numerous steamship routes, so that on this part of the journey at any rate the intervals between sighting ships should not be very long. It is hoped that captains of vessels will render assistance by flying the following signals to indicate on which side of the aviator's route they are:—

When on the north side of the route fly the following signals from the foremast:

If 90 miles to 60 miles from route, fly square flag, ball, square flag.
If 60 miles to 30 miles from route, fly square flag, square flag.
If 30 miles to 0 miles from route, fly square flag.

When on the south side of the route the same signals are to be flown, but from the mainmast.

⊗ ⊗ ⊗ ⊗

Raynham and Salmet in Ireland.

LAST weekend Mr. F. P. Raynham and Mr. Salmet were giving exhibition flights on behalf of the *Daily Mail* in the North of Ireland. On Thursday of last week they were at Lurgan. Mr. Raynham, on the Avro machine which he flew at Brooklands last year, but now converted to a waterplane, started from a small pond, while Salmet on his Blériot started from an adjoining field. In spite of the fact that the whole place was surrounded by trees, making it very difficult to get out, both pilots carried a good many passengers during the day. On Friday Raynham and Salmet were flying during the afternoon, while during the evening they flew the 25 miles to Warrenpoint. Raynham followed the canal from Portadown, and took exactly an hour, but during one half the journey his motor was only firing on five cylinders, and he flew low down between the hills; there was also a strong wind blowing. On Saturday flights were made at Warrenpoint, Salmet starting from the Golf Links and Raynham from the Bay.

Verrier at Manchester.

A BUSY day was spent by Verrier at Manchester on Saturday, and he was flying almost continuously from 11 a.m. to 5 p.m. He took up twenty-four passengers, including Miss Constance Collier, the well-known actress, and Alderman McCabe, the Lord Mayor of Manchester. At 5 p.m. Verrier with his mechanic left Trafford Park in very stormy weather for Hendon, where he eventually arrived at 9 p.m. after having made a stop at Birmingham.

Wood for Propellers.

MESSRS. JOSEPH OWEN AND SONS are unloading from the ss. "Nitonian" 1,093 prime black walnut boards which have been specially selected in the States as suitable for propeller work. The boards are 10 ft. and up long and 9 ins. and up broad, and propeller makers should make a point of obtaining from the firm at 199A, Borough High Street, further particulars of these parcels.

An Appeal for Madame Petitpierre.

IN connection with the sad case of Mme. Petitpierre, whose husband, as many of our readers will remember, was shot at Hendon in August, 1911, we have received the following appeal from Col. Massy:—

"I beg to bring to your notice the very distressing case of Madame Petitpierre of Fairview, Collindale Avenue, Hendon, N., whose husband was assassinated at Hendon some three years ago while in the employ of the Blériot Flying School. She has remained in England in hopes of enlisting the sympathy of persons interested in aviation, but without success, and is now in very critically reduced circumstances. The very smallest contributions will be thankfully received by her, or may be sent to me at the above address.

"The late M. Petitpierre being French, the Aerial Leagues to which I belong are unable to come to the assistance of his unfortunate widow as they did in the cases of Mrs. Lindsay Campbell and Mrs. Cody, and I therefore am appealing personally on behalf of Madame Petitpierre. "H. S. MASSY, Colonel.

"63, FitzGeorge Avenue, West Kensington, W., June 22nd."

More Emaillite Successes.

FIVE of the eight competing machines in the London–Manchester–London race, including the first, second and third home, were doped with British Emaillite thoughout, thus further adding to the existing record of successes in the Gordon-Bennett Cup contests of 1911, 1912 and 1913, the Aerial Derby of 1914 and the majority of all the speed contests of the past three years. These facts are eloquent. The winning machine in the London–Manchester Race was doped with a combination of Grades 2, 3 and 4, and manufacturers should note that this combination is claimed to materially increase the flying speed of any machine, owing to the almost complete absence of air friction ensured by such combination, the friction in fact being no more than that offered by a highly polished steel plate.

THE FLYING MACHINE FROM AN ENGINEERING STANDPOINT.

By FREDERICK WILLIAM LANCHESTER, M.Inst.C.E.

(*Continued from page* 663.)

10. *Vertical Surface.*—One of the quantities of great importance in connection with the type of stability known as rotative or spiral stability is that of vertical surface. It is of great importance to be able to compute with accuracy the effective distribution of vertical surface in any machine, and of recent years considerable attention has been devoted to, what we may term, the "valuation" of accidental vertical surface. For example, every vertical or inclined strut has a certain directive value which may be expressed in terms of vertical surface; the alighting wheels, especially if of disk form, represent considerable areas of the equivalent vertical surface; even the *fuselage* (the stream-line body or car) has its equivalent value as vertical surface. It was pointed out by me some years ago (*Engineering*, 26th February, 1909) that a screw propeller moving other than axially experiences a considerable lateral force. More recently Mr. T. W. K. Clarke has called attention to this action and to the importance of considering the propeller in its capacity as effective vertical surface. It appears from Mr. Clarke's investigation (*see* Memorandum 80 of the Report of Advisory Committee, 1912–13) that the propeller equivalent in terms of vertical surface is a very large and serious factor, and one that under no circumstances should be ignored. The Memorandum in question is worthy of careful consideration by all engaged in the design or construction of flying machines.

A point that should not be overlooked is that the propeller value in the sense under discussion is totally different when under power and when dragging or stationary; this suggests the desirability of locating the propeller as near to the centre of gravity (in the fore-and-aft sense) of the machine as conveniently possible.

11. *The Dynamic Load Factor and Factor of Safety.*—A matter of importance, and one of a controversial nature, is the factor of safety necessary in order to take care of the many and varied conditions met with by a machine in flight. In the simple case of a machine in horizontal flight in calm weather we know that the load supported by the aerofoil is the weight of the body of the machine and its associated parts, but not including the aerofoil itself, whose weight is directly distributed over the pressure surface; also we know that in the various evolutions a machine is called upon to perform the stresses may considerably exceed the normal, and that variations of effective load are experienced due to wind-gusts which it is quite out of the power of the pilot to prevent. Excluding for the time being the latter, we are clearly able to define the worst that the pilot is able to do and specify the factor by which the normal stresses must be multiplied in order to represent the actual stresses; conversly, we may specify arbitrarily a factor of safety, and we may tell the pilot just what he is permitted to do, and just what he cannot undertake without risk. Taking in the first instance the assumption that the pilot is allowed to do his worst—he is to be allowed *to try to wreck his machine.* There are two ways in which he can operate; first, he can drive his machine at the highest possible speed and suddenly alter his elevator to the position corresponding to the lowest possible speed; alternatively, he may take sharp turns involving heavy banking. Now the highest possible speed is the limiting velocity which the machine will acquire falling head first vertically; this, with machines at the present day constructed, may be estimated at about 140 to 150 miles an hour. The lowest velocity in the present sense is the velocity at which the aerofoil is meeting the air at its critical angle (the lowest velocity capable of giving a pressure reaction equal to the weight); this may be taken for the purpose of our argument as 40 miles an hour. If when falling vertically at 140 miles an hour the pilot with absolute suddenness jerks his elevator into the position corresponding to 40 miles an hour, the reaction brought to bear on his aerofoil is $(140 \div 40)^2$ W, that is to say, approximately, twelve times the weight of the machine. In practice, for the figures given the maximum load would be diminished, since the elevator cannot be moved with absolute suddenness, and, if it were, the machine could not answer the elevator and alter its attitude to the line of flight immediately. It is probable on the basis of the figures given that 10 W is the maximum effective load that could under any circumstances be brought to bear.

In the case of severe banking, if the machine be banked to an angle θ the resultant of the weight and centrifugal force is the value W sec θ. I have frequently made estimates of the angle of banking when a pilot has been making a steep spiral dive; the angle rarely exceeds 60° or 70°. Taking 70° as the maximum, the stresses in the machine will correspond to a load equal to 3 W.

From the foregoing it would appear almost certain that in calm weather the pilot, if asked to do his worst, cannot in any manner reach or exceed ten times the stresses due to the static load.

Let us take what may be considered an extreme gust. The machine enters air, or is struck by a gust represented by a change of velocity equal to half the flight speed. Assuming the machine has time to swing to its appropriate relative direction under the new conditions, a simple resolution of velocity shows that the worst condition is that in which the direction of motion of the gust is directly opposed to that of flight, in such a case the relative velocity of the machine becomes $1\frac{1}{2}$ times normal, and the effective load on the aerofoil will be $(1\frac{1}{2})^2 = 2\frac{1}{4}$ times normal. In case of the machine being struck by a sudden gust or squall, the load will be considerably higher, but still does not approach the figure 10 obtained on the basis of the pilot suddenly "flattening out" when at maximum speed.

It is evident from the foregoing that a flying machine in the course of its normal usage is liable to stresses many times greater than that of its normal load, and the frequency of these stresses, and the total number of times they occur in the life of the machine, will be related to their magnitude by some empirical law for any given class of service. In such a case it is evident that the term "factor of safety" does not carry its ordinary meaning; if, for example, in the lifetime of a fleet of 100 machines the stresses reach 6 times normal once, and 5 times normal, say, 10 times, and 4 times normal, say, 150 times, it will be certainly sufficient and proper if the designer work to 6 times the normal load for his elastic limit without using any factor of safety in the accepted sense at all; to do otherwise would be to burden the whole 100 machines with a weight of superfluous material without justification. Whether under these conditions we continue to employ the term "factor of safety" or not[*] the aeronautical designer must bear clearly in mind that in his particular case his factor has a double function, namely, both to give the margin of strength and durability needed under ordinary conditions of flight, and to provide for abnormal conditions of stress, occasionally even almost to the theoretical limit of the strength of the structure.

In Memorandum No. 96 of the Advisory Committee (not yet included in an annual report), the matter is fully considered, and the extreme probable values are estimated as follows:—

Nature of Contingency.	Computed Dynamic Load Factor.	Nature of Contingency.	Computed Dynamic Load Factor.
Gusts	4·0	Flattening out	8·0
Banking ...	1·4	Looping[†] ...	4 to 5

In the report in question [‡] the recommendation is made that a factor N be adopted in design not less than 5 or 6, this being considered sufficient to take care of anything likely to happen to a machine with reasonable and proper pilotage. Tests and calculations of the wing spars of different existing machines gave the following results:—

Type.	Value of N.	How Determined.	Type.	Value of N.	How Determined.
A	4	By experiment	E	3	By calculation
B	4	,,	F	4	By experiment
C	5	By calculation	G	7	By calculation
D	3	,,			

The R.A.F. have adopted a factor somewhat greater than that recommended in the memorandum in question; a machine (G in above Table), of which the aerofoil was tested to destruction, actually recorded 8·4.

In connection with the subject of aerofoil structure it is to be observed that the stress distribution varies considerably under different conditions, namely, at different angles of attack. Referring to Fig. 15 it will be noted that the aerofoil structure commonly includes two longitudinal members, front and rear respectively, and the proportions of the load borne by each depends upon the position of the centre of pressure and varies with its displacement, which can only be ascertained from experiments on a scale model of the aerofoil itself. This fact needs consideration when computing the maximum stresses on the members in question and the aerofoil structure as a whole.

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[*] This point may perhaps be emphasized by the use or some qualified expression such as *dynamic load factor*.

[†] Estimated by me; not in original report. The basis of this estimate is the phugoid chart, Fig. 1, the dynamic load factor is given by the height H in terms of H_n, or in the case of looped paths numbered 8 to 12 the value of $H \div H_n$ varies from 3·6 to 5·5.

[‡] If this factor N cannot with propriety be termed a factor of safety, I suggest the term *factor of contingency*, i.e., the factor of contingency requires to be the equal of greater than the dynamic load factor for which it makes provision.

The calculation of the aerofoil structure not only comprises the resolution of the main lifting-force distribution, as already discussed, but also entails the calculation of the longitudinal stresses due to line-of-flight, or "drift" forces. These may be quite moderate under normal flight conditions, but may become far more severe at abnormally high speeds*. The treatment of this problem does not offer any serious difficulty; it is to-day generally considered the best practice to provide for the edgewise strength of the wing by its own internal diagonal bracing.

(*To be continued.*)

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* When a machine is diving head first downwards at or near its limiting velocity the drift load is considerably greater than half the weight of the machine.

FOREIGN AIRCRAFT NEWS.

New Duration Record.

CIRCLING round and round above the Johannisthal aerodrome, Basser, on a 100 h.p. Mercedes-Rumpler monoplane, on Wednesday, beat the world's duration record, remaining in the air for 18 hrs. 12 mins. The previous record was Poulet's, 16 hrs. 28 mins. Landsmann, on an Albatros, also made a flight of more than 14 hours' duration.

More Records by Sikorsky.

ON his giant biplane, Sikorsky, on the 18th inst., succeeded in making two new world's records by taking ten passengers to a height of 2,000 metres and carrying six passengers for 6 h. 33 m. 16 s. With ten passengers on board, the machine flew for 1 h. 26 m. 21 s., which beats Faller's record of one hour.

Gnome and Rhone Join Forces.

IT is announced from France that as the result of negotiations which have been in progress for some months, the makers of the Gnome motor and the Rhone motor firm have decided to amalgamate.

A Ponnier "Tabloid."

SOME good results have been obtained at Rheims with a tiny biplane which has been produced by the Ponnier firm. The span is 8 metres, the length 5·3 metres, while the weight is 250 kilogs. The *fuselage* is exactly the same as that used in the light scouting Ponnier monoplane.

M. Deutsche Founds Another "Chair."

To his many benefactions to the cause of aeronautics M. Deutsche de la Meurthe has added yet another by providing an endowment of 5,000 francs to provide for a professor of practical and popular aeronautics at the Conservatoire des Arts and Metiers.

Aerial Touring by M. Farman.

ON Sunday week Maurice Farman, with Mdlle. Andree Laise as passenger, flew from Buc to Evreux, and after lunch went on to Herqueville, landing in the park of M. Louis Renault. He subsequently returned to Buc along the Seine valley and by Andeleys, Louviers, Acquigny, Gaillon, Vernon, Hecourt, Rosay, and Garancieres. Later Mdlle. Laise was taken to Juvisy and back by Minie.

A Surprise Visit.

SOME consternation was caused at Cerquese in the commune of Craches on Tuesday of last week by the arrival during a storm of a strange machine, which made a bad landing. The two occupants suddenly disappeared, and this gave rise to several rumours regarding spies, &c. It transpired, however, that the machine was the Demonge aeroplane which was taking part in the safety competition.

A Monument to Gasnier.

A MOVEMENT has been started at Angers with a view to erecting a monument commemorating the pioneer work of René Gasnier and also to record the first town to town flight—from Angers to Saumur—made by Martinet in the course of the Angers meeting in 1910.

Testing the Dorand Biplanes.

THE escadrille of six Anzani-Dorand machines returned from Dijon to Villacoublay on the 17th inst., thus completing the test flight of 1,465 kilometres which was commenced on the 8th inst.

Mdme. de Laroche Training for the Femina Cup.

DETERMINED to defend her title to the Coupe Femina, Mdme. de Laroche is at present training at Rheims where she hopes shortly to improve on her last year's record of 323·5 kiloms., which was made on a H. Farman biplane.

In Memory of Lilienthal.

AT Lichterfeld on the 16th inst. a monument was unveiled to the memory of the German pioneer, Otto Lilienthal. A lecture on the work of Lilienthal and his contribution to the development of the aeroplane was delivered by Major Parseval.

Two German Naval Officers Drowned.

A GERMAN naval seaplane which had started from Wilhelmshaven, while flying in the neighbourhood of Heligoland on the 15th inst., suddenly dived to the sea. Although rescue parties were despatched to the scene at once, they were unable to find any trace of the machine or its two occupants.

German Prince Injured.

SERIOUS injuries, including two broken legs, were sustained by Prince Friedrich von Bentheim-Steinfurth in the fall of a machine in which he was a passenger near Siegburg. The pilot—Heller—escaped uninjured.

Fatalities in Russia.

ONE of the leading Russian pilots—G. Jankovsky—was killed close to Gatchina on the 19th inst., when his machine fell from a height of 100 metres. On the following day Capt. Stoiakine was killed at Gatchina when testing a monoplane. Apparently the machine sideslipped when making a turn at a very low altitude. On Monday last Lieut. Borislawsky, together with his passenger, were killed while flying at the St. Petersburg school.

Mishap to the "Schuette Lanz."

AFTER making a cruise over the outskirts of Berlin on the 17th inst. the German military dirigible "Schuette Lanz" made a sudden landing, resulting in considerable damage to the cars.

The Vienna Aeroplane-Airship Disaster.

THE catastrophe which occurred near the Austrian military centre at Fischamend, in the neighbourhood of Vienna was one of the most terrible yet recorded in the history of aeronautics. It appears that on Saturday morning the Körting airship "M III" set out from Fischamend, and soon after a biplane piloted by Lieut. Flatz set off in pursuit. The aeroplane overtook the dirigible, when the latter was at a height of 400 metres. The aeroplane appeared to attempt to rise over the airship, but in some way the two aircraft collided. The aeroplane capsized and fell to the ground, while a great gash was made in the envelope of the airship and an explosion followed. The seven occupants of the car of the airship, Capt. Hanswirt, Lieuts. Hofstetter, Breuer and Hardinger, Corporal Hadima, Private Weber and civilian engineer Kammerer, were all killed and burnt to an unrecognisable extent. The aeroplane fell not far from the wreck of the airship, and both the pilot, Lieut. Flatz, and his passenger, Naval Lieut. Puchta, were killed instantly. The "M III," built in 1911, was 65 metres long, of 3,600 c. metres capacity, and was fitted with two 75 h.p. Körting motors.

The funeral of the victims on Wednesday was attended by the Archduke Peter Ferdinand, while the Emperor was represented by General Paar. During the ceremony a number of aviators taking part in the meeting at Aspern flew over and paid their last tribute by circling three times over the grave.

* *

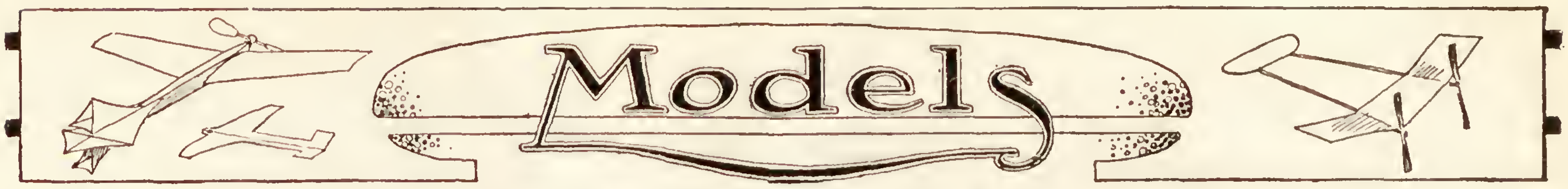
Mr. B. C. Hucks at Cardiff.

ON Thursday, Friday, and Saturday of last week, Mr. Hucks flew at Sophia Gardens, Cardiff, looping the loop many times, and making long upside-down flights. Among the passengers taken up on Friday was the Chief Constable of Cardiff, while during the afternoon Mr. Hucks took up a cinema operator in order to get some pictures of Cardiff from above. A feature of the evening demonstration was a height estimating competition. Six people estimated within 20 ft. of the exact figure, and the winner was decided by ballot at the Empire in the evening, Mr. Hucks presenting the prize, incidentally seeing the film that had been taken during the afternoon.

On Saturday, a special afternoon demonstration was given, among those present being the Lord Mayor and Lady Mayoress. On the 80 Blériot Mr. Hucks flew to Penarth, where a regatta was in progress.

Marcus Manton at Scunthorpe.

ON Wednesday and Thursday last Mr. Manton indulged in much looping at the Scunthorpe Show. The ground had a ridge and furrow surface, and Mr. Manton had to make pancake landings on each occasion. Nine landings were made altogether, and not a wire was strained, which says something for his skill. The conditions were ideal on the first day, but a severe thunderstorm made things unpleasant on the second day. Four flights were however made, and many loops which roused much enthusiasm.



Edited by V. E. JOHNSON, M.A.

The Use of Models in the Development of the Aeroplane.

(*Concluded from p.* 666.)

Where the Present-day Aeromodellist has Failed.

Now it is just here, it appears to me, where the present-day aeromodellist has failed, failed signally, though let us hope not disastrously. Aeromodellists, generally speaking, do not appear to have kept either accurate or scientific records of their experiments.

This may be, of course, a gross libel, I should only be too pleased to know it was such. Even supposing they have done so, there has certainly been no general pooling of results. Now if the model is to be worth anything from a scientific point of view in the future, it will not be by each experimentalist ploughing his own lonely furrow, but by a number of real workers and enthusiasts combining together to carry out a certain series of experiments with some useful and definite end in view. By useful and definite end I mean *some point on which designers and builders of full-sized machines desire further practical knowledge, which knowledge it appears* (*at least*) *highly probable can be obtained from careful and accurate experiments carried out with models.*

Full-sized Workers and Modellists must meet.

For this to beome possible, it is an obvious inference that full-sized workers and model workers must meet and discuss matters; so far but little has been done in this way; but a beginning has been made, with, I am very glad to be able to say, the most happy results. Each found the other had knowledge unknown to both, and more than one full-sized worker has afterwards quite frankly confessed, *that he felt quite sure he had gained as much knowledge as he had given.*

Personally, I regard this intercourse of the two parties as *essential*, if the model is going to play any part in the future development of the aeroplane. One result of such an intercourse will undoubtedly be for the full-sized man to think more of the model and the model man to think less, with, I am sure, the most happy results to all concerned.

Where the Model Scores.

The model scores most heavily, of course, on the score of expense, and from the fact that such experiments can be carried out without danger to human life. In days of adversity, of depleted exchequer and other antagonistic circumstances, the full-sized worker not unnaturally casts his eyes on the model, and is prone to ask himself the question: Is this thing any good? Or it may be that he has at last become convinced, through circumstances into which it is not necessary to enter, that experiments with models *can* be applied successfully to full-sized work; with the result that his one regret is he had not made more use of such experiments and thereby very possibly saved himself or the company, whose real head he is, thousands upon thousands of pounds.

The Scientific Model.

For well over two years I have carried on in FLIGHT a campaign on behalf of the scientific model: a campaign which I am glad to say is I think at length beginning to bear fruit.

Now what do I mean by a scientific model? I mean several things, and I do not of necessity mean the same thing now that I meant last July or that I may mean next August. A rubber-driven machine built solely for either duration, distance, altitude, &c., is not what I should term a scientific model; *it is a scientific toy*, that is all. Now there is all the difference in the world between a scientific toy and a scientific *model*. It does not matter how much scientific knowledge you may cram into your toy, not even if, as I once heard someone say, "It be fair burstin' with it," it is still only a toy. It is a toy because its design is such that it cannot by any stretch of the imagination be applied to full-sized design. Such machines are absolutely useless to full-sized designers or for real scientific experiments, experiments, *i.e.*, which can be usefully applied to full-sized work. I do not say they were not or could not have been of use in the past, but that is gone, and their chance in this respect has been, practically speaking, lost.

We must give up our single sticks, our celebrated A frames, and many other of our most cherished constructional items if we are to build a machine to which the term MODEL can be in any way truthfully and justly applied, and if we do not experiment with models of what use considering at all the question, "*The Use of* MODELS *in the development of the Aeroplane*"? Our competitions also must be so arranged that they both can and will be won by real models and not flying-sticks, no matter however well designed, constructed, and full of science they may be.

Our model aviation knowledge of to-day is far in advance of what it was two or three years ago; there is no need, no necessity whatever to build such a type of machine to get it to fly. Quite good flights can now be obtained with machines to which the term *model* can with some truth be applied. By quite good flights, I mean flights of half a minute and upwards, and a flight of half a minute even is quite long enough to make a scientific observation, more especially if 50 such flights be made and the mean result be taken.

The Type of Model Experiment that is wanted.

We especially want experiments with models fitted with covered-in *fuselages* of the Canard type, with tailless models of the Dunne type, with models of such a design as to be suitable for military purposes, fighting aeroplanes, capable of firing astern as well as ahead, with models of the combined airship and aeroplane type, a type whose total weight is somewhat heavier than air, but which is capable of rising and flying when propelled through the air at a low velocity. We also want experiments with models carrying, say, small toy cannon, or such like device, and capable of firing them whilst in actual flight in order that we may observe the effect of the gunfire on the model's stability, course, &c. We also require, perhaps, above all things, a hydro-aeroplane which can arise from and alight on the surface of really rough water. Model experiments could undoubtedly help us here, although I am afraid in this case the model would have to be a large one driven by a petrol motor.

The foregoing are only a very few of a long list of experiments that could be carried out with considerable gain to aviation work generally.

Model Research Work.

No real distinction, no hard and fast line can very possibly be drawn between investigations made with what I have termed the scientific model and model research work; save that much of the latter is generally carried out in the laboratory, and is very frequently confined to some portion of the machine in model form, and not to the machine as a whole.

Such research work is generally carried out either on a whirling table or in a wind tunnel, generally the latter, the circular course of the former being obviously a great drawback, and for anything like even fair results necessitating a very long arm.

The great advantage of the wind tunnel is that by means of having the model stationary and the air travelling past it, you can, by having a glass window in the tunnel close to the model observe very carefully and accurately what is going on.

Its chief disadvantage is that it must be of very large size in proportion to the size of the model if really accurate results are desired, which necessitates a powerful and expensive motor if the air is to be moved through the same at a high velocity. And it is experiments in winds of comparatively high velocities that are so much needed. Another manner in which such a problem could be tackled is by propelling or drawing such a model along a long wire or aerial line suitably supported at a high velocity. The model would have of course to be fitted with suitable self-recording instruments. In the writer's opinion not nearly enough use of this method has been made. Another method of attacking the problem would be by fitting a suitable attachment to a swift motor car. This latter method would have the great advantage that the model or part model experimented on would be under personel observation all the time.

Problems of stability appear to be most suitably studied in actual free flight.

If we except the model research work which has been carried out at the National Physical Laboratory, at a few technical colleges, and by some private individuals, but little work of this character has been carried out in this country. Such work, I am sorry to say, does not appear to appeal to the average aeromodellist in the least; in fact, you have only to bring up the subject, for him to look round for some avenue of escape. If you tell him that if the probable error in any single observation is 10 per cent. then at least 100 observations are necessary to reduce the probable error to 1 per cent.; that is quite enough, he wants to hear nothing more.

Where Model Experiments are so often at Fault.

And yet it is just in this very respect that ordinary model experiments or deductions are so often at fault. The observation itself and the consequent deduction may have been quite all right so far as they went; but the data, the number of the experiments made were totally inadequate. The experiment *may* have been observed correctly and the deduction correctly reasoned out. And, on the other hand, either or both may be incorrect. Would you sooner risk your life, supposing such a course became necessary, on such, or on the mean of 100 carefully carried out experiments, of which the average result was taken, due allowances being made for probable sources of error in each case? There can be only one answer to such a question.

Scientific research work is often long, tedious and laborious, to say nothing of very often being expensive as well, but it is the only way in which to accumulate knowledge, which is at the same time accurate and precise and free from unconscious error. Such work does not possess either the ease or apparent attractiveness of breaking "records," but it is just this kind of work that has got to be if the model is to be of any use in the future development of aeroplanes. As to what part the model will play in:

The Future Development of the Aeroplane

is a matter which rests very much in the hands of aeromodellists themselves. It also undoubtedly depends very largely on how far the various aeronautical bodies at present are prepared to work together for the common good: to give and take and to offer suitable and adequate prizes for original research work on model lines of a character likely to be of use in full-sized work. Neither full-sized workers nor modellists alone could draw up such a scheme; it must be done by the concerted action of both, and a third party must be found who, blessed with more than an adequate quantity of this world's goods, is prepared to part with a few, with a view to adding to the sum of human progress and human knowledge.

Above all is it necessary that the various clubs and societies, to say nothing of firms and private individuals, must know what one another is doing or intending to do, not only that unnecessary overlapping shall be avoided, but in order that each shall be able to render mutual assistance when such is possible or friendly criticism where such is valuable.

There is practically a common agreement that the model both could and should be of use in the development of the aeroplane; what remains to be done is to find out and develop the best means to carry such into effect. I need hardly add in conclusion that any further suggestions in that direction will receive most careful consideration and be much appreciated by the author of this paper.

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

Kite Competition.—On June 20th, the first kite contest of the season was held on Wimbledon Common, for prizes presented by Messrs. Brooke and Westhorp, of Brookite fame. It attracted an entry of twelve competitors. The results were as follows of the first six:—

No.	Competitor.	Make of kite.	Marks. Angle.	Stability.	Strength of construction.	Portability.	Total.
1	A. W. Howkins	Kamac triangular	106	100	60	50	316
2	A. Collins ...	Box and wing ...	82	84	60	50	276
3	W. Collins ...	Box and wing ...	68	95	60	50	272
4	A. T. K. Moir...	Brookite	58	90	50	50	248
5	L. Ingram ...	Brookite	46	80	60	50	236
6	D. Staines ...	Box and wing ...	48	65	55	50	218

The angle marks are 1 mark for each degree attained plus 3 extra for each degree above 50. The prizes were Brookites: 1st, value 35*s.*; 2nd, value 25*s.*; and 3rd, value 15*s.* The judges were F. Pringuer and the general hon. secretary.

Gamage Competition.—This contest takes place on Wanstead Flats tomorrow, 27th, at 3 p.m. For route, see the Leytonstone's Club notes of 20th.

Model Competition.—To be held on Wimbledon Common on July 11th, at 3 o'clock; entries close July 4th. Steering competition for models rising off the ground. Prizes:—1st, cup; 2nd, silver medal of the Association; 3rd, bronze medal of the Association. Tests: A. Straight flight ahead; B. Figure of eight; maximum marks, 100; 50 for each test. Additional rules governing this competition: 1. To qualify for test A, models must fly straight for not less than 50 yds. 2. To qualify for test B, models must make one complete figure of an eight, controlled by mechanical means and not by odd propellers. 3. Models must not weigh less than 6 ozs. 4. Competitors must be at the judges' flag at 2.30 sharp. Those not present at that time will be disqualified. Junior r.o.g. duration competitions; age, 16 and under; marks: duration, actual seconds. Prizes: 1st, r.o.g. model, 45*s.*, presented by Mr. A. F. Houlberg; 2nd, model value 25*s.*, presented by Mr. H. Bond; 3rd, model value 15*s.*, presented by Murray, Son, and Co. For rules see pages 5 and 6 of programme. Additional rules governing this competition: 1. Competitors must be at the judges' flag at 2.30 p.m. Any competitor not present at that time will be disqualified. 2. Models may be of any weight and of any kind, home-made or purchased.

27, Victory Road, Wimbledon. W. H. AKEHURST, Gen. Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Bristol and West of England Aero Club (Model Section) (42, Royal York Crescent, Clifton, Bristol).

Bristol International Exhibition.—More than 30 models have already been entered for the Model Aeroplane Exhibition and Competition, and further entries are expected. *It has been decided that competitors not resident in Bristol or Bath will not be required to exhibit their models from July 11th to 18th (although they are invited to do so), and they will therefore be able to bring their machines with them to Bristol on July 18eh.* A member of the Bath and Somerset Aero Club will bring the exhibits from Bath to the Exhibition on July 11th. In view of this alteration in the conditions, late entries may now be sent in not later than June 30th. The events and excursion arrangements were announced in Flight on June 12th and 19th.

Leytonstone and District Aero Club (64, Leyspring Road).

June 27th, Gamage Cup Competition on Wanstead Flats, 3 p.m. For route see last week. June 28th flying Wanstead Flats, 6.30 and 10.30 a.m.

UNAFFILIATED CLUBS.

Birmingham Aero Club (8, Frederick Road, Edgbaston).

The competitions for the Midland and English championships have both been postponed to Saturday, August 15th, owing to the club's ground being down for hay. Full particulars on application to the Hon. Sec.

Finsbury Park and District (66, Elfort Road, Highbury, N.).

June 27th, flying at Finsbury Park from 3 p.m.

Ilford Model Ae.C. (83, Endsleigh Gardens, Ilford).

June 28th, Second Competition Meeting at 9.15 (weather permitting) at the aerodrome, Hog Hill, Hainault Forest, Chigwell Row:—Event I, Charles and Co. prize, h.l. duration handicap. Event II, simultaneous handlaunching, senior and junior sections. Event III, senior section, twin-pusher, r.o.g. duration; minimum length of machine, 36 ins. Event IV, senior section, tractors, r.o.g duration. Event V, senior section, single-pusher, r.o.g. duration; minimum length of machine, 36 ins. Event VI, junior section, lightweights, h.l. duration; maximum length, 30 ins. Event VII, junior section, single-pusher, h.l. duration; minimum length, 30 ins. Event VIII, lightweights, r.o.g. duration; maximum length of machine, 30 ins. N.B.—All lightweights must be twin-pushers (0-1-1-P2 type), Competitors who are not at the judges' flag at 9.15 *sharp* will be disqualified. Three trials will be allowed per event except Events I and II. Judges: Messrs. H. Corrigan, F. M. Connellan and J. B. Fitzsimons. Timekeeper: J. B. Fitzsimons.

S. Eastern Model Ae.C. (1, Railway Approach, Brockley).

June 27th, Woolwich Common, 3.30 to 6 p.m.; 28th, Blackheath, 6.30 to 10 a.m.

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AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

1. **Elections.**—Members: John H. Patterson, Jan Schiere, Col. the Right Hon. J. E. B. Seely. Assoc. Member: Lieut.-Col. Stanhope Pedley. Foreign Member: John Gadsby.

2. **Associate Fellowship Election.**—Application forms for the next election of Associate Fellows, which will take place in July, can now be obtained from the secretary, and it should be noted that it is not necessary that the applicants should be members of the Society. Full details will be announced later.

3. **Joint Committee with the Royal Meteorological Society.**—The following gentlemen have been appointed to serve on the above Committee: Col. H. E. Rawson, C.B. (Chairman), Dr. T. E. Stanton, Lieut.-Col. F. H. Sykes, Alec Ogilvie, and another representing this Society; C. J. P. Cave, Dr. C. Chree, J. S. Dines, and G. K. Lempfert representing the Royal Meteorological Society.

4. **Award of the Society's Gold Medal.**—As will be seen by the separate announcement, the Gold Medal of the Society has been awarded to Professor G. H. Bryan, Sc.D., F.R.S., for the great services he has rendered to aeronautics by his development of the theory of the stability of aeroplanes.

5. **Library.**—The Council desire to thank the Royal Institution of Great Britain for the following gifts to the Library:—

"Photography of the Paths of Particles Ejected from Atoms." By C. T. R. Wilson, M.A., F.R.S.
"Gyrostats and Gyrostatic Action." By Professor A. Gray, M.A.
"The Winds in the Free Air." Charles J. P. Cave, M.A., J.P.
"Fluid Motions." The Right Hon. Lord Rayleigh.
"The Gyrostatic Compass and Practical Applications of Gyrostats." G. K. B. Elphinstone, M.I.E.E.
"Travelling at High Speeds on the Surface of the Earth and above it." Professor H. S. Hele-Shaw, LL.D., M.I.C.E.
"Icebergs and their Location in Navigation." Professor H. T. Barnes, D.Sc., F.R.S.
"The Pressure of a Blow." Professor B. Hopkinson, M.A., F.R.S.
"Recent Advances in Scientific Steel Metallurgy." Professor J. O. Arnold, D.Met., F.R.S.
"Recent Advances in Turbines." Hon. Sir C. A. Parsons, K.C.B.

B. G. COOPER, Secretary.

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FLIGHT

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A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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CONTENTS.

Editorial Comment: PAGE
- The Atlantic Flight ... 695
- Hendon-Paris-Hendon ... 695
- The Aeroplane in War ... 696

Royal Flying Corps. The Concentration Camp ... 698
Royal Aero Club Official Notices ... 702
From the British Flying Grounds ... 703
Royal Naval Air Service Re-organisation ... 705
Flying at Hendon ... 708
Eddies. By "Æolus" ... 710
The Flying Machine from an Engineering Standpoint. By F. W. Lanchester 713
Foreign Aircraft News ... 714
British Notes of the Week ... 716
Models. Edited by V. E. Johnson, M.A. ... 717
Correspondence... 720

EDITORIAL COMMENT.

The Atlantic Flight.

It is with some regret that we notice certain of the daily newspapers are throwing cold water on Lieut. Porte's projected attempt to fly the Atlantic. The ground they take up is that there can be but one inevitable ending to the attempt, which, needless to say, is the failure of the attempt and the death of the daring pilot. Equally, the cloven foot shows forth when the argument is adduced that the whole thing is simply designed by Lord Northcliffe and his advisers with the sole purpose of gaining advertisement for himself and his journals. One paper goes so far as to make a personal appeal to Lord Northcliffe to call the thing off in the interests of humanity.

In the light of recent news from America regarding the machine on which Lieut. Porte proposes to make his attempt, we are anything but sanguine of the cross-Atlantic flight being made this year. That, however, is not quite the thing we have in mind at the moment. The point is that, given the designer and the pilot are quite satisfied of the ability of the machine to accomplish the flight, we do not conceive that it must necessarily have the unfortunate ending so freely prophesied. On the contrary, we believe that, humanly and mechanically speaking, the possibilities are all the other way. Lieut. Porte calculates that he should reach the Azores in twenty hours after leaving his point of departure. The present duration record stands at nearly twenty-two hours, which leaves a fairly substantial margin for eventualities. True, this record was established on a "land" machine, unencumbered by floats or other adventitious aids to flying over the sea, but it nevertheless demonstrates the ability of the modern aeroplane for sustained flights, and shows beyond doubt that, if the calculations for the Atlantic flight are not hopelessly out, it is possible to fly the time requisite to cover the longest stage of the journey.

After all, the best reply that can be made to the prophets of evil is to remind them of their prognostications anent the London-Manchester flight at the time the *Daily Mail* first offered its £10,000 prize for that performance. Precisely the same things were said of it as are now being told us in connection with the Transatlantic flight, and yet——.

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Hendon–Paris–Hendon.

These long-distance aerial races are becoming so much a matter of everyday occurrence that it is really very difficult to find anything new to say about them. Time was when the mere project of a race from London to the French capital and back would have brought a storm of scoffing comment about the ears of the promoters, but now the announcement passes almost unheeded of the man in the street. It is with somewhat mixed feelings that we who are so closely interested in the aviation movement regard this passing of interest, which almost seems to indicate that the romance has gone out of flying. Not that there is, or ever was, anything really romantic about a movement which is almost purely one of mechanical development, viewed from the inside, but when the man in the street regarded the aeroplane as something almost supernatural, and the man who flew it as a species of demi-god, there somehow seemed to be more in it than in these very material days. What we have lost in romance, however, we have gained in solid progress, of which these long races are the outward and visible sign, and we must even content ourselves with that reflection.

To come down to the more material aspects of the affair, next Saturday's race looks like being a huge success, if only the elements are kind. At the time of writing no fewer than thirteen entries have come to hand, and these include practically the whole of our best-known pilots and our most tried machines. Even now there is time for more to come in, and it is thought that some of the more famous Continental pilots may help to swell the entry list. So far, then, the promoters and the Royal Aero Club have no reason to be displeased with the advance results of the race.

Not the least interesting fact in connection with this event is the action of the Home Office in consenting to exempt competitors in the race from the incidence of the Orders under the Aerial Navigation Acts, which prohibit airmen from entering or leaving England without alighting in certain prescribed areas in order to report their arrival or movements to the authorities. It is evident from this that the Home Office has got over its panic regarding the movement of aircraft over these Islands. The Aerial Navigation Acts were passed, and the Orders under them formulated, when the authorities were in a state of absolute fright caused by the sudden and somewhat belated realization that the problem of man-flight had indeed been solved. At first, these orders were enforced in a foolishly restrictive manner, as witness the trouble in connection with last year's Aerial Derby which had to be postponed on account of official interference of a kind which can only be called silly and short-sighted. However, it is evident that a more equal appreciation of what may and what may not be done in the air in relation to the safety of the State exists in the official mind—which is something for which to give thanks.

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The Aeroplane in War.

One of the best articles we have ever read on the subject of the aeroplane in war is that from the pen of the well-known war correspondent, Mr. Prevost Battersby, in the *Morning Post* of the 29th ult. In many circles it has come to be assumed that the function of the aeroplane in the wars of the future will be that of reconnaissance, and reconnaissance alone. While it is scarcely within the province of a journal such as FLIGHT to dogmatise on matters which properly fall within the scope of the professional soldier, we have never taken that view as it stands, preferring rather to think that while the ultimate duty of aircraft will prove to be the collection and transmission of information likely to prove of value to a commander in the field, that duty will only fall to an aerial force after the question of the supremacy of the air has been settled in favour of one side or the other. Once that question has been decided and aircraft have assumed their ultimate functions, the commander who has secured his place in the air will be in the position of the player who is throwing loaded dice. These appear to be the conclusions arrived at by the able writer of the article we have mentioned, for he says :—

> "The aeroplane is a wonderful instrument for reconnaissance, but such duties may come to be the last which it will have to perform. Most certainly it will, just as surely as the horseman, be challenged to fight for its information, and must be armed and equipped to accept the challenge. And where will such arming, once begun, be likely to lead us? Surely to the provision of a fleet whose prime objective must be the discovery and destruction of the enemy's aircraft. Just as the cavalry fight must often precede the search for information, and the possession of it rest with the victors, so the first effort of the Flying Corps commander will be to beat his opponent to the ground and keep the air clear for his own purposes of reconnaissance. Nor will it be for reconnaissance only that he will use the field that he has won. What is left of his fleet will be employed for a ceaseless harrying of the enemy's fortresses and camps, and in attempts to destroy the depôts on his lines of communication. In such a forecast one is not forgetting that the aeroplane has not yet been seriously opposed, and that the shell and the gun to prove its special bane may already have been invented. Most certainly the plane will have soon to confront the invention ranged against every new engine of war, and for that reason it seems probable that much which is at present regarded as within the aircraft's sphere, such as directing the fire of batteries in a general action, is likely to disappear from it. What has not been at all realised in this country is the extraordinary element introduced into war by the aircraft's mobility and new avenue of attack. The consternation which of old could only be produced in the threatened country after perhaps months of effort and the expenditure of millions can now be caused by aircraft in a few hours at practically no cost at all. It may be that all the lurid romance written round the new weapon has really dulled the general intelligence as to its coming import. One scarcely dares to talk now of dropping bombs from the sky; but, on the other hand it seems like a paltering with the most serious realities to go on writing of aircraft as a supplementary method of reconnaissance which may be put out of action by fog. The nation which continues thinking on such childish lines will pay dear for its ineptitude. The aeroplane is the deadliest weapon of man's invention, and it may prove of the greatest service to such a nation as ours with a temperamental dislike to military service. The aeroplane is not going to supersede the Army, but it is going to alter considerably its relation to war. In what respects it would be idle to dogmatise; what one desires is to produce the intense conviction of its power which may lead to right appreciation of the work before it."

These are words pregnant with a deep meaning for us. The truest word that Mr. Prevost Battersby has uttered in this article is when he says that the potentialities of the aeroplane have not been realised by the general public in this country. At all costs we must be as supreme in the air as we are on the seas. That is the very minimum to be required for the safety of the Empire, and sooner the realisation of this sinks into the public mind, the sooner we shall be on the high road to safety.

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ROYAL FLYING CORPS.

THE following announcement appeared in the *London Gazette* of the 26th ult. :—

R.F.C.—Military Wing.—Second Lieut. Lofus A. Bryan, South Irish Horse, is appointed to the Reserve. May 29th, 1914.

The following appointments were announced in the *London Gazette* of the 30th ult. :—

Royal Naval Air Service.—Engr.-Lieuts. Gerald West Storey Aldwell, Charles Russell Jekyl Randall, and Edward Featherstone Briggs to be Squadron Commanders; Wilfred Briggs, Thomas Reginald Cave-Browne-Cave, Henry Meyrick Cave-Browne-Cave, and Charles Dempster Breese, to be Flight Lieutenants.

Assistant Paymaster Charles Robert Finch Noyes to be Lieutenant.

The following officer of the Royal Naval Reserve has been appointed a Flight Commander: Lieutenant James Lindsay Travers.

The following officers of the Royal Naval Reserve have been appointed Flight Lieutenants: Lieutenants Reginald Lennox George Marix and Hugh Alexander Littleton: Sub-Lieutenants Ian Hew Waldegrave Stair Dalrymple-Clark, Ivor Guy Vaughan Fowler, Ronald Hargrave Kershaw, Thomas Alfred Rainey, Douglas George Young, Richard Edmund Charles Peirse, Christopher Draper, Hans Acworth Busk and Edward Thomas Newton-Clare.

The following gentlemen have been appointed Flight Lieutenants: Right Hon. Lord Edward Arthur Grosvenor and Charles Francis Beevor. Dated July 1st, 1914.

Distinguished Visitors at the Concentration Camp.

ON Friday, last week, the Prime Minister, accompanied by Mr. Baker, Financial Secretary to the War Office, Mr. Cyril Asquith and Miss Asquith, paid a visit to the Concentration Camp of the R.F.C. at Netheravon, being received by Brigadier-General Sir D. Henderson, K.C.B., and Lieut.-Col. Sykes, commanding the Royal Flying Corps, Military Wing. During the afternoon, Col. Seely joined the party, and went for a flight on a B.E., piloted by Capt. Todd. The party afterwards visited the Central Flying School at Upavon.

On Monday the visitors to the camp included Mr. Winston Churchill and Lord Roberts, as well as a number of foreign military attachés, among them being Major Count Greppi (Italy), Major M. Renner (Germany), Col. Inagaki, Major Tanikawa and Capt. Stubuya (Japan), Lieut.-Col. Vicens (Spain), Lieut.-Col. G. O. Squier and Capt. Wood (U.S.A.), and Major Horwath (Austria-Hungary).

During the afternoon Lord Roberts presented a number of prizes which had been won in various athletic contests.

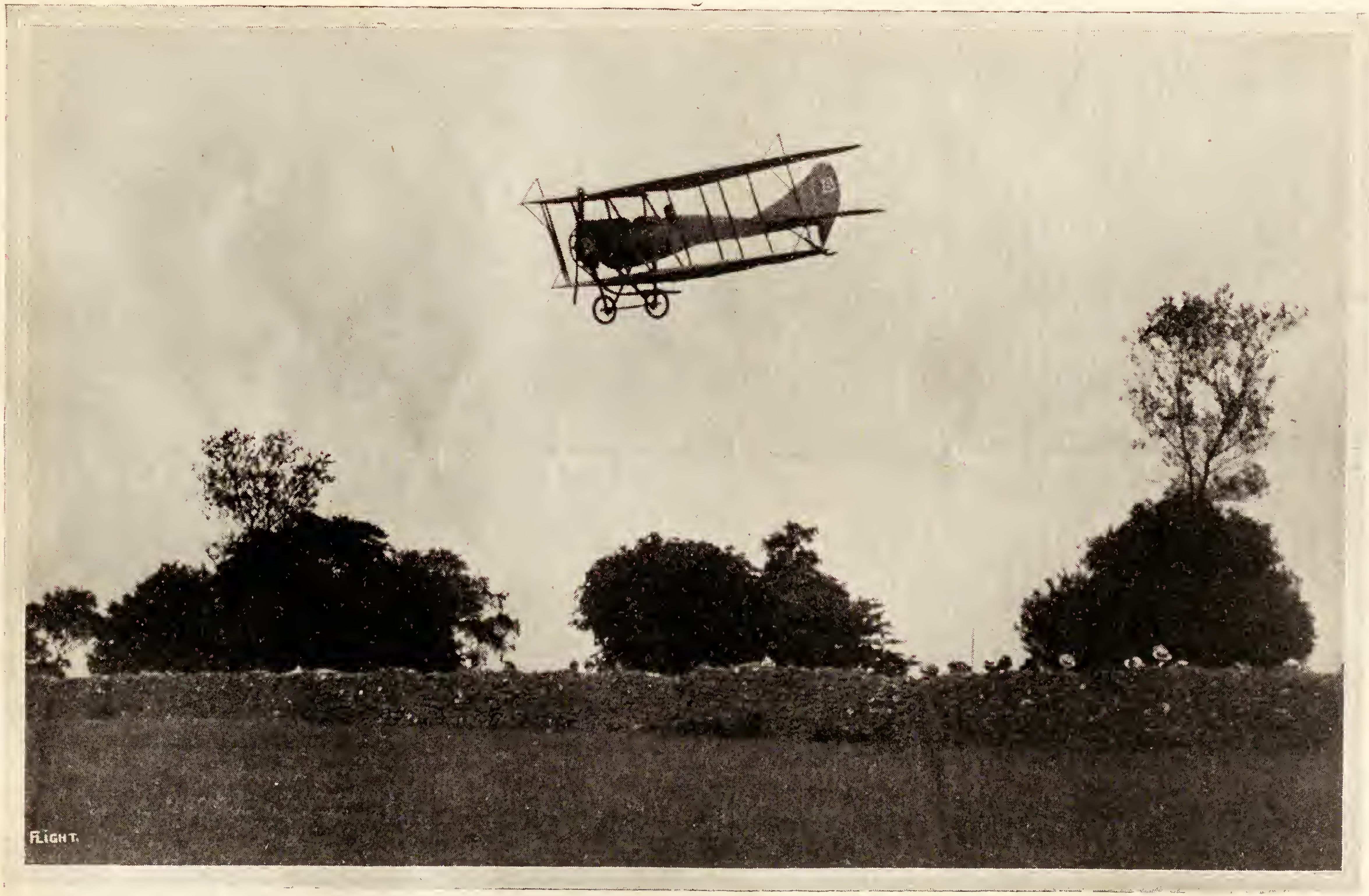


Photo by Graystone Bird, Bath.

Mr. W. Rowland Ding, flying the Handley-Page biplane at Bath recently.

ROYAL FLYING CORPS (MILITARY WING) AT NETHERAVON. THE CONCENTRATION CAMP.

(Concluded from page 677.)

Observation of Gunfire and Armament of Aircraft.—The work carried out in this direction has been of an extremely diverse character—balloons, kites and aeroplanes being employed in the exercises—but, as might be expected, the results of the observations made are of a confidential nature and hence we are not at liberty to disclose any matter relating to them in an article such as this. Extremely useful knowledge has, however, been gained during the experiments in the observation of gunfire as to the relative and potential value of the three forms of aircraft, as in the observation of gunfire all were employed, aeroplanes flying over the danger zone and the observers signalling the results of their observations to the firing point.

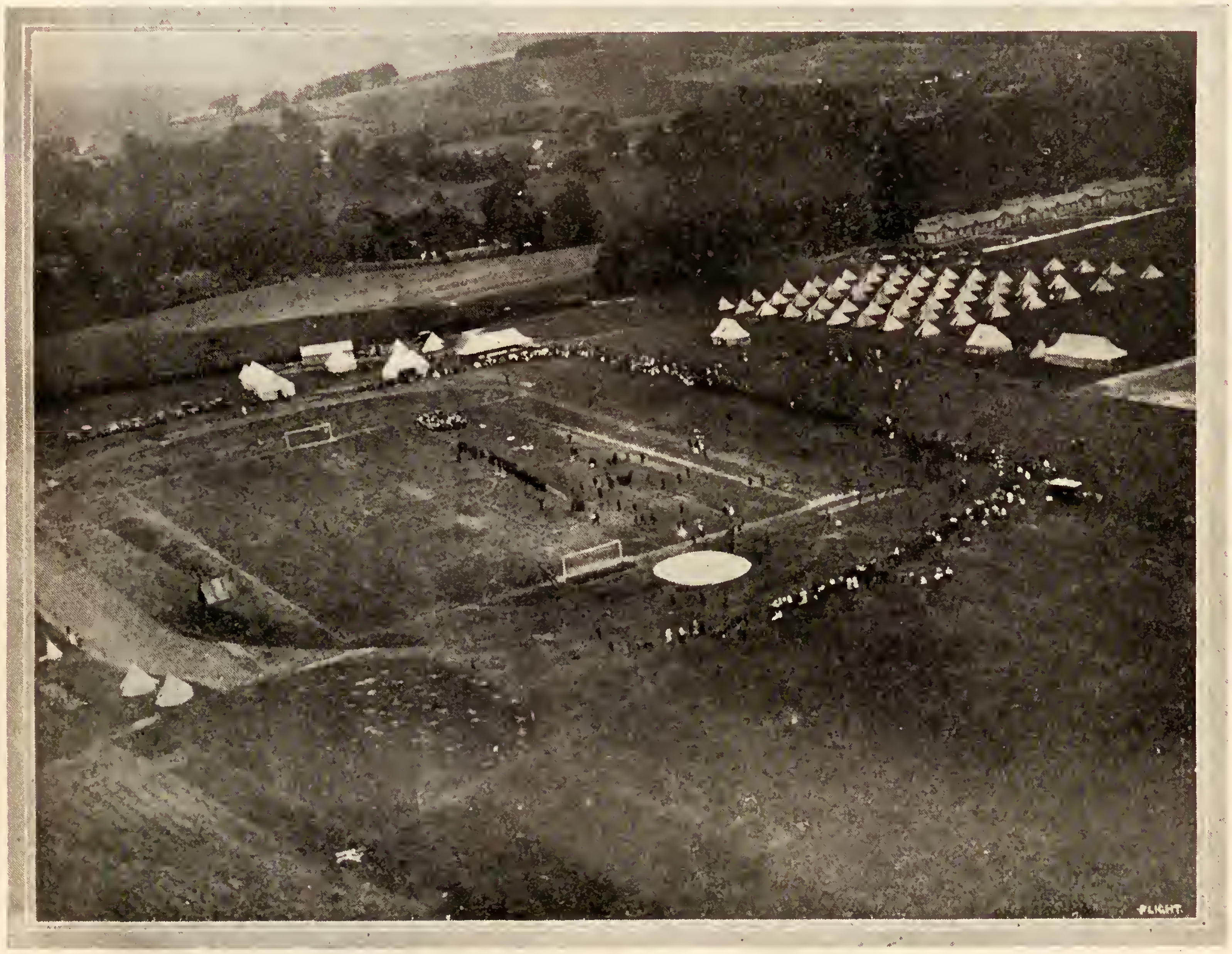
Aeroplanes armed with machine guns, rifles, bombs, &c., have also carried out operations against targets upon the ground, and kites flown in the air, and since the elevations at which the experiments were carried out were such as to render the aeroplanes practically immune from gunfire from the ground, the conditions were as near as possible similar to those which will actually exist in war time.

Transport.—The secret of success in the employment of aircraft for military operations lies in the completeness of its organisation, and that is not complete unless the transport is mobile and adequate for the maintenance of the machines in an efficient condition.

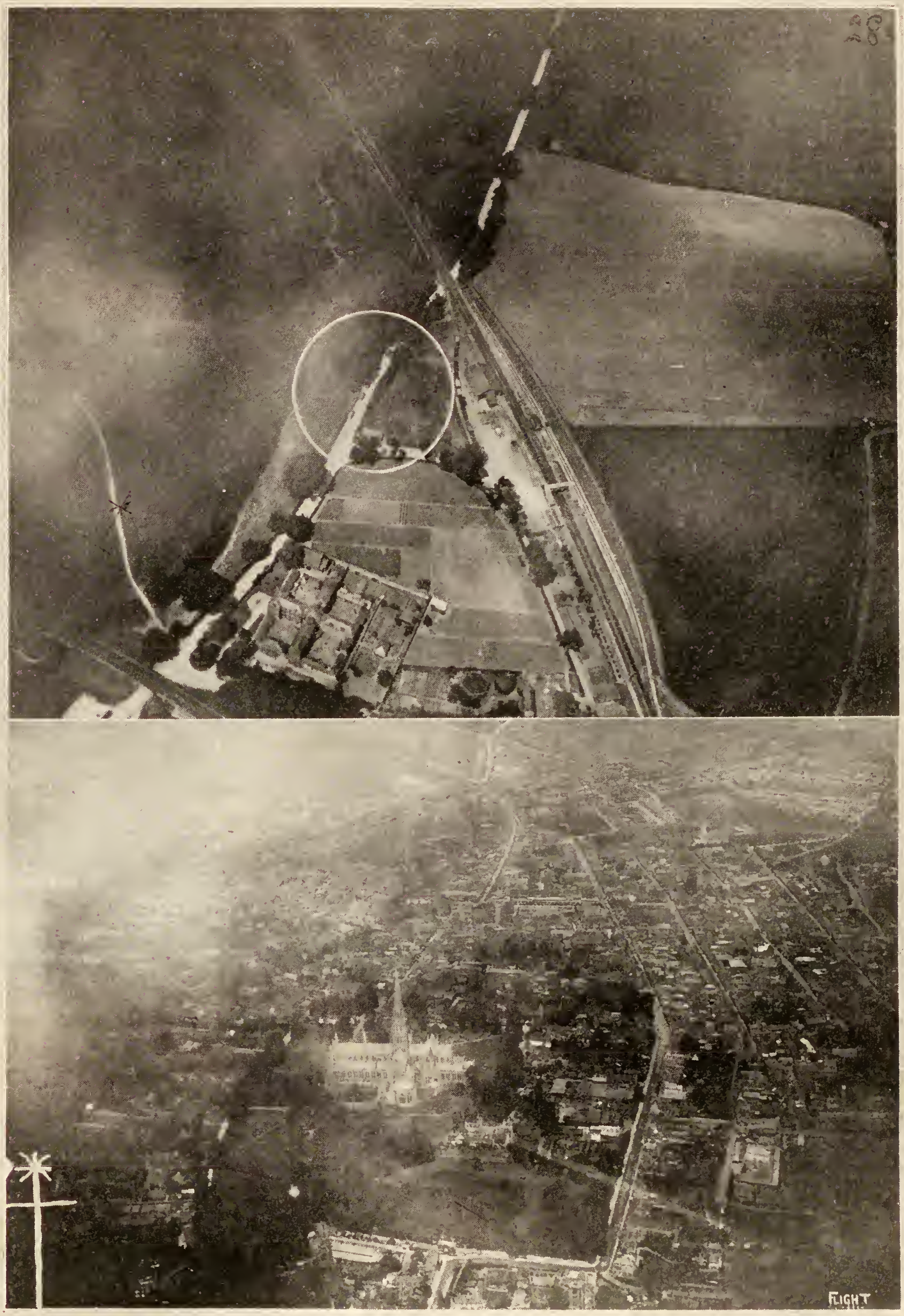
In war time, each squadron will be provided with a car for the commander, 6 light tenders of the Crossley type for the conveyance of riggers, men and boxes, 6 heavy tenders for the transport of large spare parts, camp equipment, &c., 3 reserve equipment lorries for other spare parts, 3 shed lorries, 3 flight repair lorries fitted with hand-power tools, electric lighting plant, small raw material, &c., 1 heavy repair lorry fitted with machine tools of various descriptions, 1 lorry carrying spare parts and stores for mechanical transport, 1 baggage lorry, 1 lorry for petrol and lubricants, 6 motor cycles and 6 trailers. In peace time, the squadrons are accompanied by the tenders, repair lorries, motor cycles and trailers. All squadrons at present in camp are now at full strength excepting No. 6 and No. 2—the latter having left some of its transport at Montrose—the equipment necessary being completed by the loan of spare vehicles from squadrons now forming. In war time the squadron transport would be completed by vehicles provided under the subsidy scheme. It will be observed that most of the lorries and tenders are in groups of three or multiples of three—due to the fact that the transport is thus entirely separate for each of the three flights.

Considerable attention has been directed to the exercise of the transport section of the squadrons. Convoy runs have been made by flights and by squadrons during the night as well as during the day. This is most important work as in transport it is essential for the various vehicles forming the convoy to keep in close formation, the distance apart being kept as small as possible so as to minimise the risk of capture in the event of an attack from a hostile force. It will be readily seen that the difficulty in limiting the distance between respective vehicles will increase with the speed and number of gradients negotiated, and be greater at night than during the day, so that since all these vehicles are motor driven and much of the work will from necessity be done at night, it is highly essential that exercises after dark should be frequently made.

At one of these night runs at which we were permitted to be present by permission of Col. Sykes, the convoy started at 9 p.m. and arrived back in camp shortly before midnight, making a long detour through the surrounding country, the roads of which are seldom straight for any great distance and which are freely interspersed with hills of varying gradient. The run was very successful, the vehicles being in fairly close formation—from 30 to 50 yards apart—throughout the exercise, which, having regard to the type



CONCENTRATION CAMP AT NETHERAVON.—A photograph taken from an aeroplane while the sports of the Military Wing of the Royal Flying Corps were in progress on June 20th.



CONCENTRATION CAMP AT NETHERAVON.—Two photographs taken during reconnaissances from a height of over 2,000 ft. on June 15th last. The lower photograph gives an excellent view of Salisbury Cathedral, while the upper shows the four wagons, which were the subject of the reconnaissance, on the road near Wilton.

and diversity of vehicles forming the convoy, must be considered excellent. The superiority of motor traction over horse traction was already evident, as apart from the greater speed of the former, it was not possible to discover their approach except by the visibility of the headlights until the vehicles were almost within hailing distance. Further experiments were afterwards conducted without the headlights, as it is obvious that under actual war conditions the employment of headlights would render them readily observable to a hostile aeroplane flying in the vicinity.

Lectures and Committee Meetings.—Not the least important feature of the Concentration Camp is the facilities provided for the exchange of opinions on various subjects, which more or less cover the science of practical military aeronautics. The lectures, which are detailed later, are in two series, one series being delivered by various officers, while the other is given by warrant officers and by non-commissioned officers of the corps. These should be attended with great success, as in the course of the discussion which follows each paper, points of vital interest were raised and their elucidation should do much to establish the ideas of all on sound lines. Here, also, is further evidence of the master-mind which is apparent in all the doings at the Camp. The papers read and the subsequent discussion are not to be merely of service to those who were so fortunate as to be able to attend the meetings, as a note has been taken of the discussions, which, together with the subject-matter of the Papers, will be printed when the camp disperses.

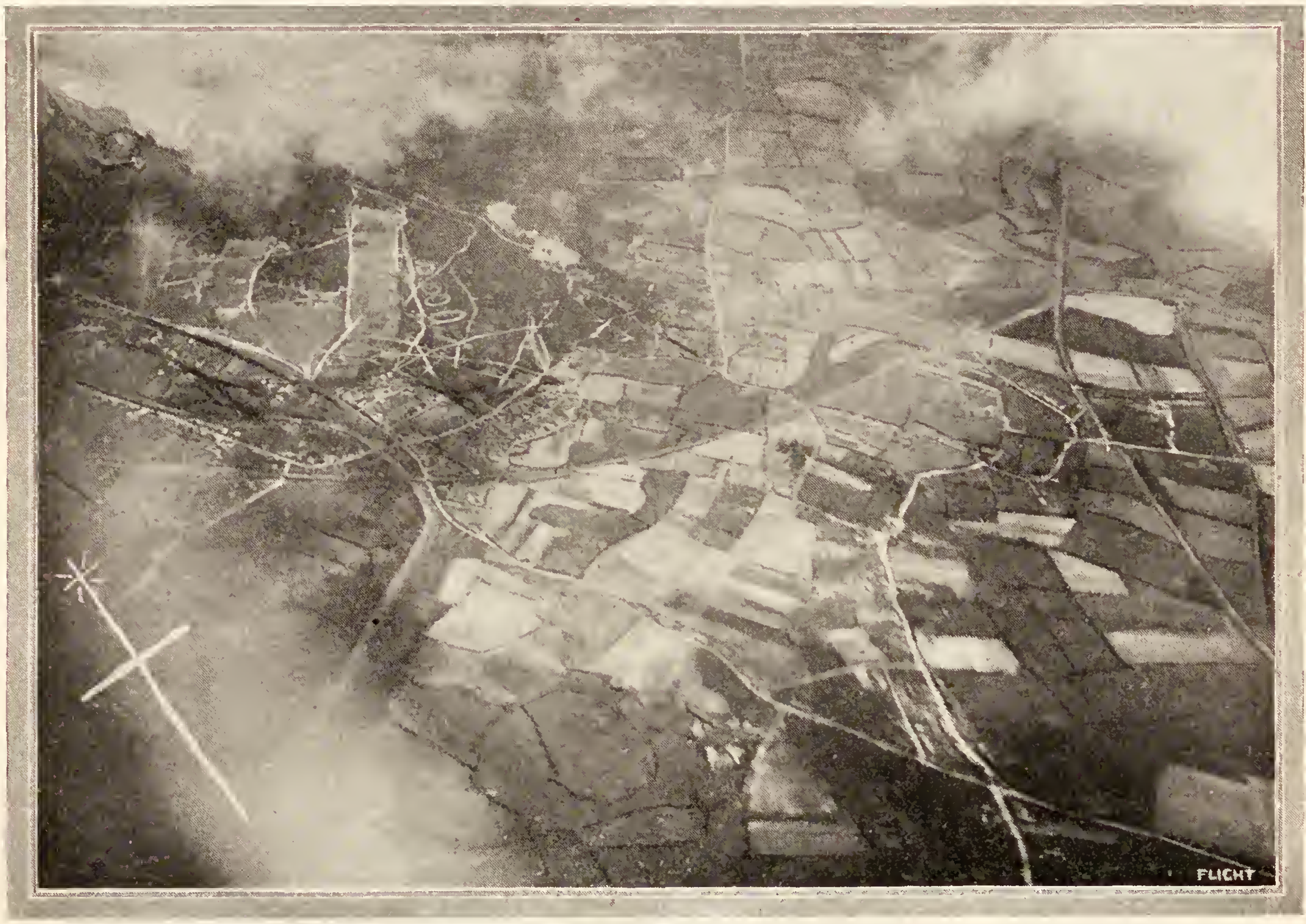
The list of lectures and the names of the lecturers are as follow :—

By Officers.

1. Notes on Aviation. Major C. J. Burke.
2. Reconnaissance. Major H. R. M. Brooke-Popham.
3. Allocation of Duties in a Squadron, and how Lack of Administration Stops Flying. Capt. U. J. D. Burke, Capt. G. S. Shephard, and Lieut. E. R. L. Corballis.
5. Recruiting and Record Duties for Military Wing. Major W. E. S. Burch.
6. Artillery Fire from an Observer's Point of View. Major J. F. A. Higgins.
7. Recruit training. Lieut. B. H. Barrington-Kennett.
8. Progress of Experimental Work. Major H. Musgrave.
9. Trade Qualifications for N.C.Os. and Men. Major A. D. Carden.
10. Piloting of Aeroplanes and Experience at C.F.S. regarding Methods of Teaching Piloting. Major C. A. H. Longcroft and Major J. M. Salmons.
11. Allocation of Squadrons to Subordinate Commands. Major Brancker.
12. Storekeeping. Capt. W. D. Beatty and Lieut. R. G. D. Small.
13. Meteorology. Capts. F. V. Holt and E. G. Harvey.
14. Mechanical Transport. Lieuts. G. B. Hynes, R. B. Martyn and A. Christie.
15. Workshop Management. Capt. G. I. Carmichael and Lieut. R. Cholmondeley.
16. Supervision of Aeroplane Maintenance. Major J. H. W. Becke.

By W.Os. and N.C.Os.

1. Rigging, and Training of Riggers. Sergts. J. Kemper and H. Bullock.
2. Renault Engines. Sergeant-Major W. Thomas.
3. Gnome Engines. Sergeant W. Bruce.
4. Austro-Daimler Engines, and Water-cooled Engines generally. Sergts. J. Wilkinson and A. Meed.
5. Common Mistakes with Engines. Sergeant-Major A. Measures.
6. Initial Recruit Training and Technical Instruction of Recruits. Sergeant-Major A. Wilford and Sergeant C. Brockbank.
7. Care of Materials in the Field. Sergeant-Major A. Fletcher.
8. Care of Mechanical Transport. Sergts. F. Bullen and W. McCudden.
9. Use of Machine Tools, and Notes on Squadron Workshops. Sergeant-Major J. Starling and Sergeant-Major F. Unwin.



A view of the country about three miles south of Farnborough from an aeroplane above the passing clouds at a height of 6,500 ft.

As regards the Committees, eight standing Committees were formed at the commencement of the Camp to consider various matters relating to the administration and organisation of the Corps on its social as well as its military side. The matters dealt with range from formulating a standard set of squadron mobilisation orders to the consideration of the N.C.Os. and men's employment association; and the programme provided for about eight sittings for each Committee during the period of the concentration. The Secretary of each Committee arranged the work, collected the required information, arranged for the conduct of such trials as were necessary, kept records of the proceedings and submitted the

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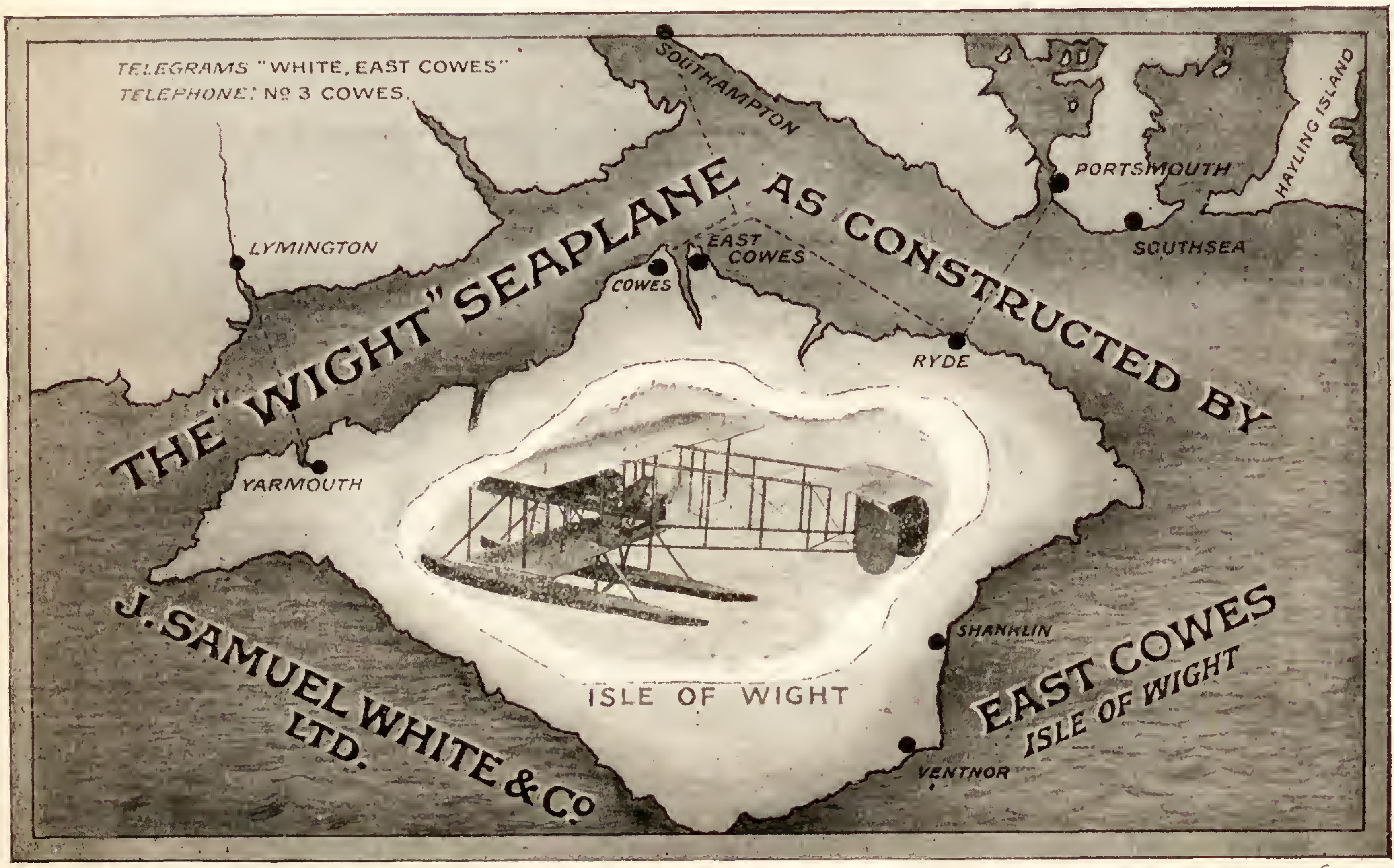


proceedings to the Commanding Officer on the completion of the investigation of a subject. Without doubt these meetings cannot fail to be productive of good to the Corps in general and the members of the Committee in particular.

General.—The experimental work which has for some time been conducted in wireless telegraphy has been vigorously continued since the concentration at Netheravon commenced. Messages have been sent from and received by the wireless officers over long distances, whilst flying in aeroplanes—the usual distance being of the order of 20 miles; but messages have been transmitted over distances nearly double this figure, and it is anticipated that much longer distances will be possible in the near future. It may be mentioned, as indicating the tremendous work which is now being done at Netheravon, that the distances covered by two wireless officers during last week totalled over 1,500 miles. There are two wireless stations in the Camp, one being immediately opposite the Officers' Quarters, while the other is at the rear of the temporary aeroplane sheds with the Headquarters Flight, both stations being completely equipped with the necessary apparatus for sending as well as receiving messages.

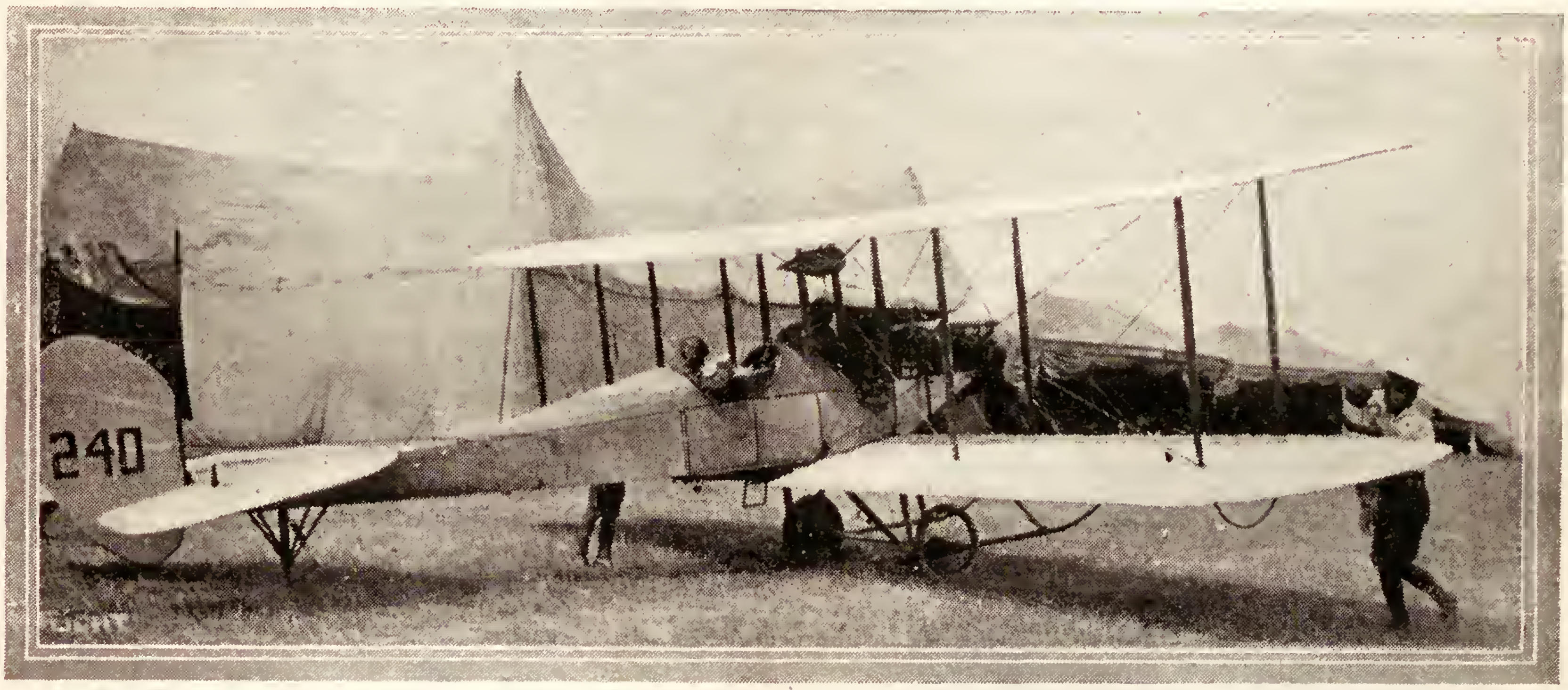
As regards photography, which is also, in the case of the visiting squadrons, attached to the Headquarters Flight, on each reconnaissance embodied in the scheme of training, an independent aeroplane has followed the aerial observers with a photographer as passenger, and the object which the machines taking part in the reconnaissance were required to locate has been photographed from a height of over 2,000 ft., so as to show to any observers who failed to discover the enemy, the exact position in which he was located at the time the observations were made. As previously mentioned, several of these photographs are reproduced in this issue through the courtesy of Col. F. H. Sykes, Commandant of the R.F.C., and Major Musgrave, while, in addition, a photograph taken from an aeroplane at a height of 6,700 ft. also appears.

In addition, photographs of the country in the immediate vicinity of the camp have been made, and it would appear to be probable that a photographic survey of the whole country from above would prove of inestimable value to pilots, despite the changes in appearance of the ground at different seasons of the year; because the prominent landmarks would appear in the photograph, exactly as they appear to the pilot. The cameras used in the R.F.C. for aerial photography differ in no way from the usual type, and are fitted with ordinary Goerz lenses.

Meteorology, that very necessary and useful adjunct to the science of aeronautics, has not been neglected, as a skilled meteorologist is continually in residence at Netheravon, his office being situated behind the permanent sheds of Nos. 3 and 4 Squadrons. Daily observations are made, and a report, deduced from these as well as other records sent in, is issued during the evening, which gives a forecast of the weather for the next day. In addition, pilots on descending from a flight report their experiences as regards the direction of the wind and the condition of the atmosphere—such reports being noted on the notice boards in the Officers' mess.

With a view to ascertaining what effect age may have on the speed qualities of an aeroplane, tests have been made on various machines in the squadrons to determine their speed ranges by flying them over a measured distance. The results of these experiments should prove highly interesting reading to constructors and others concerned with aeroplane maintenance—despite the influence of various important factors, and the fact that the slowest flying speed is so largely dependent upon the skill of the individual pilot—as at the present time little information is available as to the deterioration in performance, if any, but which probably does take place, in course of time. The results alone would, however, be of little value to our readers, as without some knowledge of the mileage flown and the treatment to which the machines have been subjected during their life, an entirely erroneous conception might be received as to the extent to which an aeroplane retains its capabilities in regard to speed. In addition, many machines, as is well known, have been largely rebuilt, and consequently their life cannot be regarded as in any way dating from the time they were originally purchased or taken into service.

So far the exercises have been remarkably free from grave mishaps. As is only to be expected in a camp of this character, where so much flying is daily indulged in, and in which the work is more or less of an experimental nature, some accidents are almost inevitable, especially as forced landings were necessary on several occasions. But it speaks volumes for the skill of the pilots and the excellence of their machines that in no case has there been any serious casualty, although more or less damage has been done to various parts of several of the machines. This is not without some benefit, as the necessary repairs and the transport of the machines provided excellent practice for these departments. The concentration, which commenced on June 2nd, closed on June 30th, and the squadrons were to disperse to their respective stations by the 2nd of July.



CONCENTRATION CAMP AT NETHERAVON.—A B.E. fitted with wireless equipment about to start on a cross-country flight.

Under the arrangements a "gasbag," which represented a derelict airship, took part in one of the special exercises which were reserved for the last two days of the camp, when the effectiveness of the aeroplane in this particular branch of reconnaissance was fully demonstrated. The balloon was sent up at Highworth, about eight miles from Swindon and about fifty miles from the camp, and the majority of the twenty-five machines of various types which were despatched to find it succeeded in their mission.

In conclusion, we may say that the work we have indicated as having been carried out during the Netheravon exercises can only be regarded as representative in the mass of what has been going on day by day as a simple matter of routine among the squadrons at their home bases. Naturally, it would not be politic to give more than a general idea of what that work consists of and of how it is carried out by the officers and men who compose that magnificent arm, the Royal Flying Corps. To praise them for their work and their entire devotion to duty would be as offensive to them as it would be pleasing to ourselves—and in these matters it is others that we must think of first of all. We will, therefore, simply content ourselves by saying that never was a motto better chosen than that of the R.F.C.—"Per Ardua ad Astra."

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Diary of Events.

July 11 ...	International Correspondence Schools Race, London–Paris–London. Hendon Aerodrome.
July 11 ...	Balloon Race. Hurlingham Club, Fulham, S.W.
Aug. 10–22	*Daily Mail* £5,000 Circuit of Britain Race. Starting from Southampton Water.
Aug. 22–29	Gordon-Bennett Eliminating Trials. Upavon, Salisbury Plain.
Sept. 19–28	Gordon-Bennett Aviation Race. Buc, France.

HENDON AERODROME.

Members of the Royal Aero Club are admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards. The Membership Card admits the Member only—motor cars must be paid for.

COMMITTEE MEETING.

A Meeting of the Committee was held on Tuesday, June 30th, 1914, when there were present:—The Marquess of Tullibardine, M.V.O., D.S.O., M.P., in the Chair, Mr. Ernest C. Bucknall, Mr. John D. Dunville, Prof. A. K. Huntington, Mr. Alec Ogilvie, Mr. C. F. Pollock, Mr. T. O. M. Sopwith, and the Secretary.

New Members.—The following new members were elected:—John Laurence Hall, Lieut. D. A. Oliver, R.N., Marc Pourpe, P. D. Thomas, and Walter Jack Wilson.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

813 John Lankester Parker (Vickers Biplane, Vickers School, Brooklands). June 18th, 1914.

814 Reginald Chambers (Bristol Biplane, Bristol School, Brooklands). June 18th, 1914.

815 Laurence Gresley (Bristol Biplane, Bristol School, Brooklands). June 19th, 1914.

816 Lieut. Bernard Edward Smythies, R.E. (Bristol Biplane, Bristol School, Brooklands). June 19th, 1914.

817 Lieut. Francis Hermann Eberli, R.G.A. (Vickers Biplane, Vickers School, Brooklands). June 24th, 1914.

818 Midshipman Geoffrey Cayley Lambert Dalley, R.N. (Wright Biplane, Beatty School, Hendon). June 24th, 1914.

819 Lieut. Leslie Fitzroy Richard, R.G.A. (Bristol Biplane, Bristol School, Brooklands). June 24th, 1914.

820 Lieut. Charles Nugent (Royal Berks Regiment) (Bristol Biplane, Bristol School, Brooklands). June 24th, 1914.

821 Capt. Henry Edward Charles Walcot (Bristol Biplane, Bristol School, Brooklands). June 24th, 1914.

822 Lieut. Gordon Shergold Creed (S.A. Defence Force) (Maurice Farman Biplane, Central Flying School, Upavon). June 24th, 1914.

823 Lieut. Basil Hobson Turner (S.A. Defence Force) (Maurice Farman Biplane, Central Flying School, Upavon). June 24th, 1914.

824 Sub-Lieut. Herbert Graham Wanklyn, R.N.R. (Maurice Farman Biplane, Central Flying School, Upavon). June 24th, 1914.

825 John Gordon Miller (Vickers Biplane, Vickers School, Brooklands). June 26th, 1914.

826 Ronald Stuart McGregor (Caudron Biplane, Caudron School, Hendon). June 26th, 1914.

Explosives Factory at Harty, Isle of Sheppey.—It was decided to oppose the application of Nobel's Explosives Co., Ltd., for a licence to erect an explosive factory at Harty, Isle of Sheppey, and Prof. A. K. Huntington was appointed to represent the Club at the hearing on the 6th inst. at the Sittingbourne Petty Sessions.

Accidents Investigation Committee.—On the motion of the Chairman, the report on the fatal accident to Capt. Cyril Percy Downer was unanimously adopted and ordered to be published *in extenso*.

(Full report will be found following these Notices).

***Daily Mail* Circuit of Britain Race.**—Letter from the Grahame-White Aviation Co., Ltd., asking for a postponement of the date of start, was read and the Secretary was instructed to ascertain the views of all competitors.

London–Paris–London Race.—Certain alterations in the regulations were made. (These alterations appear under the notices regarding this Race.)

Daily Mail £5,000 Circuit of Britain Race.

The entries for this race closed on June 30th last, and the following is a complete list of those received:—

Wm. Beardmore and Co., Ltd., London and Glasgow.
Biplane. 120 h.p. Beardmore Austro-Daimler. Pilot to be nominated.

Blackburn Aeroplane Co., Ltd., Leeds.
Blackburn Hydro-Biplane. 130 h.p. Dudbridge Salmson. Pilot: Mr. Sydney Pickles.

Eastbourne Aviation Co., Ltd., Eastbourne.
Tractor Biplane. 120 h.p. Green. Pilot: Mr. F. B. Fowler.

Grahame-White Aviation Co., Ltd., Hendon.
Grahame-White Biplane. 100 h.p. English *monosoupape* Gnome. Pilot to be nominated.

A. V. Roe and Co., Ltd., Manchester.
Roe Biplane. 150 h.p. Sunbeam. Pilot: F. P. Raynham.

Sopwith Aviation Co., Ltd., Kingston-on-Thames.

1. Sopwith Biplane. 150 h.p. Sunbeam. Pilot: Mr. C. Howard Pixton.
2. Sopwith Biplane. 100 h.p. English *monosoupape* Gnome. Pilot: Mr. H. G. Hawker.

White and Thompson, Ltd., Bognor.

1. Curtiss Biplane. Two 100 h.p. Curtiss. Pilot: Mr. A. Loftus Bryan.
2. Curtiss Biplane. 120 h.p. Beardmore Austro-Daimler. Pilot: Capt. Ernest C. Bass.

The Committee at its meeting on Tuesday last considered the question of postponing the start of the Race till Monday, August 10th. All the competitors having agreed to this postponement, it has now been arranged for the contest to be open from Monday, August 10th, till Saturday, August 22nd, 1914.

Full details regarding the Race will be announced next week.

International Correspondence Schools Race. London–Paris–London.

(*Under the Competition Rules of the Royal Aero Club.*)

Organised by the Royal Aero Club and the Aero-Club de France.

Starting and finishing at the Hendon Aerodrome, Hendon, N.W.

SATURDAY, JULY 11TH, 1914.

PRIZES.

Fastest Time...	1st Prize: £500. Presented by the International Correspondence Schools.
Handicap ...	1st Prize: £300. Presented by the Royal Aero Club. 2nd Prize: £150. Presented by the International Correspondence Schools. 3rd Prize: £50. Presented by the International Correspondence Schools.

The following are the entries:—

Grahame-White Aviation Co., Ltd.
Pilots: **Walter L. Brock.** Morane-Saulnier Monoplane. 80 h.p. Gnome.
R. H. Carr. Morane-Saulnier Monoplane. 80 h.p. Gnome.
(To be Nominated). Morane-Saulnier Monoplane. 80 h.p. Gnome.

Eugene Renaux (Pilot). Maurice Farman Biplane. 120 h.p. Renault.

John Carbery (Pilot). Bristol Biplane or Morane-Saulnier Monoplane. 80 h.p. Le Rhone.

Nieuport Company. Pilot: Probably **M. Bonnier.** Nieuport Monoplane.

Maxime Lenoir (Pilot). Ponnier Monoplane. 80 h.p. Gnome.

Deperdussin Company. Pilot: **A. Parmelin.** Deperdussin Monoplane. 80 h.p. *monosoupape* Gnome.

Martin and Handasyde. Pilot: **R. R. Skene.** Martinsyde Monoplane. 120 h.p. Austro-Daimler.

Thomas Elder Hearn (Pilot). Blériot Monoplane. 80 h.p. Gnome.

Aircraft Manufacturing Company. Pilot: **Pierre Verrier.** Farman Biplane.

The following alterations have been made to the Regulations:—

Order of Starting.—Competitors will be started in the order of their respective handicap times. The first competitor will start at 6.30 a.m., and other competitors at intervals of not less than 10 minutes.

Arrival in Paris.—The compulsory stop at the Buc Aerodrome has been extended to 2 hours.

The following are the officials at Hendon :—

Stewards—Col. H. C. L. Holden, C.B., F.R.S., Major F. Lindsay Lloyd.

Handicappers—Mr. J. H. Ledeboer, Mr. A. G. Reynolds, Marquis J. de Lareinty Tholozan.

Timekeeper—Mr. A. G. Reynolds. *Clerk of the Course*—Mr. J. H. Ledeboer.

Balloon Race at Hurlingham.

The Long-Distance Balloon Race for the Cup presented by Mr. A. Mortimer Singer was held at Hurlingham on Saturday last, and resulted in a win for Mrs. John Dunville in the "Banshee," piloted by Mr. John Dunville. The descent was made at Hythe, near Folkestone.

The next race, for the Hedges Butler Challenge Cup, will take place at Hurlingham on Saturday, July 11th, 1914.

Members will be admitted free to the Hurlingham Club on presentation of their Club Membership Cards.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

PUBLIC SAFETY AND ACCIDENTS INVESTIGATION COMMITTEE OF THE ROYAL AERO CLUB.

REPORT No. 24.

Report on the Fatal Accident to Capt. Cyril Percy Downer, when Flying at the Central Flying School, Upavon, on Tuesday, March 10th, 1914, at about 9.15 a.m.

Brief Description of the Accident.—Capt. C. P. Downer was flying a B.E. Biplane, No. 453, fitted with a 70 h.p. Renault engine, at the Central Flying School, Upavon, on Tuesday, March 10th, 1914, at about 9.15 a.m. It was the intention of the pilot to practise spiral descents, and he had reached a height of about 2,000 ft. From that height the aircraft was observed to descend in a steep spiral, the angle of descent being nearly vertical. After descending some 1,500 ft., and still about 500 ft. above the ground, the right wing collapsed upwards and a portion of the lower plane was observed to leave the aircraft. The aircraft then fell to the ground after making several turns and was completely wrecked. The pilot was killed.

Capt. Cyril Percy Downer (aged 36) was granted his Aviator's Certificate, No. 608, on August 29th, 1913, by the Royal Aero Club.

Report.—The Committee sat on Monday, March 30th, Tuesday, May 26th, and Tuesday, June 16th, 1914, and received the report of the Club's representative, who visited the scene of the accident within a short time of its occurrence, together with the evidence of eye-witnesses. The calculations of the design and results of tests carried to destruction on a similar aircraft were placed at the disposal of the Committee.

From the consideration of the evidence, the Committee regards the following facts as clearly established :—

1. The aircraft was built by Messrs. Vickers Ltd., in September, 1913.
2. The wind at the time of the accident was about 14 m.p.h.
3. Prior to the accident, the aircraft had been flown by another officer, who had found everything in good order.
4. An examination of the wrecked aircraft revealed the fact that the elevator planes were both bent downwards to the extent of several inches.
5. The control pillar was bent backwards.
6. The control wires were found to be intact.
7. A portion of the lower right wing was observed to leave the aircraft at a height of about 500 feet and was picked up about 25 yards away from the spot where the aircraft fell. A strut was also picked up some 40 yards away from the aircraft.
8. The aircraft was constructed in accordance with the official design and passed all the War Office tests.
9. The strength of the aircraft was up to the accepted standard.

Opinion.—The Committee is of opinion that the accident was solely due to the steep and protracted descent of the aircraft followed by an attempt, due to inexperience, to flatten out too suddenly when descending at an excessive speed, thus subjecting the aircraft to abnormal stresses and fracturing the wing.

The Committee is further of opinion that the bending of the elevator and control pillar was caused by the pilot's violent efforts to flatten out.

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FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—Monday, fine, one machine only was up, No. 154 D.W.F. Tuesday fine, 43 Bristol tractor.

Wednesday, Nos. 43 and 153 Bristol tractors, 3 Short, 10 Short tractor, 70 and 188 Maurice Farman, 49 B.E., 31 Henry Farman.

Thursday fine, Nos. 103 Sopwith, 43 and 153 Bristol tractors, 154 D.W.F., 50 B.E., 70 and 146 Maurice Farman, 3 and 66 Gun 'Bus Shorts. Sir Francis Hopwood, the Civil Lord inspected the School and afterwards had a flight with Com. Samson.

Friday fine, Nos. 70 Maurice Farman, 50 B.E., 150 Avro. Saturday fine, Nos. 21 Short tractor, Sub-Lieut. Fowles to Isle of Grain and back, 146 Maurice Farman, 43 Bristol tractor.

Civilian Flying.—Mr. Alec Ogilvie was out several times during the week on his Wright biplane, 50 h.p. N.E.C.

Mr. Leo Jezzi was out on Thursday and Saturday evenings and also made three fine flights on Sunday evening, two solo and one with passenger, on his 35 h.p. J.A.P., own make biplane. Mr. Gordon, with Mr. Fairey as passenger, on 80 h.p. Sociable biplane, testing before handing over to the Admiralty.

Brooklands Aerodrome.

Arrangements have been made for Mr. H. G. Hawker to give looping exhibitions on the 100 h.p. Sopwith Scout biplane every Sunday afternoon at Brooklands during the summer.

On Monday, last week, the Bristol and Blériot pupils were out. On Tuesday morning, Mr. Hawker to Farnborough on the 80 h.p. Sopwith Scout. In the afternoon, Mr. Goodden on 80 h.p. Morane, Mr. Gower on 50 h.p. Blériot, Mr. Goodden with Paul Gondre as passenger started for the North of England on the 80 h.p. Morane, Mr. Stutt on 50 h.p. Bristol, Mr. Knight on Vickers, Bristol, Vickers and Blériot pupils out, Mr. Alcock with Mr. Harold Lane as passenger to Hendon on 100 h.p. Sunbeam, Mr. Hawker solo and with passenger on 80 h.p. Sopwith.

Vickers, Blériot, and Bristol pupils out on Wednesday morning; in the afternoon Mr. Mahl across country on 80 Sopwith, Mr. Merriam with pupil on Bristol biplane, finishing with fine spiral landing, Mr. Gower across country on 50 Blériot, Mr. Hawker looping on the 100 Sopwith, Mr. Mahl with passengers and pupil, Mr. MacGordon, on 80 Sopwith. Vickers, Blériot, and Bristol pupils out. *Brevet* tests in good style by Lieuts. F. H. Eberli and L. F. Richards, Mr. C. Nugent, and Capt. Walcot, Mr. Gower across country on 50 Blériot, Thursday afternoon, and Mr. Hawker looping on 100 Sopwith.

Friday morning, Blériot, Vickers and Bristol pupils out. Brevet

Mr. R. H. Steinbach, who took his *brevet* at the Vickers Flying School, Brooklands, on June 6th.

tests in good style by Mr. J. G. Miller, altitude test, 2,500 ft.; in the afternoon, Mr. Gower on 50 Blériot, Mr. de Bolotoff taxying on his triplane, Mr. Glew on the Perry Beadle biplane, Mr. Wilberforce on 45 Anzani Blériot, Mr. Hawker, looping on 100 Sopwith, Mr. Mahl out on 80 Sopwith, Mr. MacGordon (pupil) solo circuits on 80 Sopwith.

On Saturday morning, Vickers, Blériot and Bristol pupils out. Mr. Barnwell on Vickers gun 'bus and Mr. Stutt on Bristol. Mr. Jack Alcock on 100 Sunbeam, and Mr. Wilberforce on the 45 Anzani-Blériot; in the afternoon Mr. Hawker gave two fine looping demonstrations, one during the motor racing and one after. In the June Aeroplane Handicap (9 miles) 12 started out of 15 entrants, the machines being of all types and varying in speed from a sober old biplane sailing round at about 35 m.p.h. to the latest Sopwith production, piloted by Mr. Hawker, who had previously been timed to cover at the rate of 111 m.p.h. on it. It was the finest race ever held at Brooklands; at one time no less than six machines were together in the small space between the pylon and the railway. Mr. Mahl deserves every credit for his fine win on the 80 h.p. two-seater Sopwith, only just beating Mr. Alcock on the 100 h.p. Sunbeam engined Maurice Farman biplane, who in his turn was closely pressed by Mr. Barnwell on the 100 h.p. Vickers gun 'bus. Mr. Webb on the 50 h.p. Vickers biplane retired in the first lap. The other finishers were:—Mr. Pixton, 80 h.p. Sopwith Scout, Mr. Hawker, 100 h.p. Sopwith Scout, Mr. E. Gower, 50 h.p. Blériot, Mr. V. Wilberforce, 45 h.p. Anzani-Blériot, Mr. A. Knight, 70 h.p. Vickers biplane, Mr. T. W. Elsdon, 50 h.p. Vickers biplane, and Messrs. F. W. Merriam and W. Stutt, 50 h.p. Bristol biplanes. The Perry Beadle biplane, on which Mr. F. Glew was hoping to do great things, was unfortunately rendered *hors de combat* overnight by a landing carriage mishap. Mr. Robin Skene, the new pilot of the Martinsyde monoplane, found at the last moment that his machine would not be finished in time, but he hopes to render a very good account of himself in the coming Hendon–Paris–Hendon race. After the race a number of passengers made flights over the surrounding country.

Fine exhibition flights were made on Sunday by Messrs. Hawker and Pixton on 80 h.p. Sopwith Scouts, Mr. Mahl on the 80 h.p. Sopwith two-seater, Mr. Dukinfield Jones (just back from Germany, where, with Mr. Kny, he has been visiting the D.F.W. works) and Mr. Jack Alcock on the 100 h.p. Sunbeam. Mr. MacGordon (pupil) was flying well solo on the 80 h.p. Sopwith two-seater. A number of passengers were taken up by Messrs. Alcock, Mahl and Dukinfield Jones. The winner of the ballot for the free passenger flight—Master Charles Addison Doughty, of 69, Onslow Gardens, London, S.W.—went up for a long flight with Mr. Jack Alcock on the 100 h.p. Sunbeam.

Blériot School.—Under the instruction of M. Jules Teulade: Straights or rolling on 25 and 28 h.p. Anzani-Blériots—Lieut. M. North, 1 hr. 30 mins.; Mr. R. Crick, 30 mins.; Mr. H. O'Haigh, 34 mins.; Mr. W. South, 9 mins.; Capt. de Villiers, 18 mins. Mr. Victor Wilberforce, 10 mins. at 1,000 ft. on 45 h.p. Anzani-Blériot. E. L. Gower, cross-country flights on 50 h.p. Gnome-Blériot, amounting to 2½ hours. Two new 35 h.p. Anzani-Blériots for school work are expected to be out next week.

Bristol School.—Monday, last week, passenger tuition to Mr. Adamson and Lieut. Nugent (2), after which the weather was too bad for further work.

Tuesday, passenger tuition to Mr. Godwin, Lieut. Coles (three flights each), Lieut. Britten, Mr. Treloar and Mr. Collins (two flights each). Solos by Lieut. Nugent (2), Mr. Charlesworth (2), Capt. Walcot (1), Lieut. Richard (2), Mr. Adamson (2), Mr. Treloar (1), and Mr. Rutledge (2).

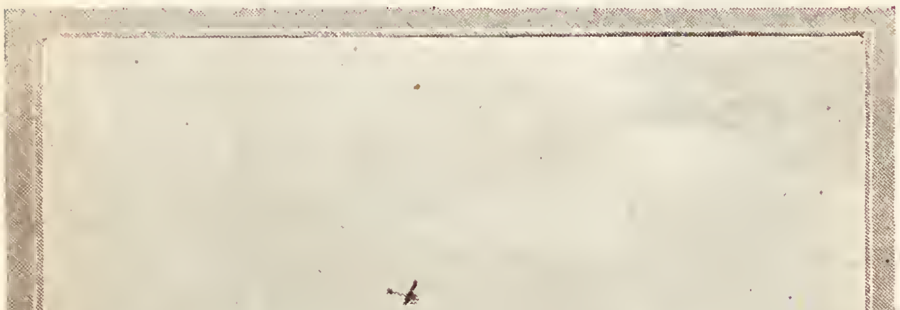


Photo by Miss R. Wallace Barr.

F. P. Raynham in flight at Scarborough on the *Daily Mail* Avro waterplane.

Wednesday, as passengers: Capt. Bernard, Mr. Charlesworth, Lieut. Britten, Lieut. Nugent, Mr. Godwin (7), Lieut. Coles (4), Mr. Collins (5). Solos by Lieut. Richard, Mr. Charlesworth, Lieut. Nugent (2 each), Mr. Adamson, Mr. Treloar, and Mr. Rutledge (3 each).

Thursday, no school work possible.

Friday, as passengers: Lieut. Coles (3), Mr. Collins (2), Mr. Godwin (4). Solos by Mr. Charlesworth, Mr. Adamson, Mr. Treloar, and Mr. Rutledge (2 each).

Saturday, passenger tuition to Lieut. Britten, Mr. Godwin (4), Mr. Collins (5), and Lieut. Coles (4). Solos by Mr. Adamson and Mr. Treloar.

Vickers School.—Tuesday, last week, with instructor: Capt. Kane, Lieuts. Clemson and Warrand—Lieut. Eberli solo.

Wednesday, with instructor: Capt. Kane, Lieuts. Warrand and Clemson. Mr. Miller solo. Lieuts. Eberli and Warrand and Capt. Kane solos. Lieut. Eberli took *brevet* in splendid style.

Friday, with instructor: Lieut. Clemson, Capt. Kane, Mr. Gordon Miller took *brevet* in excellent style. Capt. Kane and Lieut. Warrand solos.

Liverpool Aviation School, Waterloo.

On Friday, last week, Melly took out two-seater, now fitted with Isaacson engine, and circled Southport, a distance of 30 miles, in 36 min., attaining a height of 4,000 ft. in 17 mins. This is the highest this machine has yet been up to.

On Tuesday, Osborn Groves was out rolling, but did not attempt to hop owing to strong wind.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Messrs. Liu, Shepherd, Courtney straights with Instructors Barrs and Howarth. Mr. A. Boyesen solo circuits, figures of 8, &c., Mr. Upton (new pupil) rolling.

Tuesday, Messrs. Courtney, Liu, Shepherd straights with Instructor Howarth. Messrs. Robinson, Dunne and Boyesen solo circuits, &c. Mr. Upton rolling, and afterwards straights with Instructor Howarth.

Wednesday, Messrs. Palmer, Liu, Courtney, Wyles, Shepherd, Gruning and Upton straights with Instructors Howarth and Barrs. Messrs. North, Robinson, Lowe and Boyesen solo circuits.

Thursday, Messrs. Upton, Courtney, Wyles straights with Instructors Howarth and Lillywhite.

Friday, Messrs. Courtney, Liu, Shepherd straights with Instructor Howarth. Mr. Shepherd afterwards solo straights. Mr. Boyesen solo circuits, &c.

Saturday, Messrs. Upton, Liu, Courtney and Wyles straights with Instructor Howarth.

Beatty School.—During last week, pupils being instructed on dual control Wright biplanes with Instructors Baumann and W. Watts, Messrs. MacLachlan, 38 mins., Allen, 19, Bentley, 26, Hodgson, 32, Elverson, 10, Lieuts. Maguire, 50, Browning-Paterson, 29.

On Wednesday, Lieut. Geoffrey C. L. Dalley took his certificate in good style, he having joined the school on the 6th, and taking his certificate on the 24th.

British Caudron School.—On Monday, last week, the Caudron school was out at 5 a.m., under the instruction of W. T. Warren and R. Desoutter. Mr. Warren test flight, R. Desoutter flight. Mr. Abbott rolling and straights, getting in 1 hour's practice.

Tuesday, too windy for school, but Wednesday, school out at 5 a.m. W. T. Warren 15 mins. flight on 35 h.p. Caudron biplane. R. Desoutter two flights, each lasting about 10 mins.

Thursday, windy again and Friday, at 4.30 a.m. school out under the instruction of W. T. Warren and R. Desoutter. W. T. Warren and R. Desoutter test flight on 35 h.p. Caudron biplane. Mr. Macgregor doing several circuits and then going for his height test for finish of *brevet*, reaching to a height of 400 ft., and landing well.

School out Saturday at 5 a.m. W. T. Warren and R. Desoutter flight. Mrs. Buller two flights on 60 h.p. Caudron biplane. Mr. Abbott one hour on machine doing short flights.

Hall School.—Monday, last week, at 5 a.m., Mr. Clappen instructing, A. L. Brookes made three good circuits at a respectable altitude on No. 1 Caudron biplane.

Tuesday, gale; practice impossible. Wednesday, very windy. In evening, Miss Clifford made good circuits at 1,000 ft. on dual control Avro, two periods of 20 mins. each. Afterwards J. L. Hall flying on No. 1 Caudron was testing machine at high altitude. Roy Gibson doing hops on Anzani-Deperdussin monoplane.

Thursday, too windy in morning for practice. Friday, at 4 a.m. Henry Gearing and A. L. Brookes out on Caudron under Mr. Clappen.

Saturday, J. L. Hall exhibition flights, passenger carrying, and pylon racing on 50 Avro. Sunday. J. L. Hall exhibition flights and passenger carrying on Avro.

ROYAL NAVAL AIR SERVICE.

RE-ORGANISATION.

IN our last issue we reproduced the full text of the Memorandum setting forth the scheme for the re-organisation of the Naval Wing of the Royal Flying Corps. We also gave in full the first appendix. Below will be found the remaining appendices :—

APPENDIX II.

Regulations for the Special Entry of Officers into the Royal Naval Air Service.

The following regulations are for the admission of candidates from civil life into the Royal Naval Air Service for service for a limited number of years. As a general rule candidates for admission must not be more than 23 nor less than 19 years of age on date of application. Employment in the first instance will be for four years, after which period officers entered under these regulations will pass into the Reserve for a further period of four years' service, unless their term of active service is extended or renewed. On completion of the first year of their engagement they may, if considered suitable, be allowed to extend their original engagement to a total of 6 years' continuous service ; after 4 years' service to a total of 8 years ; and after 6 years' service to a total of 10 years ; or alternatively they may be permitted to renew their engagement on its completion in the ordinary course. The Admiralty reserve the right of offering further continuous service after 10 years, if their Lordships see fit to do so. In all cases active or continuous service will be followed by 4 years' service in the Reserve. The service will consist of employment in connection with any type of aircraft in any part of the world, either ashore or afloat. Candidates selected will be entered as Probationary Flight Sub-Lieutenants, Royal Navy, and will be granted commissions when duly qualified. Applications for admission should be made to the Secretary of the Admiralty, Whitehall, S.W. The form of application is to be filled in by the parent or guardian of the candidate, if he is not above the age of 21. These forms may be obtained from the Secretary of the Admiralty. Candidates must be of pure European descent, and the sons either of natural born or naturalised British subjects. In doubtful cases the burden of clear proof will rest upon the candidate. No nomination is required. Applicants who satisfy these conditions will be invited to appear before an Air Service Committee, who will interview each candidate, and examine credentials, which will have been furnished beforehand by the candidate. Details of the credentials required will be given in the application form referred to above. They will include reports from the headmaster of the last educational establishment the candidate attended, from persons under whose authority the candidate may have been during the preceding several years, or from persons who are well acquainted with the character of the candidate. The Committee will decide therefrom, on the suitability or otherwise of the candidate with regard to his abilities and general character, and will submit their recommendations to the Lords Commissioners of the Admiralty for decision. Candidates will be required to pass at the same time a medical examination according to the prescribed regulations as to their physical fitness for the Naval Air Service. Every candidate must be in good health and free from any physical defect of body, impediment of speech, defect of vision or hearing, and also from any predisposition to constitutional or hereditary disease or weakness of any kind, and be in all respects well developed and a good athlete. It should be particularly noted that full normal vision as determined by Snellen's test is required for candidates for the Naval Air Service. A memorandum is issued by the Admiralty which gives details of the physical requirements of candidates. The Committee will sit at least twice a year, generally in April and October. A list of selected candidates will be published by the Admiralty. Selected candidates may be required to obtain their Royal Aero Club pilot's certificate at a private school at their own expense. If required to do so the sum of £75 or such lesser sum expended by them in their tuition will be repaid them by the Admiralty on their obtaining their certificate. Such payment will not be made until after a reasonable period of probation, and will depend upon a satisfactory report being received from the Commanding Officer under whom the officer is serving. If a candidate is permitted to resign within four years of entry he may be required to refund this sum or part of it. Should a candidate fail to obtain his certificate within a reasonable time his name will be removed from the list. Candidates on appointment as Probationary Flight Sub-Lieutenants Royal Navy, will be appointed to undergo a course at one of the Royal Flying Corps Instructional Establishments. This course will last about four months, and will consist of practical and theoretical instruction in various branches of Air work. An examination will be held at the end of this course. The candidate, on completion of the school course, will be attached to an Air Station or Cruiser, and will be required to undergo an advanced course in seaplane work or airship work, during which time he will also receive instruction in naval matters, rifle and machine gun drill, seamanship and boat work, and other special subjects connected with the Naval Air Service. On satisfactorily completing the above courses, which will take about a year, officers will be promoted to rank of Flight Lieutenant. Probationary officers may be required to withdraw at at any time if in the opinion of the Lords Commissioners of the Admiralty (*a*) they fail to obtain a satisfactory standard ; (*b*) their conduct is unsatisfactory ; or (*c*) they are considered unsuitable for the Royal Naval Air Service. Parents or guardians of officers under the age of 21 must in all cases of permanent change of residence communicate the same to the Admiralty and to the Commanding Officer of the Naval Establishment in which their sons or wards are serving. Any officer who at any time is found to be unfitted for the duties of the Royal Naval Air Service will be liable to discharge to the Reserve or from the Service. This will not necessarily indicate that any blame is attributable to the officer. The special nature of the duties peculiar to the Air Service renders essential a very high standard of mental and physical fitness.

Reserve Service.—Officers not desirous of completing their active service may, at the discretion of the Admiralty, be permitted to transfer to the Reserve. Officers of the Royal Naval Air Service will be graded in one of the following ranks :—Flight Sub-Lieutenant with relative rank of Sub-Lieutenant, R.N. Flight Lieutenant as Lieutenant, R.N. Flight Commander as Lieutenant, R.N., over 4 years' seniority. Squadron Commander (when in command) as Lieutenant-Commander. Squadron Commander (when not in command) as Lieutenant over 4 years' seniority (but senior to all Flight Commanders). On attaining 8 years' seniority in the relative rank of Lieutenant these officers will rank with Lieutenant Commanders, R.N. Wing Commander with relative rank of Commander, R.N. Wing Captain as Captain R.N. The rates of pay for the various grades will be :—Flight Sub-Lieutenant, 10*s.* per diem. Flight Lieutenant, 12*s.* per diem, and 1*s.* per diem in addition for each year's service as Flight Lieutenant. (Max. 16*s.*) Flight Commander, 17*s.* per diem, and 2*s.* per diem in addition for each year's service as Flight Commander. (Max. 23*s.*) Squadron Commander, £1 5*s.* per diem. Wing Commander, £2 per diem. Wing Captain, £2 10*s.* per diem. Flying pay for Squadron Commanders, Flight Commanders, Flight Lieutenants, and Flight Sub-Lieutenants, 8*s.* per diem in addition to above rates. Whilst undergoing the first four months' course of their instruction officers will receive half Flying Pay at the above rate in addition to the pay of their flying rank. Whilst serving in the Royal Naval Air Service officers will rank and take command according to their grade and the date of their advancement to that grade. Officers entered direct from civil life under these regulations will be embarked in a ship of war at sea for a definite period in each year in order to identify them closely with the Royal Navy and for their general instruction. Their rates of pay will not be affected during these periods except that they will not receive Flying Pay. If at any time they are required to live in a military mess they will be granted a messing allowance of 2*s.* per diem in addition to their pay. This allowance will not be payable to Flight Sub-Lieutenants. If messing and accommodation is not provided for them officers will receive lodging and provision allowance in lieu as payable to officers of the Royal Navy. Whilst messed and accommodated they will be required to pay the same mess subscriptions, &c., as are paid by officers of the Royal Navy. Officers will be required to provide themselves with such uniform as is established for the Royal Naval Air Service. An outfit allowance of 40*l.* will be granted to officers entered under these regulations : 20*l.* of this sum will be paid on first entry and a subsequent 20*l.* after successful graduation at the termination of the four months' course at one of the Royal Flying Corps Instructional Establishments. During this course officers will only be required to provide themselves with a reduced kit. Officers who leave at their own request before the expiration of their first four years' service may be called upon to refund the whole or part of this sum. Any allowance for outfit paid in regard to service in the Naval Reserve Forces within three years previous to date of entering the Naval Air Service will be deducted from this sum. At the expiration of their active service officers will be eligible to receive a gratuity depending on the length of their service at the rate of 150*l.* for each completed year of service, including their probationary period. This gratuity will be paid to them on the expiration of their active service period. An officer retired at his own request, or for physical unfitness due to causes beyond his own control, may be awarded such gratuity as the Admiralty think fit, not exceeding 150*l.*, for each completed year of service (including probationary service). Officers of the Royal Naval Air Service injured whilst flying, either on duty or when undergoing a course of instruction at one of the Instructional Establishments, or privately with the permission of the Admiralty, will be eligible for pensions and gratuities under the same conditions and on the same scales as is the case of other officers of the Military Branch of the Royal Navy of their corresponding rank wounded in action. Officers injured on duty, but not while actually flying, will be treated as regards wounds, pensions and gratuities in the same manner as officers of corresponding rank in the Military Branch injured on duty, but not in action. The widows and children of officers dying whilst in the Royal Naval Air Service will, subject to the completion of the necessary period of commissioned service on the active list, be eligible for pensions and compassionate allowances under the same conditions and on the same scales as officers of corresponding rank in the Military Branch of the Royal Navy; but in the event of an officer's death being attributable to an injury sustained whilst flying, either on duty or when undergoing a course of instruction at one of the Instructional Establishments, *and* occurring within seven years of the date of such injury, the award of pensions, gratuities or compassionate allowances to the officer's widow and children or other relative will be made, irrespective of the length of service, under the conditions applicable to the case of officers of corresponding rank in the Military Branch of the Royal Navy killed in action. In the event of death resulting from an injury sustained on duty, but not whilst flying, any pensions and allowances awarded to dependent relatives will be on the scale and subject to the conditions laid down for officers of their corresponding rank in the Military Branch, whose deaths are attributable to injuries received on duty, but not in action. Probationary Flight Sub-Lieutenants will, if injured whilst flying, either on duty or when undergoing a course of instruction at any of the Instructional Establishments, or privately with the permission of the Admiralty, be eligible for pensions and gratuities under the same conditions and on the same scales as Sub-Lieutenants, Royal Navy, wounded in action, and in the event of death occurring as the result of such injury within seven years, pensions, &c., will be awarded to the officer's widow and children or other relative under the conditions applicable in the case of Sub-Lieutenants, Royal Navy, killed in action or dying of wounds received in action. Probationary Flight Sub-Lieutenants, if injured on duty but not whilst flying, will be awarded pensions and gratuities on the scales and subject to the conditions laid down for Sub-Lieutenants, Royal Navy, injured on duty, but not in action. In the event of death resulting from an injury sustained on duty but not whilst flying, any pensions and allowances awarded to dependent relatives will be on the scale and subject to the conditions laid down for Sub-Lieutenants, Royal Navy, whose deaths are attributable to injuries received on duty, but not in action. But in the event of a Probationary Flight Sub-Lieutenant dying during his period of probation from natural causes no pension or compassionate allowance will be granted to the widow, children, or other relatives of the officer.

APPENDIX III.

Conditions of Entry, Service, and Training for Civilians (Men).

1. Candidates are required to be between the ages of 18 and 30. The physical standard is as follows:—

Age.	Height.	Chest.
Under 22	5 ft. 3 ins.	34½ ins.
22 and under 23... ...	5 ,, 3 ,,	35 ,,
23 and over	5 ,, 3 ,,	35½ ,,

2. *Terms of Service.*—Men are required to engage for four years' active service, to be followed by four years in the Reserve. As a general principle a civilian entered as an Air Mechanic will not be advanced to Petty Officer Mechanic during his four years' service. Those men who are in all respects suitable may be advanced at the end of their four years' service, and given the opportunity of re-engaging for a second period of four years. Civilians who may enter as experienced artificers will commence as Chief Petty Officer Mechanics or Petty Officer Mechanics. As a general rule civilians entered under these regulations will not be allowed to remain for more than a second period of four years' active service, to be followed by four years in the Reserve. Extension of active service beyond this period will be for exceptional cases at the discretion of the Admiralty.

3. *Conditions of Service.*—All men selected will be liable to be detailed for any branch of the Royal Naval Air Service, *i.e.*, for Seaplane, Aeroplane, Airship, Seaplane Ship, or Kite work, &c., and will be liable for duty either afloat or ashore and at home or abroad. The selection of a man for service does not necessarily imply that he will be trained as a pilot. Men to be trained as pilots will be specially selected from those who have joined the Royal Naval Air Service. Any rating who is at any time found to be unfitted for the duties of the Royal Naval Air Service will be liable to discharge to the Reserve or from the Service. This will not necessarily imply that any blame is attributable to the man. The special nature of the duties peculiar to the Air Service renders essential a very high standard of mental and physical fitness.

4. *Qualifications.*—Candidates must have had experience in one or more of the following trades:—(*a*) General upkeep, construction, or repair of aircraft; erecting, trueing-up, &c. (*b*) Carpenter's work, joinery, cabinet-making, &c. (*c*) Boat-building. (*d*) Fabric work (airship or aeroplane). (*e*) Fitting, turning. (*f*) Care and maintenance and repair of petrol engines (*i.e.*, men who have served in petrol motor engineering works are eligible). (*g*) Coppersmith's work. (*h*) Electrician's work. (*i*) Cycle mechanic. (*k*) Motor driver. In certain cases men may be accepted who have not the above qualifications, but who are of more than average intelligence.

5. Candidates will be required to pass an examination in education, up to Standard 4, Elementary Education Code, and also an examination in their trade qualifications before selection.

6. Candidates for entry should apply to one of the following officers, by whom, if accepted (*see* para. 7) they will be provisionally entered:—The Commodores of the Royal Naval Barracks at Chatham, Portsmouth, Devonport; Royal Naval Recruiting Offices at Chatham, 3, Military Road; Devonport, New Passage Hill; Portsmouth, The Hard, Portsea; Stratford, London, 73, The Grove, Stratford, E.; The Station Officer at any Coast Guard Station; The Royal Marine Recruiting Officer at any of the following towns: Belfast, 44, Clifton Street; Birmingham, 257, Broad Street; Exeter, 9, Goldsmith Street; Bristol, 17, Bath Street; Glasgow, 392, Argyle Street; Liverpool, 20, Canning Place; London, 7, Whitehall Place, S.W.; Manchester, 289, Deansgate; Nottingham, 27, Derby Road; Southampton, 48, Bridge Road; York, 41, Tanner Row. Application should be made by letter in the first instance, giving references as to character and full particulars as regards trade experience. If the application is entertained, candidates will receive full instructions as to their subsequent procedure. A candidate who has been provisionally entered receives food or an allowance in lieu, and his travelling expenses are paid to the place of final examination. If rejected at such examination a free pass back to his place of entry is granted him. Before a candidate can be provisionally entered he must pass the prescribed medical examination, arrangements for which will be made by the Recruiting Officer.

7. Candidates whose applications for entry are considered satisfactory will be instructed to present themselves for examination at the Naval Depôt, Sheerness, on a selected date.

8. On satisfactorily passing the examination the candidates will be required to sign the prescribed form of engagement and will be given the rating of Air Mechanic, 2nd Grade. They will remain in the Naval Depôt to receive their kit and for a course of technical and disciplinary instruction lasting about three months. On completing this course satisfactorily they will be attached to one of the Naval Air Stations or to a ship connected with the Air Service. In special cases men who show considerable technical experience will be rated Chief Petty Officer Mechanic or Petty Officer Mechanic on entry.

9. Promotion to the higher grades will be by selection on vacancies occurring, candidates having passed a standard educational and professional test.

10. The various grades are as follows:—

General Branch.	Engine Branch.	Artisan Branch.	Relative Naval Rate.
C.P.O. Mechanic—	C.P.O. Mech. (E)	C.P.O. Mech. (C)	
2nd Grade ...	2nd Grade ...	2nd Grade ...	C.P.O.
3rd Grade ...	3rd Grade ...	3rd Grade ...	C.P.O.
P.O. Mechanic ...	P.O. Mech. (E) ...	P.O. Mech. (C) ...	P.O.
Leading Mechanic...	Leading Mech. (E)	Leading Mech. (C)	Leading Seaman
Air Mechanic—	Air Mech. (E)—	Air Mech. (C)—	
1st Grade ...	1st Grade ...	1st Grade ...	A.B.
2nd Grade ...	2nd Grade ...	2nd Grade ...	A.B.

Ratings will be selected to join one or other of these branches in accordance with their attainments and qualifications. Ratings will rank and take command within the Royal Naval Air Service according to their grade and their seniority in that grade.

11. The rates of pay of the various grades will be as follows:—Chief Petty Officer, Mechanic, 2nd Grade 9*s.* per diem, 3rd Grade 7*s.*; Petty Officer, Mechanic, 6*s.*; Leading Mechanic, 5*s.*; Air Mechanic, 1st Grade 4*s.*, 2nd Grade 2*s.* Whilst under instruction as Pilot 1*s.* per diem flying pay will be paid in addition to these rates. Ratings qualified and employed as pilots of airships

will receive Airship Coxswain allowance at the rate of 4*s.* per diem continuously whilst so employed. Ratings qualified and employed as crews of airships will receive flying pay at the rate of 2*s.* per diem continuously whilst so employed. These airship allowances will be applicable to the permanent crews of any large "heavier than air" craft. Ratings who qualify for pilots will be eligible from the date of qualification for additional pay at the rate of 4*s.* per diem for first-class flying certificates, and 2*s.* per diem for second-class flying certificates. Men will be allowed to hold second-class flying-certificates for 12 months only. If they have not then qualified for a first-class certificate, it will be considered whether their second-class certificate should be retained. All ratings will receive good-conduct badges under the present naval regulations, and will receive additional pay at the rate of 1*d.* per diem for each badge that they possess.

12. As regards rations and accommodation, men will receive the same treatment as naval ratings, *i.e.*, they will be provided with quarters and rations, or if these are not provided they will be entitled to an allowance in lieu.

13. Free medical attendance is provided. When hurt or sick, pay is continued, according to the Naval Regulations.

14. On entry, a free kit will be provided. Men will be required subsequently to maintain this uniform at their own expense, as is the case with other naval ratings.

15. Men invalided for injury received during employment in the Air Service will be awarded pensions, either temporary or permanent, at the rates prescribed in the Naval Regulations for men discharged on account of wounds or hurts sustained in action. These rates vary from 6*d.* to 2*s.* per diem (with additions for Petty Officer Service, &c.) according to the nature of the injury and the degree of incapacity arising from it; or, at the discretion of the Admiralty, gratuities may be awarded in lieu. In the event of death occurring within seven years of such injury, and in consequence of it, widows or children will be eligible for pensions and allowances under the conditions laid down for men killed in action, or dying from wounds received in action, or discharged for wounds received in action. The amount of widows' pensions varies from 5*s.* to 9*s.* per week, and the allowance of each child dependent on the mother from 1*s.* 6*d.* to 2*s.* per week. The detailed conditions are as laid down in the King's Regulations and Admiralty Instructions.

16. The Royal Naval Air Service will generally be administered upon the same lines as the Royal Navy, and all members of it will be borne on the books of one of H.M. ships in commission and will be subject to the Naval Discipline Act.

Scheme of Training of Civilians (Men).

17. The preliminary training of men directly entered from civil life will be conducted at the Naval Depôt, Sheerness, and not at the Royal Naval Air Stations. Classes will be formed and will be passed through a progressive programme which will change every fortnight. The course will last three months, and will thus be divided into six periods of a fortnight. Men selected for airships will be formed into separate classes to those for seaplanes, &c. The preliminary and disciplinary training will, however, be the same for all classes. Men entered direct as Chief Petty Officer Mechanics or Petty Officer Mechanics will also be formed into separate classes. The first six weeks' training will be entirely conducted at the Naval Depôt. After this six weeks' instruction the seaplane classes will be sent daily to the Naval Flying School, Eastchurch, or to the Isle of Grain Air Station for practical instruction. The airship classes will be drafted to the Airship Training Station for this portion of their training. The three months' instruction will conclude with a general examination.

Subjects of Instruction.

The following will be the subjects of instruction and the general syllabus:—

By Lecture.—Principles of internal combustion engines. Principles of flight. Different types of aircraft. First aid. Materiel, strength, &c.

Practical Instruction (Technical).—*a.* Care and maintenance of engines. *b.* Stripping, assembling, and adjustments of types of engines in use in aircraft at the present time. *c.* Adjustments and repairs to aircraft. *d.* Care and maintenance of aircraft. *e.* Method of handling. *f.* Knots and small wire splicing. *g.* Metric system of measurement. *h.* Elementary knowledge of engineering terms, drawings, use of tools, &c. *j.* Names of various parts of machines. *k.* Repair of floats.

Naval Instruction.—*a.* Principles of naval discipline. *b.* Drill and physical drill. *c.* Pistol practice. *d.* Signalling, Morse and semaphore (selected men showing aptitude to undergo a higher course in Morse and elementary principles of wireless sufficient to enable them to be used as mechanic signalmen whilst passengers in aircraft). *e.* Use of the compass. *f.* Swimming. *g.* Boatwork.

Typical Programme of Instruction.

1st fortnight: Before breakfast, physical drill; forenoon, drill and technical instruction or lecture; p.m., drill and technical instruction. 2nd fortnight: Before breakfast, physical drill; forenoon, pistol practice and drill; p.m., technical instruction. 3rd fortnight: Before breakfast, physical drill; forenoon, lecture and technical instruction; p.m., drill and technical instruction. 4th fortnight: Airship classes to Airship Training Base for practical instruction. Other classes: Before breakfast, physical drill; forenoon, lecture and technical instruction; p.m., to Grain or Eastchurch for practical instruction. 5th and 6th fortnights, ditto.

APPENDIX IV.

General Conditions as regards Selection and Advancement of Ratings.

It is not intended that ratings drawn from the Fleet should sever their connection with the general naval service, and for this reason a close connection will be maintained between advancement in naval rating and advancement to a higher grade in the Royal Naval Air Service. As a general principle ratings will return to the Fleet on the completion of four years in the Royal Naval Air Service, and will not be eligible for re-selection for at least two years. It is desirable that during this period they should so far as practicable pass such examinations as may be necessary to qualify them for advancement in their naval rating. The following principles will be adopted as regards the selections of various ratings:—

Seamen.—Will be required to have at least one year's seagoing service as Able Seaman. It is desirable that they should have passed the examination for advancement to Leading Seaman. No men holding a higher non-substantive rating than S.G. or S.T. will be eligible for selection.

Engine-room Ratings.—Stokers will be required to be Stokers First Class, and to have passed through the Auxiliary Machinery Course. Men selected for the Air Service will be eligible for the three months' mechanical training course on reverting to the Fleet if recommended by the Inspecting Captain of Aircraft. Engine-room Artificers will be required to possess the necessary certificates to qualify them for advancement to Engine Room Artificer, 3rd Class. Mechanicians will be eligible for selection after obtaining confirmation in their rank.

Telegraphists.—Will be required to have one year's service as Telegraphist. Service in the Royal Naval Air Service will count for the second year's service required for advancement. They will revert to the Fleet when they are rated Leading Telegraphist, and will be eligible for re-selection as P.O. Telegraphist.

Signalmen.—Will be required to have one year's sea service as Signalmen.

Marines.—Will be required to have one year's service afloat as private. The Regulations in regard to Advancement of Royal Marines serving in the Royal Naval Air Service are under consideration.

Electrical Artificers.—Will be required to possess the necessary certificates to qualify them for advancement to Electrical Artificers, 3rd Class.

Armourers and Armourers' Mates.—Will be eligible for selection at any period of their service, and will revert to the Fleet after four years' service, and will qualify for advancement in the ordinary manner.

Carpenter Ratings.—Carpenters' crews will be eligible for selection after one year's sea service. Shipwrights will be eligible for selection on advancement to Shipwright, 2nd Class. The following principles will be adopted in regard to advancement:—1. Advancement in naval rating will in all cases be made by the commodores of the depôts, and will be dependent on position on the rosters and the possession of full qualifications for such advancement. Advancement in Air Service grades will be regulated by the Air Department independently of the port divisions. 2. Arrangements will be made for those who, whilst in the Air Service, apply to pass for higher naval rating and who possess the qualifying service to attend at one of the naval centres (Appendix X, Part XVII., K.R. and A.I., Vol. II.), or on board ship as the case may require. 3. The recommendation of the Inspecting Captain of Aircraft will be counted as a seagoing recommendation in all respects. 4. During service in the Fleet, ratings who have been graded in the Royal Naval Air Service will revert in all respects to their naval rating of the Sea Service. 5. When men of Seamen class below the rating of Petty Officer who have been graded revert to the Fleet, they will hold the non-substantive rating "A" until they have qualified or requalified as S.G. or S.T. In no case will this non-substantive rating "A" be allowed for more than two years from the date of reversion to the Fleet. This will carry with it non-substantive pay at the rate of 3*d.* per diem. This non-substantive rating will not be granted to men who revert to the Fleet for misconduct, unsuitability, or at their own request. In reverting to the Fleet these ratings will, if recommended, be given an opportunity to qualify or requalify as S.G. or S.T. During their service afloat they will be eligible for selection to qualify for higher "G" or "T" ratings, but such qualification will debar them from returning to the Royal Naval Air Service. Except in regard to qualifying courses ratings on reverting to the Fleet will usually be drafted to sea service. 6. In exceptional cases a man may be allowed to remain without reverting to the Fleet after his first four years' service, and he will then be eligible for advancement in Acting Air Service Grades as vacancies occur. He will not, however, receive any advancement in naval rating for which he has not fully qualified, and to which he is not entitled to by his position on the depôt roster, and if he is at any time required to revert to the Fleet he will resume his naval rating in all respects. This option will, as a general rule, only be granted to those men whom it is desired to retain permanently in the Royal Naval Air Service. 7. In considering men for re-selection after their service in the Fleet preference will be given to those ratings who have qualified for advancement to Petty Officer in their Naval Rating. Men so qualified may be advanced to the grade of Acting Petty Officer Mechanic as vacancies occur, but will not be confirmed in this grade until they have been advanced to Petty Officer in their Naval Rating. 8. As a general principle Leading Rates and below will not be advanced beyond the grade of Leading Mechanic during their first four years' service in the Royal Naval Air Service. 9. All grades in the Royal Naval Air Service are liable to be taken away for misconduct or incompetence under the present Naval regulations for disrating. As a general principle a reduction in grade for misconduct will be accompanied by a corresponding reduction in Naval Rating. 10. For all purposes of naval pensions the Naval Rating and the Air Service grade will be taken into account, the men being given the benefit of the higher rating for pension purposes. 11. It is recognised that this scheme will take some time to establish in working order, particularly as regards the higher ratings, and it has, therefore, been decided as a temporary measure to establish the following methods of obtaining Petty Officers:—(i) To select Petty Officers who may volunteer from the general Naval Service. Petty Officers who have had no previous Air Service Experience will only be taken until time renders it practicable to establish this system of re-selection. They will be graded Petty Officer Mechanics. (ii) To advance to an acting naval rating those men who have been pioneers in the Royal Naval Air Service, irrespective of their seagoing qualifications, on the understanding that they are required for permanent retention in the Air Service, and that if they subsequently desire to return to or are sent back to the Fleet, they will be required to qualify for their naval rating. If they fail to qualify educationally and professionally within one year they will revert to their former naval rating. If they qualify, they will receive special consideration as regards confirmation in their naval rating. All men so rated will be eligible for advancement in the Royal Naval Air Service grade as vacancies occur. A suitable notation will be made on their service certificates to show the conditions which they have accepted.

12. *Civilians.*—To maintain the relative equality between the naval ratings and the civilian direct entries, it will be a general principle that a civilian entered as an Air Mechanic will not be advanced to Petty Officer Mechanic during his first four years' service. Those men who are in all respects suitable will be given an opportunity of re-engaging for a second period of four years, and will then be eligible for selection for advancement to Petty Officer Mechanic to fill vacancies. Civilians who may enter as experienced artificers will commence as Chief Petty Officer Mechanic or Petty Officer Mechanic. As a general principle civilian ratings will not be allowed to remain for more than a second period of four years' active service, to be followed by four years in the Reserve, *i.e.*, 12 years in all. Extension of active service will only be allowed in exceptional cases at the discretion of the Admiralty.

FLYING AT HENDON.

ALTHOUGH it was fine and sunny on Thursday afternoon of last week, a stiff wind prevented much flying from being done. A. E. Barrs, R. J. Lillywhite and Louis Noel, however, put up several exhibition and passenger flights. The first up was Lillywhite on the 50 h.p. G.-W. bi-rudder 'bus, Noel following shortly after on the 70 h.p. Maurice Farman. Both pilots made their other flights on these respective machines, whilst Barrs piloted Lillywhite's machine.

Last Saturday's flying opened shortly after 2.30 p.m. with a flight by R. J. Lillywhite on the 50 h.p. G.-W. bi-rudder 'bus, the principal feature of which was a *finale* of spirals. The next flights were made by W. Birchenough on the 70 h.p. Maurice Farman, and A. E. Barrs on the 80 h.p. Blériot, both with passengers. Later

Louis Noel, who on Saturday put up a new speed record for Hendon Aerodrome, receiving from the donor the miniature replica, as consolation prize, of the handsome cup seen on the table, presented by Mrs. Manio for competition, and secured by R. H. Carr on June 13th, in the cross-country race.

on four pilots went up one after the other, P. Bjorklund on his 50 h.p. Blériot, Lillywhite the 80 h.p. Blériot, Louis Noel on the Maurice Farman, and Barrs on the G.-W. 'bus No. 107. Bjorklund ascended to an altitude of several thousand feet, and Noel executed some of his remarkable switchbacks. Three more flyers then came out, these being P. Verrier with a passenger on the 70 h.p. Aircraft-Maurice Farman, J. L. Hall on his 50 h.p. Avro, and E. Baumann on the 50 h.p. Gyro-Wright. Three passengers were then taken up by Noel on the 80 h.p. Blériot, Birchenough on the Maurice Farman, and Lillywhite on the bi-rudder 'bus. The canvas screen which has been erected by the Grahame-White Co. alongside the railway with the idea of preventing the numerous "hedge tickets" that gather on Hendon Hill from seeing into the aerodrome, was carried away, either by a desire also to fly, or by the wind, for a portion of it made a short flight.

After having suffered several postponements due to bad weather, the speed contest for the "Shell" Trophy was then flown off. It was not, however, until the final heat had been completed that Mr. J. Cates—representing "Shell"—assumed a less anxious look. The first heat of four laps was made up of the following: N. Howarth on the bi-rudder 'bus (2 mins. 22 secs.); W. Birchenough on the Maurice Farman (1 min. 35 secs.); A. E. Barrs with a passenger on the 80 h.p. Blériot (27 secs.); and Louis Noel on a new 80 h.p. Gnome-Morane-Saulnier built at the G.-W. works (scratch). Noel's new Morane developed a remarkable turn of speed and brought him in an easy first, Birchenough coming in second 14 seconds after; Barrs was third, 4 seconds behind Birchenough. Four also started in the second heat (4 laps) as follows: E. Baumann on the 50 h.p. Gyro-Wright (2 mins. 10 secs.); R. J. Lillywhite on the bi-rudder 'bus (1 min. 12 secs.); J. L. Hall on the 50 h.p. Avro (12 secs.), and P. Verrier on the 70 h.p. Maurice Farman (scratch). Hall and Verrier both flew an excellent course, and came in first and second respectively with 20 secs. between them. Verrier passed Baumann at the last moment, and was only ⅗ secs. in front of the latter. Lillywhite suffered from engine trouble, and came in last 4⅖ secs. after Baumann. The final heat was over eight laps, and the starters were: Birchenough (3 mins. 23 secs.), Verrier (2 mins. 57 secs.), Hall (2 min. 31 secs.), and Noel (scratch). In this heat Noel simply romped home, and by the time he had completed his eighth lap he was nearly a lap in front of the others. He thought, however, that he was behind instead of in front, and so completed another lap, hoping to catch the others up, and in this he was successful, for as they completed their eighth lap he crossed the line just in front of Birchenough, who was fourth. The second man, Verrier, was 55 secs. behind Noel, and 11 secs. in front of Hall, 4 secs. separating the latter and Birchenough. Incidentally Noel beat the aerodrome speed record, formerly held by F. P. Raynham on the 80 h.p. Avro biplane, for his average speed was 73·4 m.p.h. In between the first and second heats, Noel took up two ladies on the Maurice Farman—one at a time—whilst Lillywhite also took up a lady on the bi-rudder 'bus, and Bjorklund made another flight on his Blériot. A few more flights were made after the final heat before the proceedings were brought to a close, the flyers being Bjorklund on the Blériot, Baumann on the 50 h.p. Gyro-Wright, Watts on the 40 h.p. Wright (Wright engine), Noel on the Maurice Farman, Verrier on a similar machine up very high, F. G. Dunn on the bi-rudder 'bus—his first exhibition flight—Barrs with a passenger on the 80 h.p. Blériot, and N. Howarth on a new mount for him, the Maurice Farman.

"Flight" Copyright.

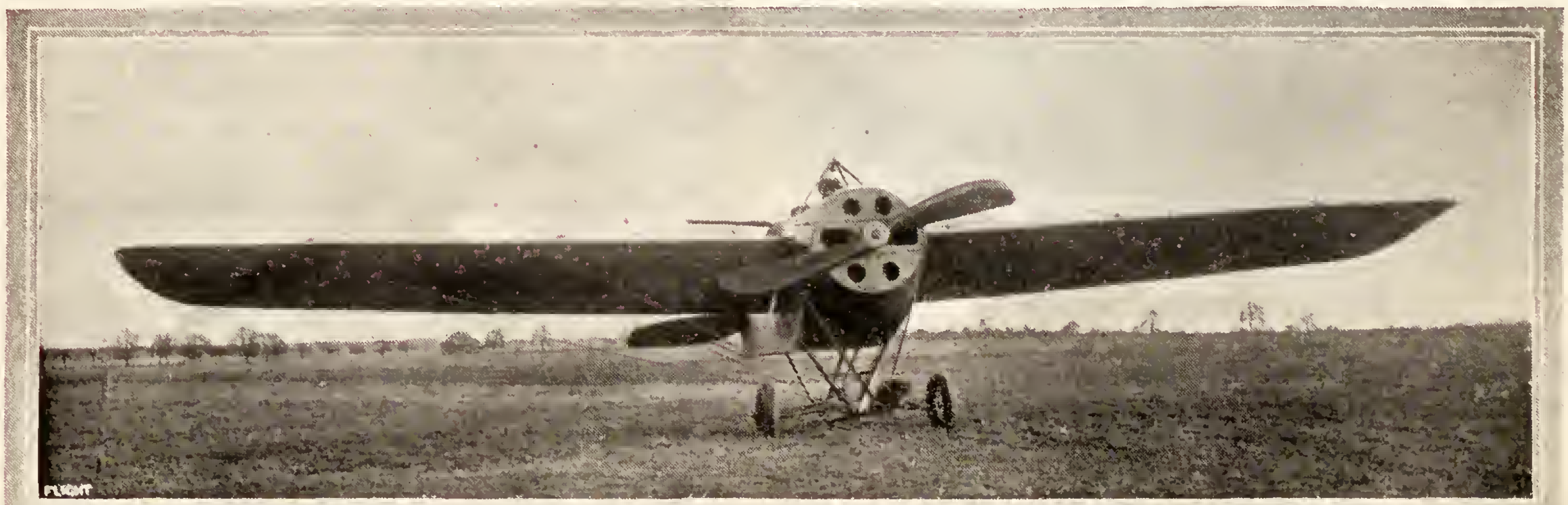
Louis Noel, on the 80 h.p. Morane-Saulnier, after having finished first in the final heat of the speed handicap at Hendon last Saturday, completing an extra lap whilst the other competitors are finishing the heat.

Final Heat (8 Laps) of Speed Handicap for "Shell" Trophy and 50 Guineas.

		Handicap.	Handicap Time.
		m. s.	m. s.
1.	Louis Noel (80 h.p. Morane-Saulnier monoplane)	scratch	12 31
2.	P. Verrier (70 h.p. Maurice Farman biplane)	2 57	13 26
3.	J. L. Hall (50 h.p. Avro biplane)	2 31	13 27
4.	W. Birchenough (70 h.p. M. Farman biplane)	3 23	13 40

A very successful meeting was held the next afternoon, Sunday, there being plenty of sunshine, visitors and flying. The first up was R. J. Lillywhite on the 80 h.p. Blériot, and Louis Noel made some very fine flights on the new 80 h.p. Morane-Saulnier. Pierre Verrier took up many passengers and played all sorts of tricks on the 70 h.p. Aircraft-Maurice Farman, whilst W. Birchenough was busy with passengers on the G.-W. Maurice Farman. Other flyers out during the afternoon were J. L. Hall on his 50 h.p. Avro, A. E. Barrs with passengers on the Blériot, and N. Howarth on the G.-W. 'bus.

* * * *



THE ARMOURED NIEUPORT MONOPLANE WHICH HAS DONE SO WELL DURING ITS TRIALS.—**This machine is covered in front with special nickel-steel armour plate of 3 mm. thickness. The chief characteristics are: Span, 40 ft. 6 ins.; length 26 ft. 6 ins.; area, 251 sq. ft.; weight, empty, 1,433 lbs.; useful load includes pilot, gunner, gun and ammunition with petrol for 2 hours; engine, 160 h.p. Gnome; diameter of propeller, 8 ft. 9 ins.; speed with full load, 74·5 m.p.h.; climbing 1,640 ft. in 7 mins.; starting after run of 328 ft.; alighting and stopping after run of 262 ft.**

EDDIES.

A long row of masts erected at the Hendon aerodrome in the vicinity of No. 2 pylon, near the railway, has aroused considerable curiosity among visitors to the flying ground, some hazarding the suggestion that a wireless station was in the course of erection, whilst others maintained that it was the commencement of an attempt to provide the aerodrome with a screen high enough to exclude the wind and thus ensure absolutely calm air for the speed races round the pylons. The purpose of the masts became evident, however, when the canvas strips were hoisted, as seen in our photograph, since it was then realised that the canvas very effectively hid the hill from view, by old Hendon Church. It is no uncommon sight for this field on race days to be black with people who, for the modest sum of threepence, obtain an excellent view of the aerodrome. The canvas screen, whilst not of course extending sufficiently high to prevent people from seeing the machines when in the air, prevents them from witnessing the start and finish of a race, and also the greater part of the course round the pylons, so that it would appear the "deadheads of the hill" will have to sport another threepence and go down to the proper enclosure within the aerodrome.

This is not a huge triplane, but the new "screen" protecting the Hendon Aerodrome from the spying eyes of the "hill deadheads."

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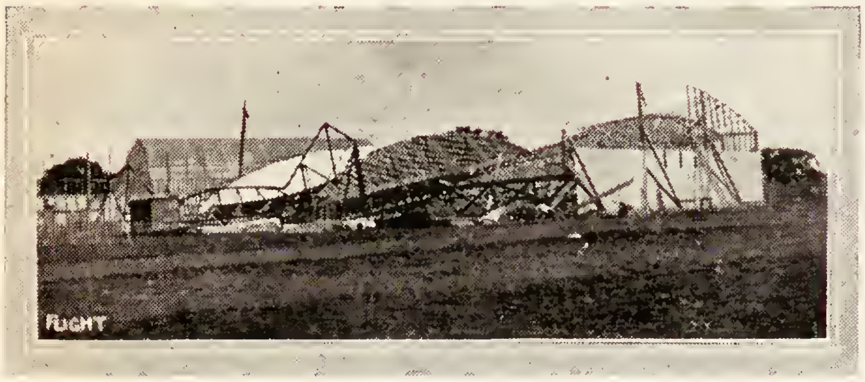
It is evident that not only does the design of large size machines present problems for the aeroplane designer, but that constructors of sheds in which to house them are also "up against it." The Grahame-White Aviation Co. were having a large hangar erected, the dimensions of which were 200 ft. by 100 ft. As this hangar was intended to house a very large machine, (a trans-Atlantic 'bus it is rumoured) all central supports of the roof had been dispensed with, but before the building was finished the whole thing collapsed. Fortunately nobody was hurt and, moreover, as the Grahame-White Co. did not build the shed themselves, beyond the consequent delay, they are never one penny the worse for the mishap.



The collapsed hangar at Hendon.

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The other day when travelling on the Tube, I happened next to a passenger who was deeply absorbed in the study of a copy of Flight. We had stopped at Hampstead, and the starting bells were tinkling along the train. Just as the conductor on the first car gave the all clear signal, my neighbour looked up and seeing the name of the station he made for the door, but too late! He had to proceed to Golders Green. My modesty prevents me from saying what page of Flight he was reading.

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A friend of mine related the following amusing incident the other day: His radiator has a nasty knack of leaking, and so as a precaution he usually carries an extra supply of water for replenishment. Leaving his car for a few minutes some time ago he noticed on returning to it that the petrol tin in which he carried his extra supply of water had been shifted. On examining the tin he found it empty. After driving along a short distance he overtook another car that had stopped. My friend also stopped and inquired what the trouble was, and was greatly amused when the driver of the other car replied: "Some blithering idiot has put water in my petrol tank."

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The Perry Beadle tractor biplane was taken out for a few short flights on Friday last and appeared to behave very well indeed, the pilot doing short banked turns. Unfortunately a wheel buckled on alighting and let the machine down on her skids, with the result that she turned completely over. With the exception of a broken propeller, surprisingly little damage was done, and the machine is expected to be out again in a few days.

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I see that a German pilot has established a new world's record for duration by flying for 21 hrs. 49 mins. on an Albatros military biplane. The name of the pilot is given as Herr Landmann, but it seems to me that his truly is a misnomer—it surely ought to have been Herr Air-mann.

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Mr. C. Kny has now returned from his recent trip to Germany, and as a result from his visit three D.F.W. machines will arrive at Brooklands shortly. One is a military all-steel biplane which is credited with a climbing capability of 1,000 ft. per min. with full military load. The second machine is a fast military-type biplane which is very stable, whilst the third is a scout of the Arrow type. Each of these machines will be fitted with 120 h.p. Beardmore-Austro-Daimler engines, British built of course. In the hands of such capable pilots as Lieut. Collett (late R.N.) and Mr. Dukinfield Jones, these new D.F.W. biplanes should put in some fine work.

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I had a chat with Mr. Dukinfield Jones the other day after his return from Germany, where he has spent some time at various aerodromes and aeroplane factories. Mr. Jones is very enthusiastic over the excellent works in which the D.F.W. machines are built. The works are so arranged, that the raw materials enter the stores and shops at one end of the buildings, and the complete machines emerge from the other end, which faces the hangars situated a short distance away. These hangars are fitted with doors both ends, and the machines arriving from the works enter the hangars at the back, and are wheeled out on to the flying ground through the front doors, which all run on trolleys. In addition to the splendidly organised factory, there are spacious suites of offices and numerous club rooms for pilots, civilian pupils, officer pupils, sapper pupils, &c. Mr. Jones was very impressed with the military precision with which the school work is carried out. For instance, when the afternoon flying commences at 5 o'clock all doors are swung open and the machines are wheeled out. The instructors are all there and each machine is looked after by two mechanics. The pupils are then put through the various practices according to the degree of proficiency they have attained. Progress at the school is very fast as the 75 h.p. school machines are particularly easy to handle. Mr. Jones is looking forward to the arrival of the new machines at Brooklands, as he is very anxious to see what he can do on a really fast machine.

Mr. Noel just "off" on his Morane at Hendon.

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The James brothers, who, it will be remembered, got their ticket at the Caudron School at Hendon, and who have been doing a considerable amount of flying in Wales on a machine of their own make, are now in a position to commercially manufacture their machines, and have established an aeroplane factory at Narberth, their home town. They can thus claim to have established the first Welsh aeroplane factory. I feel sure that our readers will join me in wishing them every success in the venture.

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It is a sure sign that Marcus D. Manton is beginning to acquire fame by his flying, for he has now been added to the list of pilots who are popularly supposed to be dying of consumption. Judging from appearances, however, I don't think anybody could accuse him of being after the fading away stakes.

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It was indeed a narrow escape which Mr. Hawker had the other day at Brooklands, when he fell from a height of over 1,000 ft. in his Sopwith biplane. According to eye-witnesses, Hawker had just made a loop with his engine shut off, in order to make the loop as slowly as possible. On reaching the top of the curve, the machine appeared to stop, or at least hesitate for a moment, and then fell out of the inverted position sideways. After dropping nose first, whilst spinning round its longitudinal axis, the machine appeared to flatten out when a couple of hundred feet from the ground, but was then seen to dive again and disappear behind the trees. Everybody thought that the worst had happened, but when the spot where the machine had fallen was reached by those who had rushed from the aerodrome, Hawker had already gone off on the carrier of a motor cycle. It appears that the machine had flattened out just before reaching the ground, and had charged into the top of a tree, where it hung a few precious moments before dropping to the ground. Hawker was practically unhurt, and on Sunday (the next day) he was flying again!

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Considerable enthusiasm was aroused "down south" the other day by an aeroplane *v.* motor car race from the Brighton–Shoreham aerodrome to Worthing Pier and back, a distance of nine miles. Mr. Cecil Pashley was the pilot of the aeroplane, while Capt. Tyrer was at the wheel of a 15-20 h.p. car. Both started from the aerodrome at 6.55 p.m., but Mr. Pashley was handicapped on the outward journey by a strong head wind, and as a matter of fact he was only half way to the pier by the time Capt. Tyrer had reached the turning point. On the return trip, however, the tables were turned, Mr. Pashley having the advantage of the following wind, and he just romped home over the 4½ miles in under 4 mins., so that he was an easy winner with 4 mins. to spare. Mr. Pashley's time for the complete course was 14 mins., while Captain Tyrer took 18 mins. By the way, I understand that at one of the forthcoming meetings which are being arranged at this aerodrome the British Petroleum Co. (Shell) will offer a valuable trophy.

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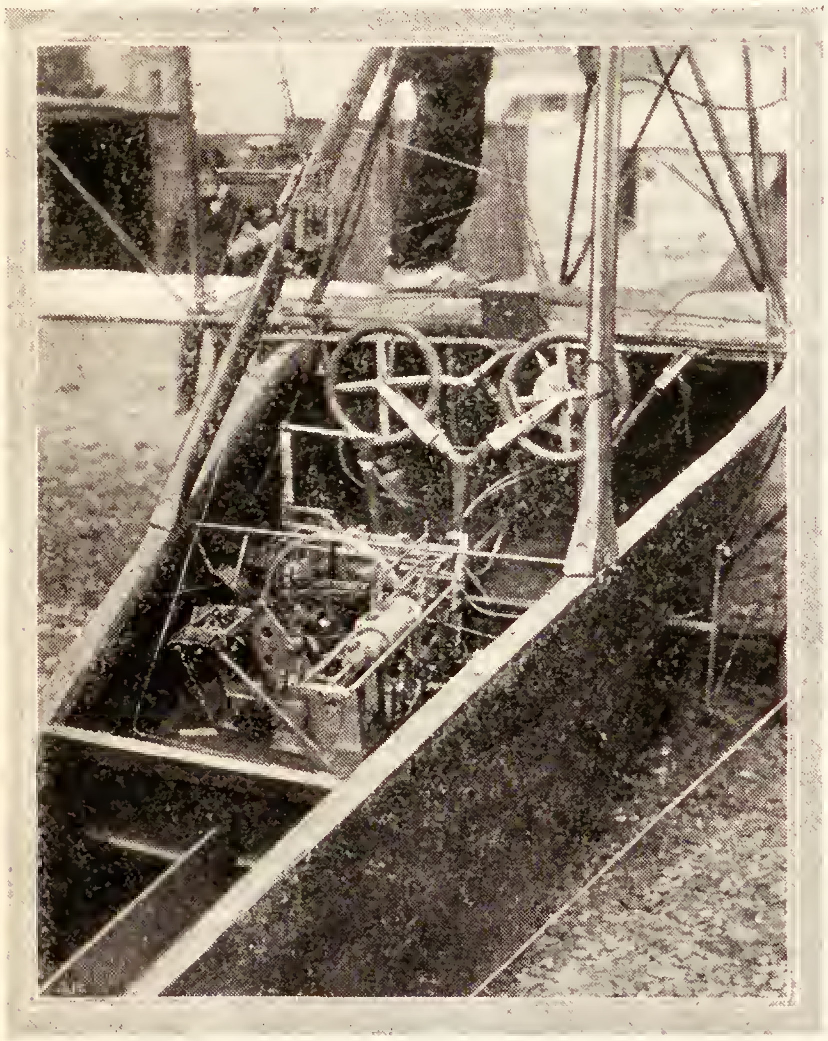
What I have seen in the past of various functions got up by the "Profession" leads me to anticipate plenty of fun in store for those who visit Hendon next Tuesday on the occasion of the Charity Carnival and Aviation Day in aid of Joe Elvin's scheme for a Music Hall Convalescent Home. In addition to the usual exhibition and passenger flights, and a speed race in which actresses will be carried as passengers, there will be numerous other forms of entertainments, including an attempt to fly the "Atlantic" by three well-known "pilots"—Harry Tate, Harry Weldon and Joe Elvin. I believe Mr. North has designed the three machines specially for the occasion on Gulf Stream lines. There will also be a grand speed race for four-wheeled cabs. Miss Fay Compton and Mr. Lauri de Frece will sell by auction passenger flights, vaudeville entertainments will be given by a large number of music hall "stars" on the stage in the paddock enclosure, and——Phew! it's too hot to write all the rest, so "Go and see."

Mr. J. D. North, chief designer to the Grahame-White Aviation Co., in a new *rôle*. He is here seen "flagging" the machines at the end of a speed race.

"ÆOLUS."

TESTING THE SPERRY-CURTISS STABILIZER.

SOME very interesting demonstrations are reported to have been made with the Sperry stabilizer fitted on a Curtiss flying boat, in connection with the "Concours de la sécurité en aéroplane" on Friday week. The scene of the demonstrations was the Seine at Bezons, and the tests were carried out under the official observation of the judges of the competition. Piloted by Mr. Sperry, Jun., the son of the inventor of the gyroscopic stabilizer, the Curtiss flying boat left the water easily and rose to a height of about 400 ft. The mechanic was then seen to leave his seat and walk out along the lower plane, whilst the pilot held his hands above his head in order to show that the machine was controlled by the stabilizer only. This performance was repeated several times, and on another flight Mr. Sperry was accompanied by one of the judges—Commandant Barrès—in order to make absolutely certain that the pilot did not use the controls.


The gyroscopic installation on the Sperry-Curtiss machine.

The Sperry gyroscopic stabilizer consists of a quadruple gyroscope actuating the *ailerons* and elevator, and driven by the engine at the rate of 12,000 r.p.m. The longitudinal attitude of the machine is regulated by means of a small wind vane (which is seen in our photograph at the top left, attached to one of the engine struts) actuating one of the gyroscopes. If the speed of the machine drops below a certain limit, the vane depresses the elevator through the intermediary of the gyroscope. If, on the other hand, the speed is increased owing to a dive, the elevator is pulled up so as to "flatten out" the path of the machine. A clutch is provided by means of which the gyroscopes can be brought into or put out of action at the will of the pilot.

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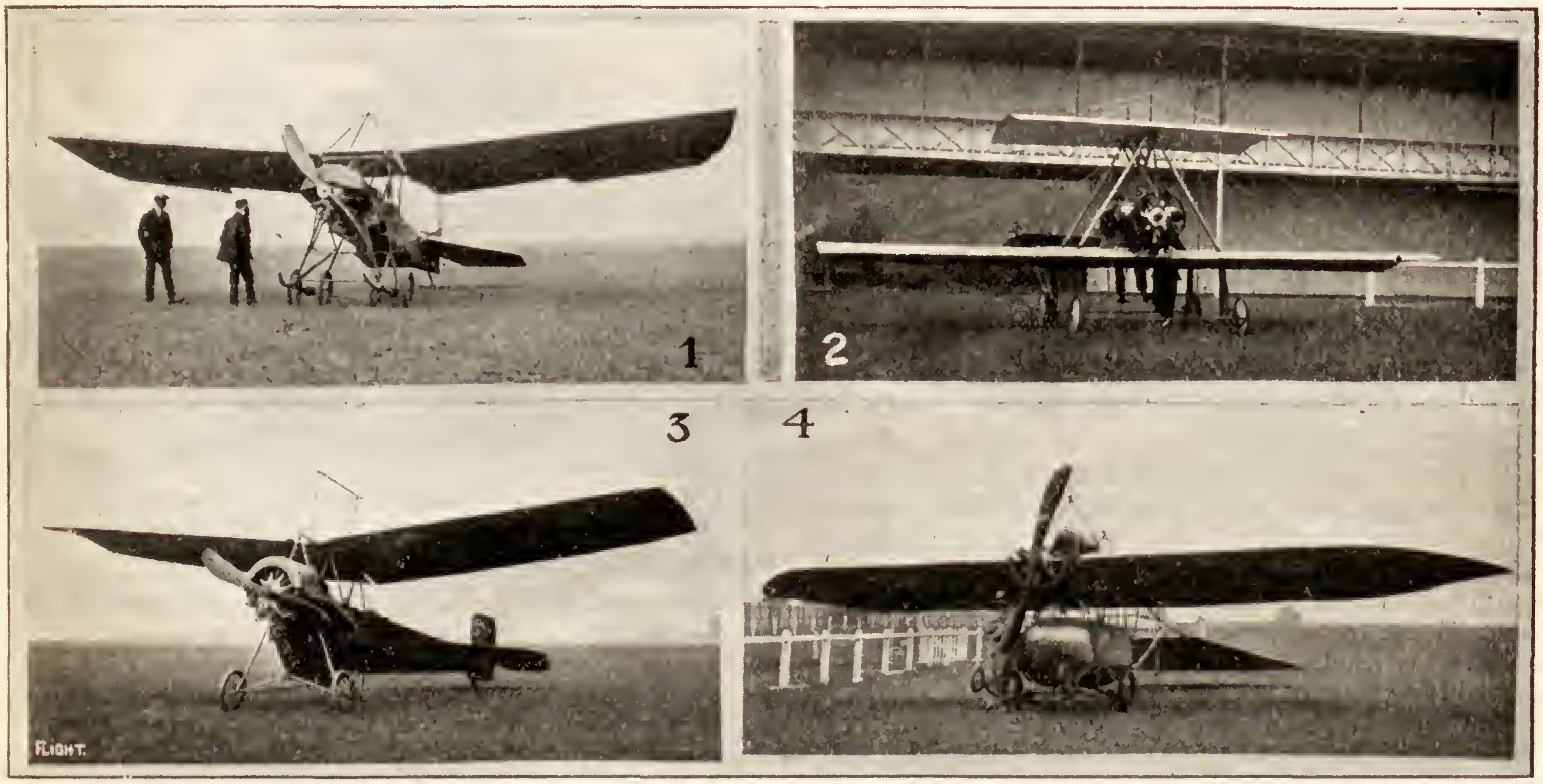
Manton at Malton.

AT the annual fête in aid of the Malton Cottage Hospital on June 25th, Mr. Manton gave a fine exhibition, including 13 loops and one upside down flight. At 2.30 Mr. Manton took his seat in the 50 h.p. Blériot, started away giving a ten minutes' exhibition of fancy flying, banking, and switchbacking, &c., and did not appear to be bothered by the somewhat tricky state of the atmosphere. On landing the machine came almost immediately to a standstill owing to the uphill nature of the ground, but this was rather a disadvantage for getting away, while over the crest of the hill the machine encountered one or two severe bumps. In the evening the conditions improved and, if anything, Mr. Manton gave an even better demonstration than in the afternoon.



Photos by Mr. F. Oswald Watt.

A FEW OF THE MACHINES COMPETING IN THE "CONCOURS DE LA SÉCURITÉ EN AÉROPLANE."—1. The Deperdussin monoplane, total visibility type with automatic stability. 2. The only British machine entered for the competition—the Watson rocking wing aeroplane. We are told by Mr. Summerfield, of Melton Mowbray, who piloted this machine, that the "Watson" was ruled out of the competition for no apparent reason, as it flew quite well once Mr. Summerfield got used to the rather novel control. 3. The R.E.P. monoplane, total visibility type, which is fitted with standard control. 4. The Moreau "Aerostable," which was exhibited at the last Paris Aero Show, when we gave a description of it.

THE FLYING MACHINE FROM AN ENGINEERING STANDPOINT.

By FREDERICK WILLIAM LANCHESTER, M.Inst.C.E.

(*Continued from page* 692.)

12. *Landing Gear.* 8. The question of alighting mechanism detail next claims our attention; this is necessarily of two distinct types depending upon whether the machine is designed for land or for marine usage. Taking first the land or military type of machine, the essential features comprise ordinarily a pair of pneumatic-shod wheels (in some cases two pairs) arranged on a common axis somewhat forward of the centre of gravity of the machine, and supplied with a rudimentary elastic suspension of some form, in addition to runners or skids to take the "bump" in emergency, and the provision of some kind of temporary tail support, consisting either of a castor-pivoted wheel, or (as more generally the case) of a simple spring-controlled skid. It was at one time believed to be essential that the alighting wheels should be all castor-pivoted or *orientable*, the intention being to take care of the relative motion of the ground when alighting across the wind*; experience appears to show that with reasonably careful handling this provision is unnecessary. Two types of suspension are illustrated in Figs. 31 (R.A.F.) and 32 (Blériot); it will be noted that in both cases the medium employed to absorb the shock is rubber; this is preferable to steel (as universally employed on road vehicles) for two reasons: firstly, the energy good vulcanized rubber will absorb is far greater than is the case for steel; it runs to some 500 to 1,000 lbs. per lb. (some 10 or 20 foot-lbs. is all that may be allowed for steel); and secondly, the signs of fatigue in rubber are evident to the most casual observer and the rubbers are cheap and easy of replacement. The alighting wheels with their associated parts are mounted on a structure commonly known as the landing chassis whose function is to raise the machine proper a sufficient height above the ground to provide clearance for the propeller, aerofoil, &c.; unless careful design and workmanship is put into the landing chassis its "spidery" proportions necessary to give clearance may, on the one hand, constitute a source of weakness, or, on the other, give rise to excessive resistance. Owing to the liability of the landing chassis to injury it is clearly desirable that its structure should be complete within itself, yet this is very difficult of achievement in actual design; more often than not there are members in common to the landing chassis and the aerofoil structure or the *fuselage*. This must be considered a weak point in any design, since it involves the risk that some essential flight organ may on landing be strained or otherwise injured or at least stressed beyond the limit for which it has been designed.

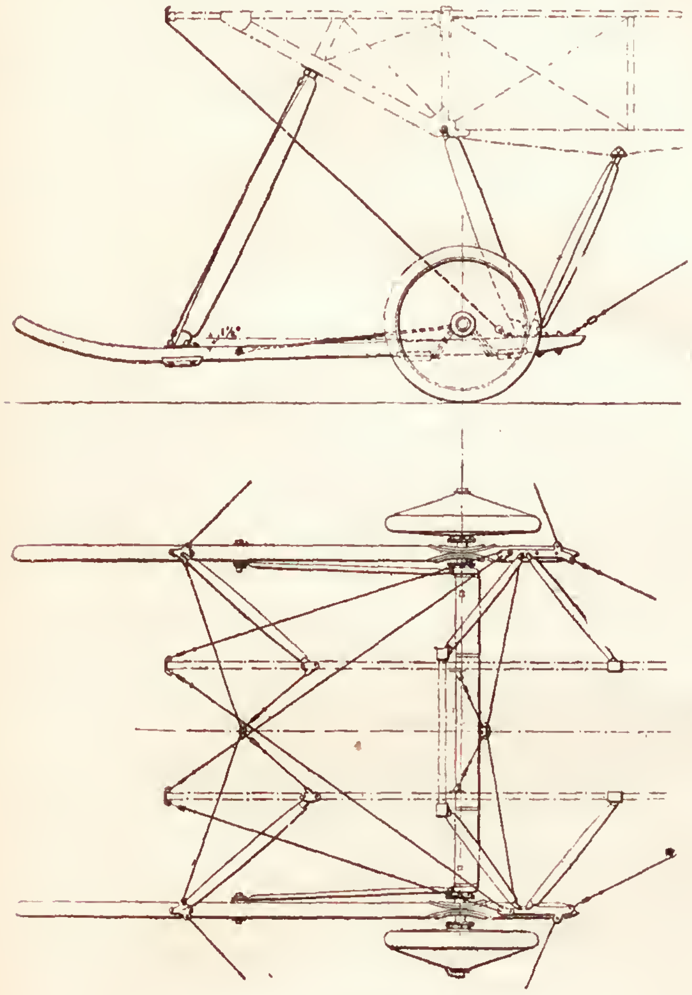


Fig. 31.

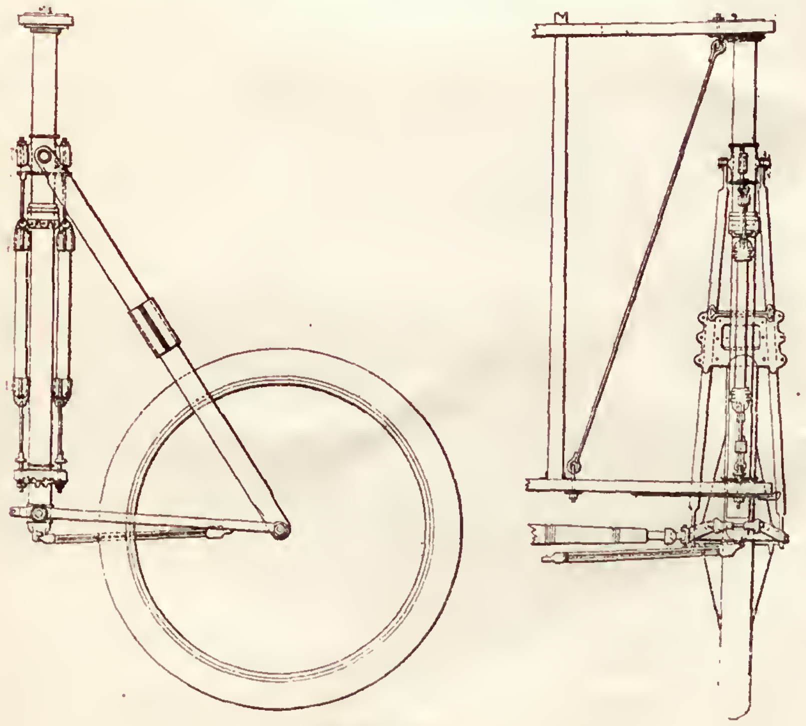


Fig. 32.

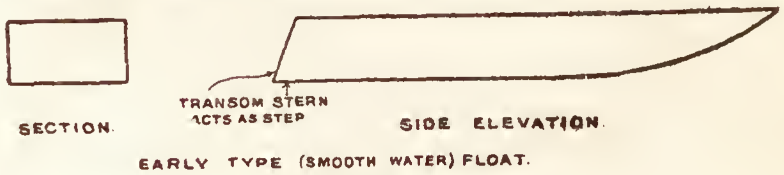
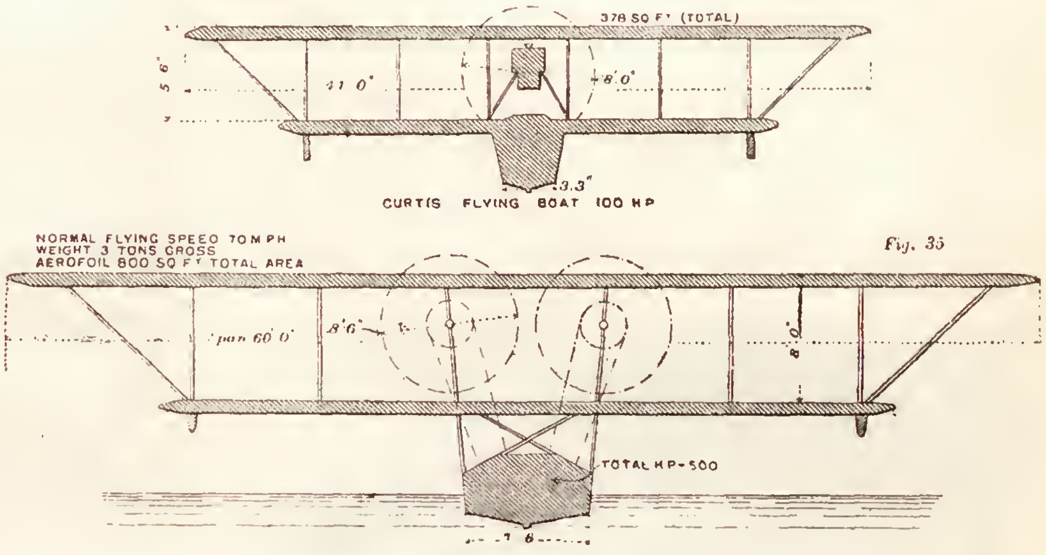


Fig. 33.



Figs. 34 and 35.

In spite of all that has been done up to the present the landing chassis is only able to take a very moderate "bump" with safety, a 1 foot free fall on to a hard surface is as much as can be deemed safe in the best of existing machines, a free fall of 4 or 5 feet would lead to almost certain failure. This requires that, in landing, a machine should never under any circumstances be allowed to take the ground with a greater vertical velocity component than 8 feet per second. Assuming a gliding angle of $\frac{1}{7}$, this means that a machine, flying at 38 miles per hour (56 feet per second or ft./sec.) could be allowed to take the ground (presuming the latter horizontal), without intervention of the pilot, but for any higher velocity of flight its course must be eased or flattened; in actual practice it is, of course, part of the art of flying to avoid all shock when alighting, no pilot would think of taking the ground without at least making his best effort to flatten his angle of descent. There is probably a future for some form of hydraulic-pneumatic device; already several attempts have been made in that direction.

Passing now to the marine type, we find in the earlier examples a

* Messrs. Voisin Brothers, in the days of their pioneer work, attached great importance to this point. They attributed the early success of Farman (on his Voisin machine) largely to the fact that this feature was embodied in his machine.

landing chassis of the ordinary pattern fitted with a pair of floats in place of wheels and skid, and a temporary tail support in the form of a third float arranged aft under the tail member. In the earlier machines these floats were little more than boxes of rectangular section, Fig. 33 ; more recently there has been a tendency to give to the floats a more boat-like form (*see* Report of Advisory Committee, 1912–13, Memo. No. 70), surfaces of single or double curvature being adopted in place of flat, and so the liability to being stove in has been reduced to a minimum. The double-float support has proved itself suited to comparatively smooth water, but a strong feeling exists at the present time that for machines intended to serve on the high seas that construction will be abandoned in favour of the single central boat, as already to be seen in the Curtiss and Sopwith machines (Fig. 34) ; here auxiliary floats or bob-floats are fitted to the extremities of the aerofoil to give stability to the machine when resting on the water, and to avoid damage to the aerofoil when getting under way or when alighting.

The main floats, whether single or double, require to be constructed to rise in the water on the same principle as the so-called hydroplanes or skimmer craft, being designed with the usual stepped bottom ; a single step is found to give the best results.

The design of floats or hull for a marine machine must be regarded as still in an early stage of development, and much will depend in the future on the general evolution of the machine as to what form of float gear will ultimately be found most appropriate. The author is of opinion that as a development of the single boat type at present existing it would appear to be desirable to bring the motor or motors, and other heavy parts as far as possible, down into the hull, and design the boat as a thoroughly sea-worthy craft with proper metacentric height and fitted with its own (marine) screw propeller so that it is capable of being navigated independently of its flight organs, Fig. 35. In such a design it would evidently be necessary to drive the propellers through a belt, chain, or gear of some kind, and mechanism would be provided by which the pilot could jettison the superstructure in emergency. Such a machine would be essentially one of considerable size, and would probably be fitted with two, three, or even more engines, with a total of over 500 h.p. The weight of such a machine would require to be some 3 or 4 tons, and would be capable of making port under its own power in the event of the flight organs being abandoned.

(*To be continued.*)

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FOREIGN AIRCRAFT NEWS.

New World's Duration Record.

Brief reference was made in our last issue to the splendid flight of Basser on a Rumpler biplane on the 24th ult., when he made a non-stop of 18 hrs. 11 mins. He started at 3.49 p.m. on the 23rd ult. and landed at 10 a.m. the next morning. Landsmann on an Albatros biplane who started at Johannisthal at 9.9 p.m. on the 23rd ult., after circling above the aerodrome for some time was driven away by a storm and eventually landed at Liegnitz in Silesia at 2.25 the following afternoon, having made a non-stop flight of 17 hrs. 17 mins. The previous duration record was Poulet's 16 hrs. 28 mins. made in April last on a Caudron.

Splendid as was Basser's record, it was beaten within four days by his rival Landsmann who, starting at 8.30 p.m. on Saturday last flew over a course between Johannisthal and Schulzendorf for 21 hours 49 mins. without stopping, the flight only coming to an end through the petrol supply failing. Altogether 625 litres of fuel and 50 kilogs. of oil were used while the distance covered was about 1,900 kiloms. Landsmann used an Albatros biplane which, like Basser's Rumpler, was fitted with a 100 h.p. Mercedes engine.

Herr Max Schüler (centre), who established a world's distance record with two passengers (seen in the photograph) by flying from Leipzig to Breslau—a distance of 205 miles—where he competed in the East German Race on his 150 h.p. D.F.W. scouting biplane. It was on the same machine, it will be remembered, that Herr Schüler won the German "Triangular" Race a short time ago.

A Tour of Inspection.

On the 25th ult. Molla arrived at Vincennes on his R.E.P. and completed a tour of 1,200 kiloms., which was undertaken to enable Deputy Girod, who was Molla's passenger throughout, to visit the principal centres of aviation in France.

Buc to St. Raphael on a Blériot.

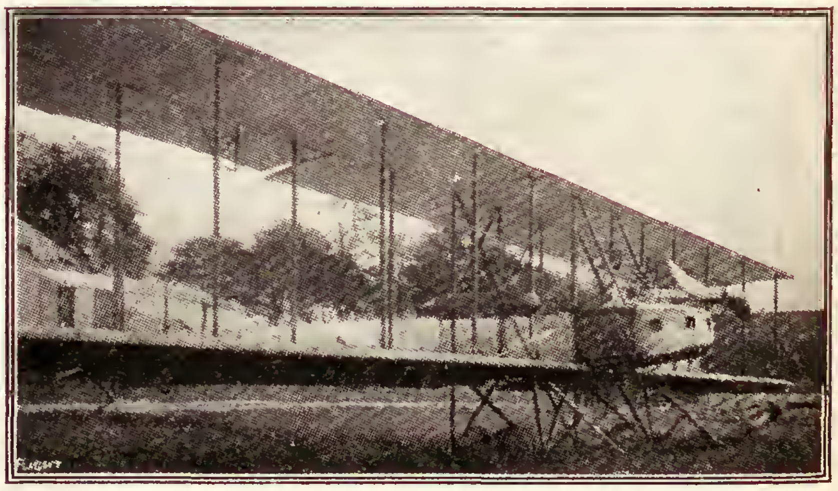
On a Blériot monoplane fitted with a 60 h.p. Clerget engine, Naval Lieut. de Laborde on the 26th ult. made a splendid flight of 850 kiloms. from Buc to St. Raphael in the South of France. Two stops were made, one of three hours at Nevers and the other of two hours at Lyons.

Injured Aviators Honoured.

On the 23rd ult. Col. Bouttieaux, in command of the military aviation centre at Dijon, visited the hospital at Vichy and handed to Capt. Voisin the cross of the Legion of Honour and to Sapper Destot the military medal, the awards having been conferred in consideration of the fact that Capt. Voisin and Sapper Destot were injured while flying on duty recently.

Testing the Ponnier Tabloid.

Further tests were made on the 25th ult. at Rheims with the "tabloid" biplane built by the Ponnier firm. With a load of



French military biplane designed and constructed at the military aircraft factory at Chalais-Meudon.—This machine is characterised by a very long and narrow *fuselage*, which carries at its rear end a biplane type elevator. The engine is a 200 h.p. horizontal Salmson (Canton-Unné system) driving through bevel reduction gearing a single tractor screw situated in front of the main planes and above the nose of the *fuselage*. Several seats are provided, and the machine is fitted with a complete set of instruments for wireless telegraphy.

160 kilogs. it climbed 1,000 metres in 7 mins., while the maximum speed was 110 k.p.h. and the minimum 55 k.p.h. Afterwards Rost flew the machine from Rheims to Chateaufort in order that some Russian officers might inspect it.

Robert Morane a Pilot.

Robert Morane, the brother of the well-known constructor and pilot, Leon Morane, qualified for a pilot's certificate at the Morane School at Villacoublay, last week. It may be recalled that Robert Morane was severely injured in a smash when starting as passenger with his brother in an attempt for the Puy de Dome Michelin Prize in 1910.

To See Eclipse from Aeroplane.

An aeroplane is included among the equipment of Professor Todd, who is coming to Europe from America in order to make observations of the eclipse of the sun on August 21st. Should the weather be cloudy at the time of the eclipse, Professor Todd, who will make his observations at Riga, hopes to be able to rise until he is clear of all obstructions.

Four Fatalities in Germany.

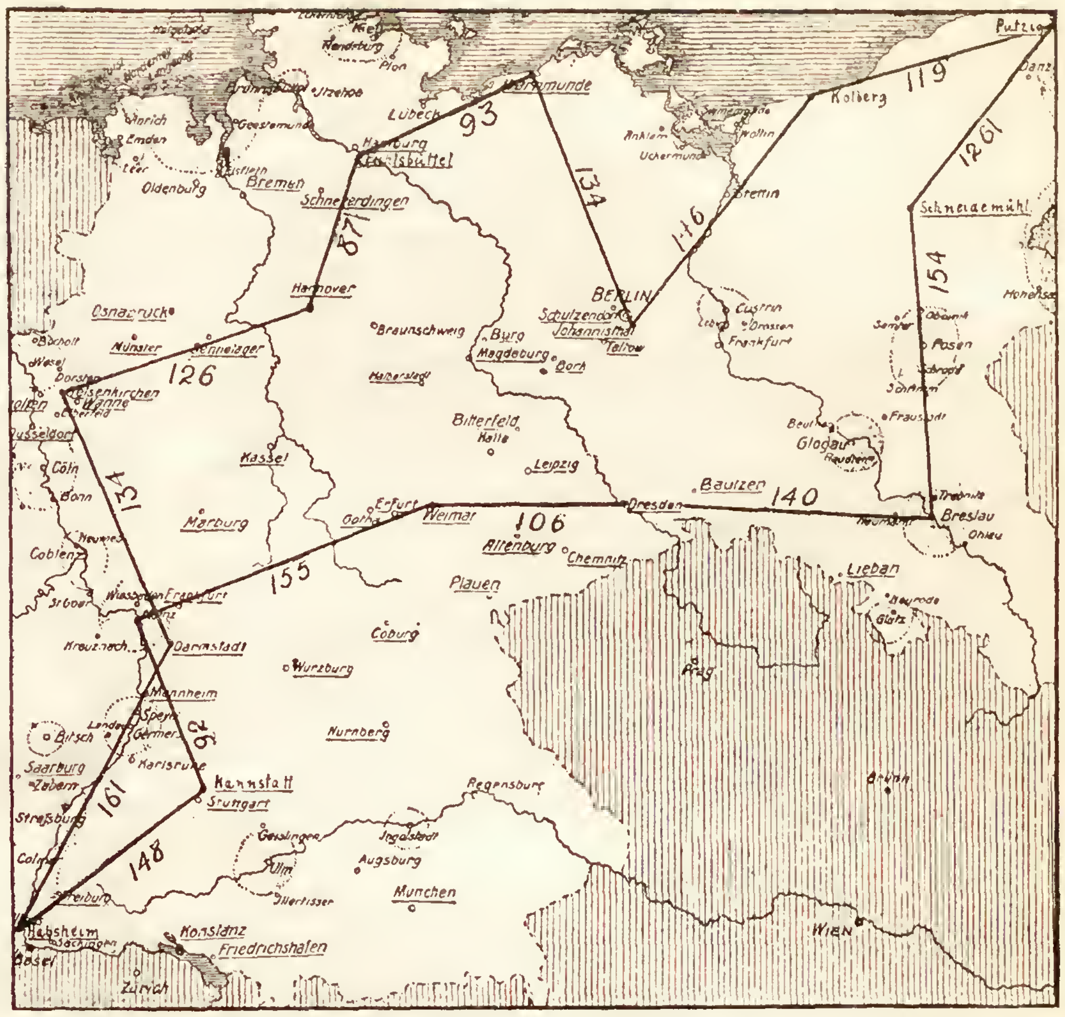
While flying a monoplane at Schwerin, Mecklemburg, on the 24th ult., Lieut. Kolbe fell into a garden and received injuries which resulted fatally. His passenger, Capt. Rhode, escaped with a fractured arm. At Kiel on the following day Naval Lieut. Schroeder was drowned through his seaplane falling from a height of 40 metres. On the 26th ult. a military pilot, Private Grunow, was killed in a fall of 30 metres when flying at Metz; while at Bitsch, in Lorraine, a military aeroplane fell, and the passenger, Major Buechner, was killed, but the pilot escaped with slight injuries.

Belgian Officer Injured.

The Belgian officer Liedel, while flying at Martelange on the 27th ult., fell from a height of between five and six hundred metres. He had both arms and legs broken, and was taken to the hospital in a very critical condition.

Good Work by Italian Airships.

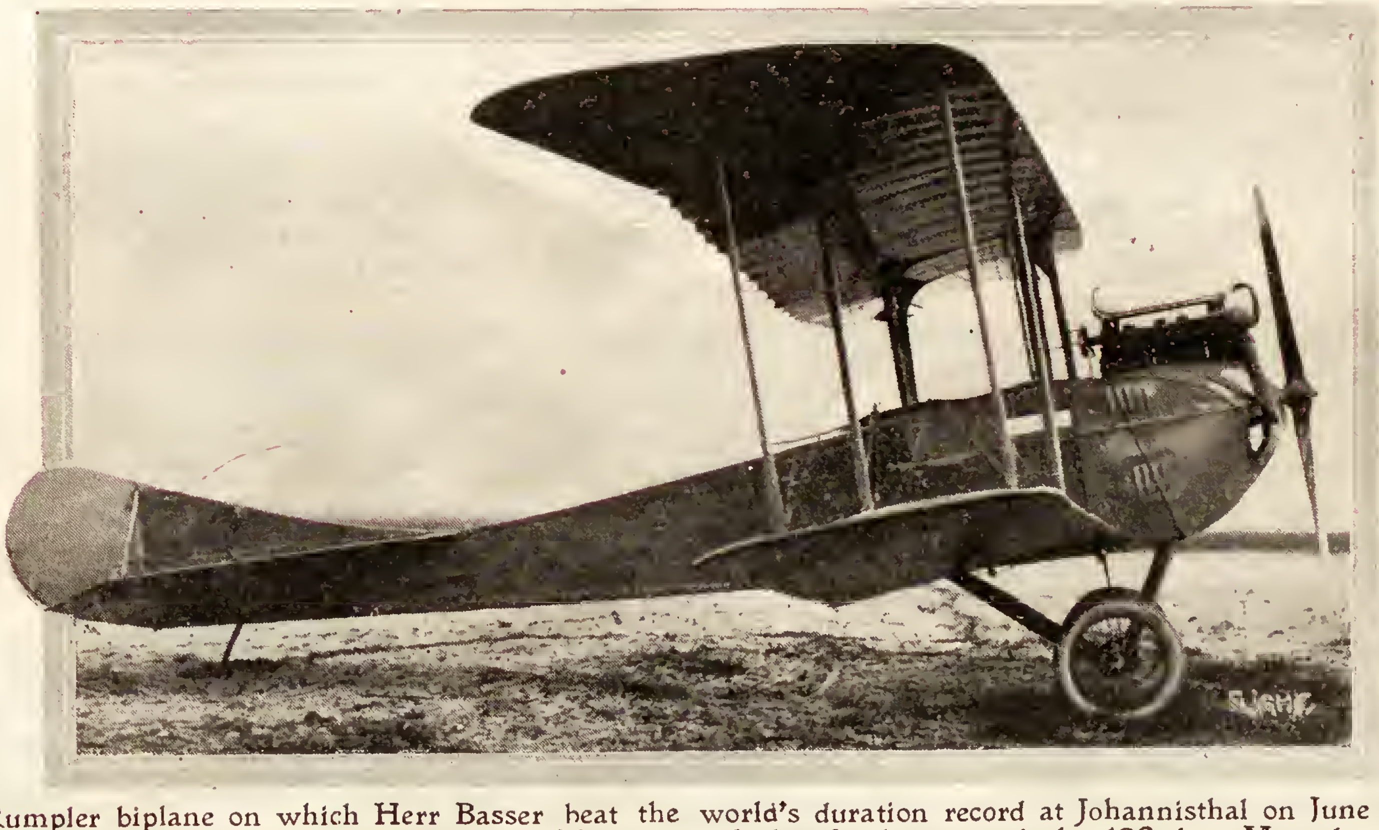
Leaving her hangar at Boscomantico, near Verona at 4.30 a.m. on the 25th ult., the Italian military dirigible "P5" cruised to Turin, the voyage, which was made by way of Crema, Lodi, Mortara, and Chiavasso, taking four hours. Later in the day she returned to her station.



MAP OF THE 1914 GERMAN MICHELIN CUP COURSE.—The distances between control stations are shown in miles. Competitors are allowed to start from any one of the fifteen turning points. On June 19th, we gave the course for the 1914 French Michelin Cup.

"Adjudant Vincenot" Beats the Record.

With a non-stop cruise of 35 hrs. 20 mins. the French military dirigible "Adjudant Vincenot" regained for France the airship duration record. Leaving her station at Toul the airship was steered over a circular course and passed over Paris at 5 p.m. on Saturday afternoon. The previous best recorded performance was that of one of the Zeppelins, which cruised from Friedrichshafen to Johannisthal in 34 hrs. 50 mins.



The Rumpler biplane on which Herr Basser beat the world's duration record at Johannisthal on June 24th last, with a flight of 18 hrs. 12 mins. duration. The nose of the *fuselage* round the 100 h.p. Mercedes engine is covered with aluminium, whilst the top of the body is covered with three-ply wood. The rear portion of the *fuselage* is totally covered in with fabric. Provision has been made for quick erecting and dismantling of the wings, which are separated by 12 steel tube struts of streamline section. The chassis is exactly similar to that of the Rumpler monoplanes, thus allowing of interchange of spare parts.

BRITISH NOTES OF THE WEEK.

Men of Moment on Naval Machines.

A visit of inspection to the Naval Flying School at Eastchurch was made on the 25th ult. by Sir Francis Hopwood, Civil Lord of the Admiralty, who afterwards enjoyed a flight on a biplane piloted by Commander Samson. On Monday Mr. Eustace Fiennes, M.P., who was included among Mr. Winston Churchill's party on the "Enchantress" for the week-end, went for a flight over Calshot and Portsmouth on a biplane piloted by Lieut. Bigsworth.

The Army and the B.Es.

In the House of Commons last week, the Secretary of State for War was asked if he would give an explanation as to why so many accidents had occurred with the B.E. biplanes belonging to the Army; why the rudder has no stays to strengthen it, and why the main spars of the machine have such large bolt-holes drilled through them, when other types of machines do not have their spars weakened in such a way; and whether he would do away with the use of the B.E. type of machine in the Army.

Mr. Baker, who replied, said that if the number of accidents in connection with B.Es. appeared to be large, that was because there was a large number of them in use and because they are continuously in the air. The details of construction are based on most careful and long-continued calculation, and the strength of these machines is in every way satisfactory. There is no intention of doing away with the type until it is superseded by a superior pattern. In reply to a supplementary question, Mr. Baker said that he had made enquiries, and thought it quite untrue that officers had any dislike to the B.E. kind of machine.

The Round Britain Flight.

When the entry list for the Round Britain flight for the *Daily Mail* prize closed on Tuesday last, it was announced by the Royal Aero Club that they totalled nine, the latest being a Beardmore waterplane, fitted with 120 h.p. Austro-Daimler engine, entered by Messrs. Beardmore, Ltd. It will be remembered that the other entries are two Curtiss, two Sopwith and one each Avro, Grahame-White, E.A.C., and Blackburn, as set out in the Royal Aero Club notices. It will also be noticed that the Royal Aero Club, after consulting all the entrants, has decided to postpone the start to Monday, August 10th, and the competition will therefore be open from August 10th to August 22nd. Further details as to the arrangements for the race, which, as last year, will start from Southampton Water, will be published next week.

The London–Paris–London Race.

Some further details regarding the race from London to Paris and back, which is to be held on Saturday, July 11th, will be found among the Royal Aero Club notices on p. 702. The entries number eleven; they comprise three entered by the Grahame-White Co., including W. L. Brock, R. H. Carr and another pilot yet to be nominated, all on 80 h.p. Gnome-Moranes, Eugene Renaux on a 120 h.p. Maurice Farman, Lord Carbery on either his new Bristol or the Morane, Mallard on a 100 h.p. Gnome-Nieuport, Max Lenoir on a 80 h.p. Gnome-Ponnier monoplane, A. Parmelin on a 80 h.p. Gnome-Deperdussin, R. R. Skene on a 120 h.p. Austro-Daimler-Martinsyde monoplane, T. Elder Hearn on his 80 h.p. Gnome-Blériot and Pierre Verrier on a Farman.

It will be seen that the first competitor will be started from Hendon at 6.30 a.m., and the others will follow in the order of their handicap at intervals of not less than ten minutes. The compulsory stop at Buc, the turning point, has been extended to two hours.

In order to enable the competitors to cross the Channel at a considerable height the competitors will leave the English coast at a high altitude between New Romney and Dungeness, coming down low for identification at Boulogne after the Channel crossing, and on the homeward journey they will leave the French coast, flying high over the Point du Hourdel, near Valery, coming down lower when crossing the harbour at Folkestone. The rules of the contest insist upon all pilots wearing lifebelts.

The pilot completing the course in the fastest time will receive a valuable trophy and a cash prize of £500 presented by the International Correspondence Schools, who have also presented £200 to be divided between the pilots who are second and third in the handicap. The first prize for the handicap, a sum of £300, has been presented by the members of the Royal Aero Club.

The Grahame-White Scholarship.

On Tuesday last, Col. Seely presented the Grahame-White scholarship, tenable for twelve months at the Hendon aerodrome, to Sidney Tompkins of St. John's School, Ealing.

Three Days' Flying at Glasgow.

On the opening day (Thursday, 25th ult.) of the three days' meeting at the Scotstoun Ground on the outskirts of Glasgow the weather was somewhat rough. Mr. Hucks, too, had some bad luck, the tent which did duty as a hangar falling down owing to the breaking of a pole, but little damage was done beyond breaking the rudder on his looping machine. Mr. Hucks first made a solo flight on the two-seater Blériot, after which he took a very young member of a local model aeroplane club up to 4,300 ft. for a joy ride. This was followed by a fine display of steep banking and steeplechasing which aroused great enthusiasm. After a short interval, Mr. Hucks brought out his 50 h.p. Blériot and gave a very fine upside down flight followed by a number of loops. In the evening the conditions improved somewhat and Mr. Hucks gave a similar demonstration to that of the afternoon.

Friday proved a much better day, for although there was a fair amount of wind it was less gusty than on the previous day. During the afternoon Mr. Hucks broke the Scottish height record, attaining an altitude of 7,200 ft., and descending by means of a very fine spiral *vol plané*. In the evening both Mr. Hucks and Mr. Manton, who had arrived with his machine from Malton during the afternoon gave solo and combined demonstrations of fancy flying, after which each did some looping. The last flight of the evening was a demonstration of combined looping; Mr. Hucks and Mr. Manton both on 50 h.p. Blériots rose to the same altitude and manœuvred round until they were in line side by side and then looped, this evolution being carried out several times before descending. The machines moved with such precision that it seemed as though they were connected by means of an invisible bar.

Saturday, the last day of the meeting was taken up with a similar programme in both the afternoon and evening.

The Advisory Committee's Report.

A large number of enquiries have been received as to the price, &c., of the Report of the Advisory Committee for Aeronautics. This report costs 10*s.* and the postage is 5*d.*, and copies can be supplied post free from Flight offices, 44, St. Martin's Lane, W.C. on receipt of remittance for 10*s.* 5*d.*

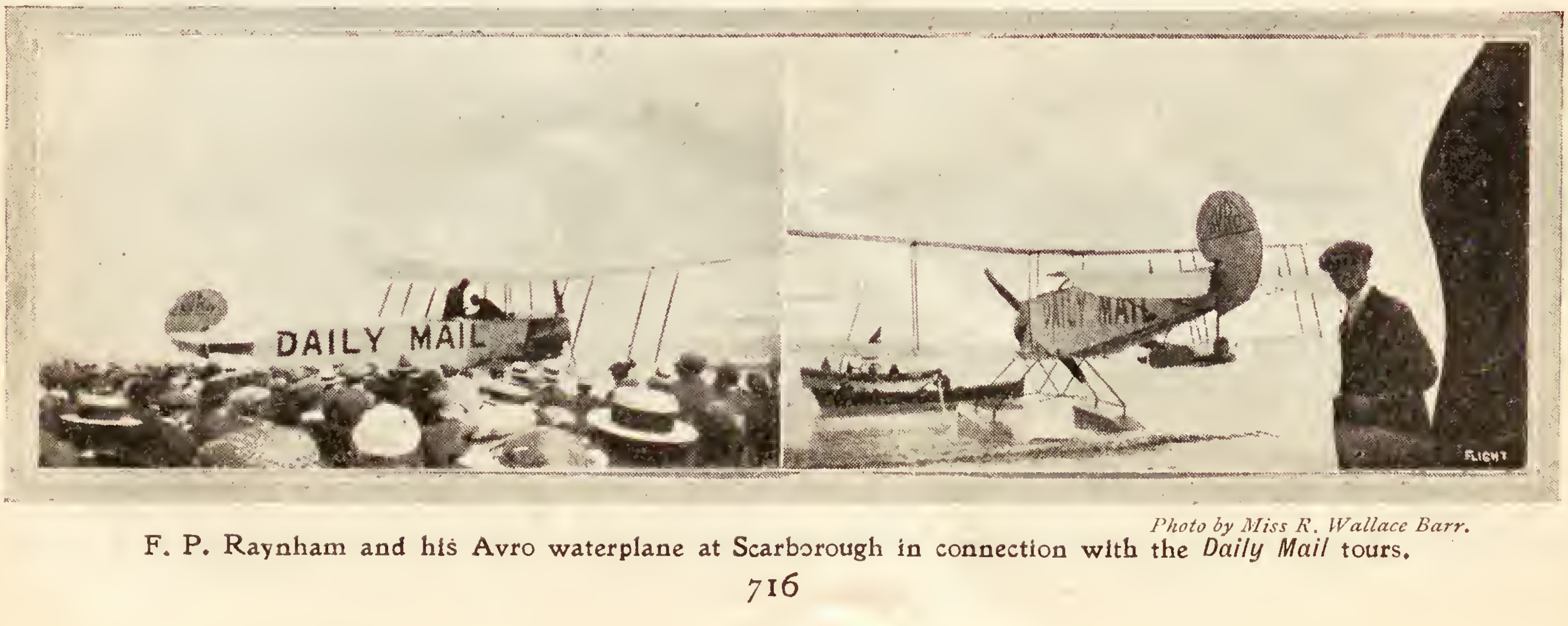
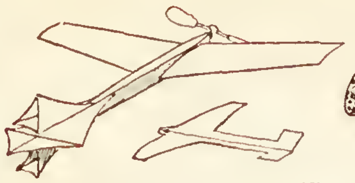
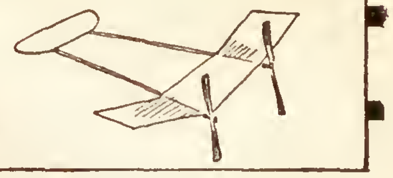


Photo by Miss R. Wallace Barr.

F. P. Raynham and his Avro waterplane at Scarborough in connection with the *Daily Mail* tours.



Models



Edited by V. E. JOHNSON, M.A.

The K. and M.A.A. Programme for 1914.

THE programme of the Kite and Model Aeroplane Association's aviation meetings for this season possesses a good many features of especial interest, and a copy of the same should be procured by everyone taking the least interest in either kites or model aeroplanes. The competition meetings extend right on until the end of October, and there is thus plenty of time in which to make every preparation for the majority of the competitions. Considerable alterations have been made in the rules governing many of the competitions with a view to making them of a more reliable and scientific character; for instance:—

1. The distance between the rubber hooks must not exceed the span.
2. Minimum loading for biplanes 4 ozs. per sq. ft., and for monoplanes 6 ozs. per sq. ft.
3. Aspect ratio must be not less than five and not more than twelve.

All r.o.g. models must also rise direct from the ground under their own power, no special rising surface being allowed; and competitions are to be decided on the flight average and not on a best single flight, unless otherwise stated. No less than 16 trophies are to be competed for during the season, as well as The Royal Aero Club Prize, The Women's Patriotic League Prize, The Aeronautical Society's Laboratory Prize, and other prizes, such as silver cups, medals, &c.

Perhaps the competition which will arouse the most widespread interest is that for the Farrow Challenge Shield and Baden-Powell Medals. An inter-club series of competitions which should do much to promote and assist existing model aeroplane clubs and encourage the formation of additional ones as well. This competition is naturally open only to clubs affiliated to the K. and M.A.A. The winning team holds the very handsome shield (which was on view at Olympia) for one year, each member of the team receiving a silver medal, whilst each member of the team next to the winning one receives a bronze medal. The steering competition for models to be held on Wimbledon Common on July 11th is of especial interest because one of the tests, viz., Test B, is a figure of eight; and to qualify for this test, the models must make one complete figure of eight, controlled by mechanical means and not by odd propellers.

On July 25th there is to be two ladies' competitions, one for models and one for kites, both on Wimbledon Common.

The Royal Aero Club Hydro Competition is fixed for August 8th at the Welsh Harp. The minimum weight for the models this time is to be 1 lb. and one trial or launching out of the three is to be made *with the wind*, a course of procedure frequently advocated by the writer.

On the same date and at the same place is to be held the Lady Shelley Hydro Competition for power-driven hydro-aeroplanes rising off the water under their own power. The first prize, a very handsome silver cup, to be won outright.

A very important point about this competition is that the design of the model submitted must be such as is applicable to full-sized machines.

Another competition restricted to power-driven models is the Sir John C. Shelley Competition for power-driven models rising direct from the ground; here again, the design of the model submitted must be applicable to full-sized practice.

Another competition of more than usual interest is the one to be held on Wimbledon Common on September 19th, viz., the T. W. K. Clarke Challenge Cup, presented by Messrs. T. W. K. Clarke and Co. In this competition, whilst competitors may submit models of any kind, the trophy is to be awarded to the designer of the machine which demonstrates a device or principle which would be considered of the greatest practical use as applied to a full-sized machine.

Another interesting competition is to be held on the same date and at the same place for the Weston Challenge Cup, presented by Mr. H. R. Weston of the Star Aeroplane Co. The competition is one for distance, the type of machine to be used is a single-screw tractor model with an enclosed body. The models must not be less than 8 ozs. in weight, and must have enclosed bodies whose ratio of width to span must not be more than 12. Amongst other competitions we have one for models carrying no forward elevator or tail. Single or twin screws may be used, and the model may be of the monoplane or multiplane type with enclosed body. We have also two weight-carrying competitions and one for hydro-biplanes of 16-oz. minimum weight, and a duration and stability competition for twin-screw tractor r.o.g. models, for which the editor of the model section of FLIGHT is presenting a silver cup. The model body must consist of at least three longitudinals.

The foregoing jottings concerning this season's competitions, which is by no means exhaustive, and from which an excellent selection of kite competitions is entirely omitted, ought surely to be of sufficient interest and value to whet the appetite of even the most indifferent aero model amateur. It is very certain that no other branch of model work can show such a fine collection of valuable trophies to be held and prizes to be won.

That the Association can present such a fine programme speaks volumes for its organisation and the zeal and diligence of its General Honorary Secretary, Mr. W. H. Akehurst.

Messrs. J. Bonn and Co.'s New Specialities.

We have received from the above well-known firm some of their latest specialities for model aeroplane builders, including a pair of their new B.M. type steamed propellers, a specially light and large gear wheel suitable for weight-carrying models, a propeller bracket of excellent scientific design and of very light weight, whilst still possessing an abundance of strength; as well as a propeller shaft axle and rubber hook suitable for holding the B.M. propellers referred to above. These propellers, whilst of minimum weight (a 9-in. propeller, I find, weighs exactly 5·5 grammes), are still quite strong enough for the ordinary r.o.g. models. Every one of the above items undoubtedly supplies a *want*, and as such will undoubtedly be appreciated by all aeromodellists.

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration ...	J. E. Louch ...	95 secs.
Twin screw, do.	Distance ...	R. Lucas	590 yards.
	Duration ...	G. Hayden ...	137 secs.
Single screw, rise off ground	Distance ...	W. E. Evans ...	290 yards.
	Duration ...	J. E. Louch ...	68 secs.
Twin screw, do.	Distance ...	L. H. Slatter ...	365 yards.
	Duration ...	J. E. Louch ...	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance ...	C. C. Dutton ...	266 yards
	Duration ...	J. E. Louch ...	91 secs.
Do., off-ground	Distance ...	C. C. Dutton ...	190 yards.
	Duration ...	J. E. Louch ...	94 secs.
Single screw hydro., off-water	Duration ...	L. H. Slatter ...	35 secs.
Single-tractor, do., do. ...	Duration ...	C. C. Dutton ...	29 secs.
Twin screw, do., do. ...	Duration ...	L. H. Slatter ...	60 secs.
Engine driven off grass ...	Duration ...	D. Stanger ...	51 secs.

Official Trials.—The monthly official trials were held on Wimbledon Common. June 20th. The results were: Duration, single-screw, h.l., J. E. Louch, K. and M.A.A. and Leytonstone Club, 95 secs.; duration, single-screw, r.o.g., J. E. Louch, K. and M.A.A. and Leytonstone Club, 68 secs.; duration, single-screw tractor, r.o.g., D. Laing, K. and M.A.A. and Wimbledon, 90 secs.; duration, single-screw h.l., F. Wilkinson, Wimbledon, 57 secs.; duration, twin-screw h.l., P. P. Peebles, K. and M.A.A., 134 secs. As will be seen, Mr. J. E. Louch captured two records, raising the single-screw, h.l., from 85 to 95 secs., and the single-screw, r.o.g., from 64 to 68 secs. Mr. P. P. Peebles made three splendid flights in his attempt on the British record of 137 secs. for twin-screw, h.l. models, held by G. Hayden. His three flights were 110, 115, and 134 secs., his last flight being only 3 secs. outside record. This being his first attempt on the records it is hoped he will before long capture some. The official observers were A. F. Houlberg and H. A. Lyche, A.F.K.M.A.A.

The Next Monthly Official Trials in London District.—For the registration of model aeroplane performances, for the purpose of establishing records, will be held on July 18th, on the Leytonstone Club's Ground, Wanstead Flats. Application forms must reach Mr. H. Lyche by Saturday, July 11th.

Competition.—The fifth annual competition for the Gamage Challenge Cup for longest flight took place on June 27th, on Wanstead Flats, the ground of the Leytonstone Club. There was a good field, and was keenly contested. The judges, Messrs. W. H. Akehurst, F. Grattan, H. A. Lyche, and H. Weston made the following awards, which were on the one longest flight, and not on the average, although Mr. Louch would have been the winner if it had been on the average. The result of the first six were: 1st, J. E. Louch, K. and M.A.A. and Leytonstone, 673 yds.; 2nd, H. Bond, K. and M.A.A. and Leytonstone, 462 yds.; 3rd, J. McBirnie, K. and M.A.A. and Aero Models, 403 yds.; 4th, H. Bedford, K. and M.A.A. and Leytonstone, 326 yds.; 5th, C. Dutton, K. and M.A.A. and Paddington, 294 yds.; 6th, T. Carter, Paddington, 247 yds. Mr. Louch, therefore, won the gold medal, and holds the cup for one year from date of prize distribution. Mr. H. Bond and Mr. J. McBirnie won the silver and bronze medal respectively. All the medals are being given by A. W. Gamage, Esq.

Competitions.—Kite-flying competition on Wimbledon Common on July 18th, at 3.30 p.m.: entries close last post Saturday, July 11th; open to members only; registration fee, 3*d*. The Baden-Powell Challenge Shield, presented by Major B. Baden-Powell, F.R.A.S., for best kite of the year. Prizes:—1st, gold medal of the Association, and winner to hold shield for year; 2nd, silver medal of the

Association; 3rd, bronze medal of the Association. Special additional rules: 1. Competitors may use any kind of kite, with a minimum measurement of 20 ft. computed by Rule 2. 2. Competitors must be at the judges' flag at 3 p.m. sharp, any not present at that time will be disqualified. 3. Total length of line or wire to be 300 yards, but not exceed 310 yards. 4. Each competitor is allowed one assistant, who must wear the competitor's number; any other person assisting will render the competitor liable to disqualification. 5. Marks will be awarded as follows: Angle, one mark for each degree attained, plus 3 extra for each degree above 50; stability, 125; strength of construction, 75; portability, 50.

Inter-Club Competition.—The secretaries of the affiliated clubs met on June 25th, and drew for the first round in this contest for the Farrow Shield and the Baden-Powell Medals, which was as follows: Bath and Somerset *v.* Sheffield Aero Club, Croydon *v.* North-East London, Leytonstone *v.* South-Western, Paddington *v.* Wimbledon, Stony Stratford *v.* Reigate and Redhill, Aero Models *v.* Windsor. This round takes place on Saturday, 4th, and the official results duly signed by the observers present, must be posted to reach the gen. hon. sec. by 1st post on 6th.

27, Victory Road, Wimbledon. W. H. AKEHURST, Gen. Hon. Sec.

AFFILIATED MODEL CLUBS DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Bath and Somerset Aero Club (199, WELLSWAY, BATH).

Monthly Report.—The excellent flights of Mr. Rowland Ding on the 100 h.p. Handley Page biplane were the means of arousing great enthusiasm and interest in Bath. The members of the club assisted the organisers by acting as stewards. The hon. sec., Mr. R. C. Cross, was taken for a passenger flight. Much good model work has been done during the month Mr. R. C. Cross carried out a number of flights with his large twin-screw machine at night, the model being illuminated with a large paraffin flare placed in front and above the model. During a long glide after a high flight the model alighted on the top of a high tree and was rescued next morning. Messrs. Knight, Lewis, Baker, Jennings, Brampton and Tolman flying consistently and well. Members are busy preparing for the big competition at Bristol.

Croydon and District Ae.C. (82, CLARENDON ROAD, CROYDON).

Monthly Report.—Owing to the favourable weather experienced during June, members have been very busy, and model flying exhibitions have been given in Croydon and the surrounding districts. Mr. C. Smither has been prominent in this respect, and has been flying at Caterham, Purley, Mitcham, Duppas Hill, &c. On June 14th, at Mitcham, Mr. C. Smither obtained a duration of something over 3 mins. with a h.l. model. Though on previous performances the average duration of his model was about 80 to 85 secs., there was no mistaking the great duration of the flight in question. A good crowd of spectators witnessed the flight, and can testify to this effect. With tractor models, Messrs. Taylor, Carter, C. Smither, H. Smither, D. Pavely and P. Hart have all had good flights. Mr. D. A. Pavely obtained a fine duration of 80 secs. with a specially light model built for this purpose. Mr. H. Smither has had some fine flights with a model mono. with tail behind the propellers, which is somewhat unusual. He is confident that with this type of model he will be able to obtain some record results, and it certainly looks as if his anticipations will be fulfilled. On June 28th, a r.o.g. tractor duration competition was held at Mitcham, for a cup presented by Mr. P. Hart. This cup was won by Mr. Fred Carter, who put up a magnificent show. The official figures are not yet to hand, but Mr. D. A. Pavely was second, and Mr. P. Hart, who flew to add more entries to the competition, was third. Mr. H. Smither also had some fine flights, but was troubled with a breakage to the *fuselage*. Members are now busy tuning up their Farrow Shield models.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

JULY 5TH, flying on Wanstead Flats at 6.30 and 10.30 a.m.

Monthly Report.—The past month has been a very successful period for this club, both as regards the week-end meetings and the results of the K. and M.A.A. open competitions and official trials. At 6.30 a.m. on May 31st, seven r.o.gs. were flown, three of which were loaded at 4 ozs. to sq. ft., and the remaining four at 6 ozs. to sq. ft. Mr. Bedford with 6 oz. loading averaged 80 secs. for five flights. Mr. Bond, also with 6 oz. loading, averaged 82 secs. for a similar number of flights. Mr. S. C. Hersom with 4 oz. loading averaged 80 secs., and F. Wood averaged 60 secs. Mr. Wharnsley obtained good flights, but with lower durations, about 50 secs. Mr. Grattan and Mr. W. Hersom were each flying single screw tractor models. At 10.30 a.m. a duration competition was held and attracted five entries. Result: Mr. H. Bond 1st, average 80½ secs. for three flights; Mr. H. Bedford 2nd, 66 secs., and F. Wood 3rd, 62½ secs. June 7th, a good meet, but heavy rain spoiled flying. June 13th, four members of this club flew at Wimbledon for the *Model Engineer* Cup and medals. Mr. H. Bond secured 1st place, Mr. H. Bedford 2nd, Mr. J. E. Louch 3rd, and Mr. T. Kimpton 5th; a very gratifying result, especially as this was the first competition under the new 6 oz. loading rules. On the 14th, fourteen members assembled, and r.o.gs. were flown by Messrs. S. C. Hersom, H. Bedford, H. Bond, Wharnsley and T. Kimpton. The durations taken were rather low, the best being 57 secs. by Mr. H. Bedford. June 21st was unfavourable on account of rain, but Messrs. Wharnsley, S. C. Hersom and H. Bedford flew r.o gs., Mr. T. E. Grattan his tractor, and Mr. L. H. Midsan (who has recently joined the club) brought out a scale monoplane of 6 ft. 6 in. span, which was fitted with a steam plant of his own construction. The model in flying order weighs 10 lbs. The engine did several successful runs, but while Mr. Midson was preparing for a flight a slight excess of spirit caused a momentary flame from the lamp to set fire to one of the wings, so the model was put out of action. Mr. Midson is hard at work on another model, so that he will shortly be in the field again. In the competition for the Gamage Cup and medals, which was held on Wanstead Flats on June 27th, Mr. J. E. Louch obtained 1st place with a flight of over 600 yds. Mr. H. Bond was 2nd and Mr. H. Bedford 4th. June 28th, seventeen members turned out. Mr. S. H. Hersom, whose model would not fly straight for the previous day's competition, was getting some beautiful straight flights with good durations. Messrs. Wharnsley, H. Bedford, H. Bond, T. Kimpton and F. Hawthorn also flew r.o.gs., all of which climbed high and put up good durations. At the K. and M.A.A. official trials on June 20th, Mr. Louch beat the existing records for single screw models, both hand launched and off ground. A committee meeting was held on June 17th, when the club was shown to be in a satisfactory condition.

N.E. London Model Ae.C. (47, JENNER RD. STOKE NEWINGTON, N.)

Monthly Report.—Mr. W. A. Dore with 9-oz. tractor has been on chassis experiments; highest duration, 50 secs. S. Lewin (tractor and single-screw) obtained 45 secs. with tractor and second place in tractor competition. Others flying, Glinsman ("Demoselle" tractor), W. Wood (single canard), and F. Burton. Longstaffe, with 4 ft. tractor, chiefly consisting of rubber, has been giving demonstrations of vertical climbing; this model was the winner of tractor competition trophy. A new 10-oz. twin by Longstaffe made its first trial flights on Saturday last, obtaining 55 secs., also some effective gliding.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

JULY 4TH: Inter-club contest for Farrow Shield, Paddington *v.* Wimbledon, at Sudbury. Aug. 1st: open competition for Paddington Cup. Entrance fee 2*s.* for non-members. Entries must be received by the secretary not later than first post Monday, July 27th. Applications for entry forms should be made without delay. Models must be of the single-screw pusher type, minimum weight and loading 4 ozs. Average of three flights for duration r.o.g.

Monthly Report.—Very little flying has been done during the past month owing to the grass being required for hay. Members have, however, been busy constructing models for the forthcoming competitions of the club and of the K. and M.A.A. At a special general meeting, held on June 17th, the date of the Paddington Cup open competition was fixed for Aug. 1st, and of the President's Prize (value one guinea) for Aug. 29th. The latter competition, for members only, will be for single-screw tractor models, minimum weight 4 ozs. Average of three flights for duration. It is hoped that every member will compete for this prize.

Reigate, Redhill and District (THE COTTAGE, WOODLANDS AVENUE, REDHILL).

JULY 4TH: This club will fly in the first round of the Inter-Club Challenge Shield Competition against Stratford, flying taking place at Earlswood Common at 5.30 p.m. Observers: Messrs. S. G. Wilson, J. W. Burghope and H. V. May.

Monthly Report.—During month club records for distance and duration have been raised. Mr. Hooton, on the 6th, raised duration to 65 secs., and Mr. Key, in Rawson Cup Competition, making 76$\frac{3}{5}$ secs. and 627 yds. The chief event was the competition for Col. R. H. Rawson's Challenge Cup on June 20th before a large number of spectators. The conditions were twin r.o.g.'s 4-oz. loading (minimum), no special rising surface. Duration, three trials, average for points. The competition was exceedingly successful, bringing out some of the best of models, and also bringing some of the "lesser lights" to the fore. Mr. Key proved to be the winner with an average of 73$\frac{1}{3}$, Mr. Funnell second, average 50$\frac{2}{5}$, and Mr. Hooton third with 42, Mr. Sutton 32$\frac{2}{3}$, Mr. Norton 30$\frac{2}{5}$, Mr. R. G. Wilson 16$\frac{1}{3}$, Mr. Kennard 10$\frac{11}{15}$, Mr. M. H. Wilson 4$\frac{2}{3}$. Mr. Key's durations were 68 secs. in a tree, 75 secs. out of sight, and 76$\frac{3}{5}$ "landing" in a lake. Agreed: a good all-round model. The second flight made a point-to-point distance of 627 yds. after circling, all three being high and very steady. Great credit is due to Mr. Funnell for getting second place as he has not been long at "the game." Mr. Kennard had hard luck in colliding with the usual "boy" in the second flight, upsetting the tune of his machine. Mr. Hoyle smashed during tuning up, collided with a tree. The judging and time-keeping was done by Messrs. S. G. Wilson and J. W. Burghope. A sweepstake competition was held, Mr. Hooton drawing the winner and Mr. Funnell curiously drawing himself second. The cup and medals were presented in the evening at headquarters by Mr. J. W. Burghope, vice-chairman, amid the usual festivities and speeches. During the month Mr. Key has been out with Olympia tractor, also 8-oz. r.o.g., getting 80 secs. with latter. Mr. Norton, Olympia 10-oz. r.o.g. and Etrich tractor, 45 secs. with former and Etrich doing about 30 secs. carrying post-cards (photos of itself), also carrying out tests with less and more power and minor alterations to plane. Mr. Sutton's Handley Page Olympia tractor doing a great deal of work, one day flying in strong gusty wind, testing new screws; flying one evening rubber attachment at tail became unfixed when 40 ft. up, rubber suddenly shot to nose—result, nose-dive vertical, but thanks to H.P. planes flattened out and landed gracefully on wheels as though nothing had happened. Mr. Hooton, 8-oz. r.o.g. mono., getting fine flights, also J.W.B. tractor, now extinct. Mr. Hoyle 50 and 55 secs. with Olympia r.o.g., steady flying. Mr. Funnell very good flying with 8½-oz. r.o.g. mono. 35 secs. to 55 secs., very reliable, and flies on low power. Mr. Kennard, 8-oz. r.o.g. mono., the build of which does him credit, has been getting anything up to 55 secs. Messrs. Wilson have had out a good many of their 6-oz. r.o.g. loopers and floating tails, also 10-oz. floating tail r.o.g.

Sheffield Ae.C. (41, CONISTON ROAD, ABBEYDALE, SHEFFIELD).

Monthly Report.—June 2nd, 3rd and 4th, Mr. Marcus Dyce Manton gave exhibition flights of looping the loop, &c., a good number of the members of the club each day in the intervals of his flights demonstrating the capabilities of their models in the air at Redmires Racecourse. The machines belonging to W. H. Bagshaw, jun., J. P. Worrall, C. F. W. Cudworth and Master C. Dewsnap did some wonderful flights and reached great altitudes.

Master C. Dewsnap, the winner of the Colver Cup, for r.o.g. machines. The model seen in his hands secured him the silver medal presented by Mr. Marcus D. Manton for tractor biplanes.

South-Western Aero Club (373, BRIXTON ROAD, S.W.).

Monthly Report.—A good many new machines have been out this month, among which are the following:—Mr. Prodgers, hollow-spar twin-pusher, of very neat design, durations about 60 secs. r.o.g.; this model r.o.g.'s very well indeed, and is very steady on its chassis. Mr. Dickson, twin-pusher A-frame, duration about 50 secs. Mr. Miller, tractor, unfortunately run over and "killed' in its infancy by a small boy. Mr. Peel, 4 ft. 6 ins. twin-pusher, of very good stability; on one of its first flights this machine ran off the park and investigated some high trees, from which it was ultimately rescued by the secretary. Flying meetings are held every Wednesday evening in Brockwell Park, opposite the Clock Tower, at 6.30 p.m., and competitions will be occasionally held at the same time and place. The following members are constructing new machines:—Messrs. Miller (tractor), Dickson (h.s. canard), M. Prodger (pusher), Bell (twin-pusher), Drake (tractor biplane). Mr. Peel and Mr. Prodger both entered for the *Model Engineer* Cup, but unfortunately damaged machines in test flights just before the race.

Stony Stratford and District Kite and Model Ae.C. (OLD STRATFORD).

MONTHLY meeting, first Wednesday July. Competition third Saturday. Buckingham members are requested to whip up and see the branch secretary for their arrangements.

Monthly Report.—May and June. Usual meetings at Buckingham, best performances by Williams and Palmer; Palmer, 53 secs. Stony Stratford.—Monthly meeting, May 6th, subject, "Ding Sayer Model." New rules for competitions arranged. May 18th, the following records passed:—Mr. Brown, Class 1B, 63 secs.; Class 1A, 442 yds. Competition, May 16th at Old Stratford. Results: Mr. E. Brown, 1st, average 210 yds. 2 ft.; O. Hamilton, jun., 2nd, 144 yds. 2 ft.; Mennell, 3rd, 130 yds. 1 ft. Excellent flying with single-screws to 42 secs. June 17th, general business. The secretary was able to report good support to prize fund. A tractor r.o.g. being received from the Star Aeroplane Co.; a tractor r.o.g. and pair of propellers from Messrs. Murray, Son and Co., the last-named being allotted for the best performance of r.o.g. machines; the secretary's medal for season 1913-14; Mr. H. Hamilton, pair of propellers, for the best duration during the current three months; Mr. O. Hamilton, jun., a pair of propellers for the first flight of 20 secs. with a tractor r.o.g. The following record was passed: Mr. Mennell, Classes 2A and 2B, 223 yds. 1 ft., and 31 secs. June 20th, distance competition: 1st, W. Palmer, average 246 yds. 2 ft.; Mr. Brown, 2nd, 240 yds.; B. Williams, 3rd, 195 yds. Best single-screw: Mr. Mennell, average of 70 yds. 2 ft. Winner of novices' prize: Mr. Fancutt, average 118 yds. 1 ft. The club were asked along with other local societies to demonstrate at the Hospital Fête at Newport Pagnell on June 27th. Result of a competition arranged for those taking part in the demonstration: Mr. E. Brown, 1st, average $54\frac{1}{5}$ secs.; Mr. E. Brown, 2nd, $35\frac{1}{5}$ secs.; Mr. Mennell, 3rd, $24\frac{7}{10}$ secs. Mr. Mennell successfully raised the single-screw duration to $32\frac{1}{2}$ secs. The club have adopted the following basis for future competitions:—1 mark for each second of duration, 1 mark for each 20 ft. distance; but the secretary would like to know of a quick and accurate method of measuring the distances for it takes a little time measuring up 48 flights of average 200 to 400 yards.

Wimbledon and District (165, HOLLAND ROAD, W.).

THE first round for the Farrow Shield takes place on July 4th on the ground of the Paddington Aero Club. The following will represent the Wimbledon Club:—Messrs. G. Hayden, A. F. Houlberg, L. H. Slatter, F. Powell, D. Laing, T. D. C. Chown, A. G. Boniface, D. Easdale and H. D. Davis. July 5th, flying as usual.

Monthly Report.—On June 2nd a handicap competition for duration r.o.gs. was held and attracted a good entry. Mr. Boniface, flying a tractor, took first place with flight of 77 secs., and Mr. Laing, flying a twin-screw, second with 68 secs. With a 4-oz. loading biplane Mr. Hayden has on one occasion got 102 secs. A similar machine by Mr. Laing, with swept-back wings, shows good stability. Both these models were flown in the *Model Engineer* competition on June 13th, but Mr. Hayden broke a wing and Mr. Laing experienced trouble in getting off. Mr. A. F. Houlberg, with a 6-oz. loading mono. with metal plane, and Mr. Slatter, with a 4-oz. loading biplane, also flew on this occasion, the latter coming in fifth. The official trials were held on June 20th, and several members made attempts on the records, without success. Mr. Laing flew a tractor, Mr. F. Wilkinson had a light h.l. single-pusher canard, Mr. Boniface a 0–1–1–P for the distance record. Mr. F. W. Jannaway, a welcome addition to the club, has been flying his Olympia weight-lifter; Mr. Davis his small twin-screw of which the wing span is 48 ins. and the length of the frame only 33 ins., this combination, with the business-like chassis and bracing, giving the model a resemblance to the full-sized machine which is lacking in most twin-screws.

Windsor Model and Gliding Club (10, ALMA ROAD.).

Monthly Report.—The greater part of this month has been occupied in the construction of the full-size machine. The *fuselage* has been nearly finished, so that work will soon begin on the wings. So far the weight has worked out very light, consistent with the strength. Time has been found to fly some new models. F. Camm's big weight-carrying machine has made some very impressive flights, and although smashes have been frequent, no great damage has been done. Mr. S. Dandridge has flown a tractor monoplane with great success. It is extraordinary slow, but maintains good stability. J. E. and W. Rogers have flown the model entered for the *Model Engineer* Cup competition, and have made some good durations. S. Camm, S. Spicer and E. Stanbrook have flown various models, but as the average output of the members is three per week, detailed mention cannot be made of them. It is rather a pity that the majority of this season's contests seem designed to encourage the simple duration model, and it is very apparent that if clubs continue to fly models which have no pretensions to resemble full-size design, public interest, so necessary to success, will die out. It is for this reason that the members of this club are building the full-size machine. If all clubs had progressed along these lines, it is not too much to assert that the model movement would have been of considerably more use to aviation. It is gratifying to record that the people of Windsor have responded very well to the appeal for funds.

UNAFFILIATED CLUBS.

Burton and District Aero Club. (156, SHOBNALL ROAD.)

THE club has been requested by the Towns Attractions Committee to make all arrangements for the Hydro. Competition to be held at the Burton Fête and Gala on August 29th, open to rubber-driven machines of any size or weight. The prizes are £3, £2 and £1; also a silver challenge vase to be competed for by two members of any club within 50 miles of Burton, to be held for one year.

Monthly Report.—The club is making great progress now and anyone in the district interested would do well to communicate with the hon. sec. The result of the Whitsun Competition was:—Duration: 1st, C. G. Lamb; 2nd, J. Makin; 3rd, L. N. Fearn.

Dover Model Ae.C. (1, GUILDFORD LAWN, DOVER.)

Monthly Report.—Some good flying has been done, especially with hydros. Messrs. C. Sargeant and H. T. Holman's machines being the most successful. Mr. Duncan Davis created a club record of nearly 600 yds. with Mr. Ian Macdonell's twin monoplane. Mr. J. Clarke had a flight of about a quarter of a mile with a tractor monoplane, but unfortunately it was not official or it would have been a club record. Although members still persist in fitting sensible chassis on r.o.g. machines, and refuse to use rising boards or carpets, the class of flying is steadily improving. Mr. Sargeant was making some fine r.o.g. flights with his twin-screw biplane of about 400 yds., and Mr. Whorwell with his tractor monoplane r.o.g. flights of well over 200 yds., and durations of over three-quarters of a minute. With his hand-launched tractor monoplane he got distances of from 350 to 360 yds., and with his tractor biplane from 250 to 260 yds. Messrs. C. Sargeant and Ian Macdonell have been devoting their attention lately to biplanes, and have taken turns in moving up the biplane duration record during the month. It now stands in favour of Mr. Ian Macdonell with a flight of 82 secs. Mr. Ian Macdonell also had some good monoplane flights averaging over 60 secs. Mr. Wicks was doing good flying at the beginning of the month with an r.o.g. monoplane. Mr. Watts has been testing a tractor and twin monoplane, the latter proving the most successful. Mr. H. T. Holman won the recent duration handicap with Mr. Watts a close second. The scale Morane monoplane, which was built by Mr. C. Sargeant for the Dover Model Aero Club Exhibition, has recently been purchased by the Grahame-White Aviation Co. Mr. Sargeant has also nearly completed his model of M. Blériot's cross-channel machine for the Dover Museum, and it is said by those in a position to know that it is quite the equal of the best model seen at the recent Olympia Aero Show. During the past eight weeks papers on various subjects of interest to modellists have been read, and very much appreciated by members. The list is as follows: H. T. Holman, "Model Propellers"; A. Wicks, "Model Airships"; C. Sargeant, "Gnome Engine"; H. T. Holman, "Motive Power for Models"; H. E. Whorwell, "Aviation (a Retrospect)"; H. T. Holman, "Hydros."; H. T. Holman, "Tractors."

Dundee Aero Club (4, FORESTER STREET).

NEXT competition for Luis Trophy, tractor competition. Single screw minimum weight, 6 oz. Last week in August. Hydro-Aeroplane Competition in September.

Monthly Report.—May 23rd, Messrs. Robertson, Maxwell, McNab, Stuart and Powrie were flying at Magdalen Green. Robertson with a 1–1–P2–0 r.o.g. got 40 secs., a club record, and also a Scottish record for this type of machine. Thanks to the kindness of the commanding officer a very enjoyable evening was spent inspecting the hydros at the naval base on June 10th.

Edinburgh Aero Club (13, HERMAND TERRACE, EDINBURGH).

Monthly Report.—On June 6th flying at Inverleith. Wind blowing hard, but some good flights were obtained by Messrs. Watt, Fiddes, Saidler, Harrison and Ramsay. Mr. Harrison was flying a large r.o.g. twin prop. mono., which did some long flights and some startling banks. On 13th, the long postponed hydro. competition took place at Craiglockhart. The conditions were ideal, the water being very calm and a slight breeze blowing. Messrs. Harrison, Saidler, Watt, Fiddes and Ramsay entered, other members being spectators. The machines with the exception of Mr. Fiddes' were all under surfaced, and they were unable to do anything over a yard out of the water. Mr. Fiddes' machine rose after a run of about 15 yds. and flew for about 15 secs., covering more than half the pond. He had several such flights, which won him the competition. On 20th, flying at Inverleith. Most members present with various machines. Mr. Fiddes some good flights with hydro., Mr. Harrison flying well with large r.o.g. mono., Mr. Watt also some good flights with h.l. mono. On 27th, flying at Inverleith, but owing to high wind only a few members present with machines, the best flights being obtained by Messrs. Harrison and Watt; Mr. Ross out with small looper glider, doing good loops.

Finsbury Park and District (66, ELFORT ROAD, HIGHBURY, N.).

JULY 4TH: Competition meeting, 4.30. Events: 1, speed; 2, h.l. duration for tractors and r.o.g. duration for twin-screw models; and 3, target contest, all types

Monthly Report.—The general design of models has undergone great improvement, nearly all the single-stick machines having been replaced by a sensible type of body. On May 30th, an all tractor competition meeting was held, which was a great success. The events were:—R.o.g. duration, r.o.g. distance, and h.l. distance. Mr. A. Richards headed the list with 556 points, gaining the club's silver medal; Mr. H. Mullin, 2nd with 459; Mr. S. Pratt, 3rd with 143 points, the other competitors followed closely. Mr. A. Richards' monoplane was a Deperdussin tractor and a fast flyer, Messrs. H. and R. Mullin's machines were of the square wing fish-tail type, Mr. S. Gibbs had a floating tail tractor, and Messrs. B. H. Barnard and S. Pratt, the former with a Deperdussin mono and the latter with a Blériot mono., also put up some steady flying. Mr. A. Richards on June 6th, raised the club's distance record for h.l. tractors to 600 ft. with a Morane swept-back wing tractor mono. Mr. B. H. Barnard put up some good flying with his Morane racer, a heavily loaded monoplane which climbs at a very steep angle without stalling, Mr. S. Pratt also did good work with a Blériot. June 20th, Mr. B. H. Barnard out with Morane mono., S. Gibbs with Handley Page tractor and A. Richards with Deperdussin machine. On June 27th, Mr. Savage was out with twin-screw canard Mr. S. Gibbs' Morane tractor and Mr. B. H. Barnard, Morane tractor, all flying well.

Liverpool Aero Research Club (62, CEDAR GROVE, LIVERPOOL).

JULY 4TH, 4 p.m. till dusk, at Stanley Park, all types. *Aero Research Trophy Competition Rules for 2nd Quarter.*—This competition is open to members of the Liverpool Aero Research Club only and will be awarded for:—Models of either the tractor or propeller type capable of rising from the ground under their power. Models must be equipped with *fuselage* entirely covered in. Propulsion may be of any form the competitor may select. The official flying will be timed on Saturday, July 18th or 25th. Models will be required to rise from natural ground, artificial surface will not be provided. Competitors may change, add to, or repair their motive power as often as it is found necessary. Competitors must not assist their models by pushing or otherwise, in rising off, under penalty of being disqualified. The winner shall be the competitor who gains the highest average of points. Points will be allowed one for each second duration. If time permits three trials will be allowed. These regulations will be added to or amended at the discretion of the judge. Entries must be made not later than July 14th.

Monthly Report.—Excellent work has been done by T. W. Bennett (floating tail r.o.g.), B. Tear (canard mono.), G. H. Kilshaw (r.o.g. mono. and canard). Whit-Monday, G. H. Kilshaw and W. Beale out on Aigburth Cliffs experimenting with 6 ft. divided tail mono. as glider. T. W. Bennett (who has also a ¼ full-sized Cody man-lifting kite and large "Hawke" kite) and B. Tear at Stanley Park, with r.o.g. and h.l. machines. At Sefton, E. Kilshaw, r.o.g. pusher, G. H. Kilshaw with 4 ft. tractor and h.l., and W. T. Beale. On June 13th and 20th members inspected T. Elder Hearn's Blériot two-seater at Childwall, under repair after its recent mishap and which afforded a good opportunity of studying wing construction, &c. June 16th, Bennett out with 8 ft. 6 ins. box kite and large hawk. The first midweek meeting took place at Stanley, Thursday, June 18th, the impromptu contest between T. W. Bennett and G. H. Kilshaw keeping the crowd in good tone; the former's machine 3 secs. the better. Second midweek meeting at Stanley Park, June 25th, B. Tear with back-swept h.l. canard doing good flights and also h.l. wash-out wing 1–1–0–P2. T. W. Bennett flying his retreated wing h.l. pusher with usual good results, also having out 8 ft. 6 ins. fin box kite and another 4 ft. 6 ins. W. T. Beale flying the former's midget with remarkable results, being only 1 ft. span.

G. H. Kilshaw testing propellers on a twin-pusher, a pair of Chauvière-type low-pitched sending the model to better heights than tbe high-pitched carved or bent. Several members are now well on with the trophy competition models, and tbose intending to compete should get finished and tuned up in good time for contest next month.

St. John's Model Ae.C., Hensingham (19, BEDFORD STREET, HENSINGHAM, WHITEHAVEN).

MEMBERS are requested to note that the closing date for the Beginners' Competition bas been postponed from June 30th to July 11th.

Monthly Report.—Competition on June 13th won by H. C. Allinson with his "Jupiter" model, and on June 27th by J. W. Smith. Flying during month by above members, also by Rev. C. E. A. Blackburn, Messrs. Ingledow, Selby, Bedgar, Reynolds and Postlethwaite.

Scottish Ae.S. Model Ae.C. (5, DOUNE QUADRANT, GLASGOW).

JULY 4TH at Paisley, h.l. and r.o.gs. July 11th, third and final competition for "The Arthur Corbett Cup" at Maxwell Park Pond. Type, Waterplanes. No other official flying meetings will be held during July owing to holidays.

Monthly Report.—At Paisley on May 2nd, the first of tbe competitions for "The Arthur Corbett Cup" was held, being for h.l. type. Tbe result was as follows:—1. Jas. C. Balden, distance 1,260 ft., duration 52 secs., points 112. 2. T. Graham, distance 800 ft., duration 59 secs., points 97. 3. Ian S. Ross, distance 500 ft., duration 40 secs., points 63. At Paisley on May 9tb, Mr. T. Graham testing a new twin-screw r.o.g. with tubular *fuselage*, his best times being 35, 36, and $38\frac{4}{5}$ secs., the latter being a new official Scottisb record for this type. Mr. Jas. C. Balden had out his new looping model, getting $43\frac{4}{5}$ and 46 secs. and one or two loops. May 16th, Mr. T. Graham flying a twin-screw h.l., his best times being 57, 61, $66\frac{2}{5}$ secs. Mr. Jas. C. Balden was experimenting with a new single-screw h.l. model, getting $49\frac{2}{5}$ and $48\frac{2}{5}$ secs. Mr. G. Pinney had several good flights with a twin-screw A-frame, his best durations being 33, $32\frac{4}{5}$, and 31 secs. May 30th, Mr. Ian S. Ross flying a neat twin-screw h.l., his best durations being $54\frac{1}{5}$ and $67\frac{2}{5}$ secs. June 13th, the second of the competitions for "The Arthur Corbett Cup" resulted as follows:—1. T. Grabam, distance 773 ft., duration 40 secs., points 80. 2. Jas. C. Balden, distance 504 ft., duration 37 secs., points 63. Total to date: 1. T. Graham, 177 points; 2. Jas. C. Balden, 175 points. Mr. Graham's flight of 40 secs. in this competition constitutes a new official Scottish record for this type. On Thursday, Friday, and Saturday last week, the members visited Scotstoun Showground to witness B. C. Hucks and Marcus Manton's exhibition of flying. On tbe Thursday, Allan M. Muir, one of the youngest members of the club, went up with Mr. Hucks as a passenger, being the winner of the sweepstake organised by the club. He was in the air for twenty minutes, and reached an altitude of 4,300 ft.

The Scottish Aeronautical Society Model Aero Club.—The Arthur Corbett Cup, presented by Lord Rowallan to the Club for annual competition. On the right, Mr. T. Graham, of the Scottish Aeronautical Society Model Aero Club, with his twin-screw H.L. record-breaking model (duration 95 secs., distance 3,049 ft.).

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

THE usual flying meetings this week-end. Members are requested to note that a Garden Fête and Model Aeroplane Display is being given at the Riverdale Mills, High Street, Lewisham, on Thursday, July 23rd, in aid of local hospitals. Every member is expected to assist, either by personally demonstrating his model or by lending one for exhibition purposes.

Monthly Report.—During the past month Messrs. F. Edwards, A. F. Chinery, W. Jones, G. H. Westwood, W. Entecott, A. D. Nicholls, R. W. Prance and A. B. Clark bave been most regular in their attendance at the various meetings. Messrs. Hatful and McLaughlin have flown single-propeller machines, F. Dixson an A-frame and R. E. Attwooll a neat tractor. Amongst some of the most noteworthy flights may be mentioned those made by Messrs. Wilkinson and Nicholls. The former, with an r.o.g. single-propeller model, and the latter, with an r.o.g. twin, captured the club record for their respective class. The membership has lately been appreciably augmented, and the hon. sec. (Mr. A. B. Clark) will be pleased to meet anyone at the next Blackheath meeting. Full particulars of membership may be obtained if written application be made to him at 1, Railway Approach, Brockley.

Southend. Westcliff and Leigh Model Aero Club (96, VALKYRIE ROAD, WESTCLIFF-ON-SEA).

FLYING meetings Wednesday evening and Saturday afternoon.

Monthly Report.—At the meeting for the Watson Trophy the winner was E. Gage. The members also took part in a competition held in Chalkwell Park, Leigh, open to the district, two first prizes out of three being taken by members of this club. 1st, for twin-screw h.l., being E. Prockter; 1st, for simultaneous start race, D. Plaistowe. Others flying: E. Woodfield (new single-screw), E. Prockter (r.o.g. and stability tractor), J. Clappen (single-screw), E. Louis (single-screw bow-frame).

Twickenham and District (74, CLIFDEN ROAD, TWICKENHAM).

JULY 4tb, 3.30–6 p.m., waterplane competition for the Franklyn Prize, at Bushy Park; July 5th, 11th, 12th, 18tb, and 19th, flying as usual at Whitton Park.

Monthly Report.—June 7tb, Mr. Franklyn brought out a 3 ft. 3 ins. floating tail hollow spar machine, but it was very unstable fore and aft, which appears a common fault with this type. Later it was fitted with an elevator, which seems to have corrected all its former vices, and it now puts up good duration flights comfortably. June 20th–21st, amongst others there were present, Messrs. Stagg, Bremner, Maynard, Barnes, Foster, and the secretary, who were out with many and various macbines. June 25th, at meeting, the half annual report was read, in which the sec. stated that it was the 27th meeting of the club, and that the state of the club was practically all that could be desired. During the evening a paper was read by Mr. H. Barnes on "Aeroplane Controls," and an interesting discussion followed.

Westcliff-on-Sea and District Aero Club.

A NEW club has been formed by a few gentlemen in Westcliff under the above name. Their first meeting was held on June 11th, being attended by some experienced flyers. A flying meeting is held every Saturday. Competition flights for club cup on alternate Saturdays. New members are required; any gentlemen in or near district sbould apply for particulars of membership, &c., to Mr. V. A. Gage, 51, Milton Road, Westcliff-on-Sea, or to secretary, Mr. H. R. Cooper, Fleming Crescent, Leigh-on-Sea.

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CORRESPONDENCE.

Gyroscopic Action of Rotary Engines.

[1873] With regard to your article on the "Gyroscopic action of Rotary Engines," may I call your attention to the fact that the idea that the axis of rotation should be transverse to the machine, quoted from the *Scientific American*, is by no means new. It was propounded by me in a letter to FLIGHT published on December 24th, 1910, and an arrangement was suggested whereby this gyrostatic action might be used for the purposes of stability. Now, as then, I would still advocate the building of large machines, though, in view of Professor Bryan's investigations on stability, I should probably modify my views as to the necessity of gyrostatic control at all, though conceivably it might be used as an adjunct for the purpose of helping any manual control that might be necessary.

The College, Epsom. CHRISTOPHER W. C. WHEATLEY.

Brakes for Aeroplanes.

[1874] I was very much interested to see letter No. 1870 in this week's issue, as the same thing occurred to me with the exception that I did not think of a reversible engine but of a reversing gear, as reversing engines in marine work are, I believe, not a success. I am looking forward with interest to seeing the opinions of your readers as to the effect of reversing the screw.

S. J. H. TOWNSEND.

Royal Automobile Club, Pall Mall, S.W.

The New Naval Service Badge.

[1875] I see that an eagle has been chosen as the badge of the New R.N. Air Service. Would not an albatross or gull, or other sea bird, have been more appropriate? An eagle at the best of times would make a poor show of water-work.

Southgate Hill, Winchester. G. S. MOBERLY.

⊛ ⊛ ⊛ ⊛

Aeronautical Patents Published.

Applied for in 1913.

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12,716. C. CANOVETTI. Aerial propellers.
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CONTENTS.

Editorial Comment: PAGE
The R.A.F. and the Private Constructor 721
Flying at Hendon 728
The Concentration Camp R.F.C. at Netheravon 723
Royal Aero Club Official Notices 731
From the British Flying Grounds 731
London-Paris-London Race... 734
Eddies. By "Æolus" 736
The Flying Machine from an Engineering Standpoint. By F. W. Lanchester 739
The New Vickers Biplane 740
Foreign Aircraft News 742
Models. Edited by V. E. Johnson, M.A. 744
Correspondence... 745

EDITORIAL COMMENT.

The R.A.F. and the Private Constructor. Almost from its very inception the Royal Aircraft Factory has stood as a sort of *bête noir* to the private constructor of aircraft. On the one hand, it has been freely stated that the purpose of those in charge of the Factory is to get the whole of the constructional work for the Army into its own hands and to put the private builder down and out, as the vulgar phrase goes.

On the other side of the picture, the officials have been painted as angels of light, whose one aim in life it is to foster the private industry and to assist by all means in their power to build up a stable industry upon which the country will be able to lean in time of stress. So far as our own attitude towards the Factory is concerned, we have always endeavoured to hold the balance fairly as between it and its critics, leaning neither to the one side nor the other. On occasion we have not hesitated to criticise the policy by which it is directed, particularly with regard to constructional work, neither have we hesitated to fall foul of those who in our judgment were wrong in their facts or criticism of that policy. We would, therefore, have it clearly on record that in what we have to say on this present occasion, we are not in the least actuated by a spirit of hostility to the R.A.F. or towards those in control of its work.

It has come to us through a leading private constructor, whose name we refrain from mentioning, for obvious reasons, that it has been decided to lay down a large number of the new R.E. machines for construction in the R.A.F. solely, and that no orders are to be placed for the type with private firms. Ostensibly, the reason for this is that it is considered desirable that the details of these machines shall be kept secret. On the face of it, this may appear to be a good reason, but on examination we do not think it will appear quite as sufficient as at first sight. First of all, let us go back a little and recall the many statements that have been made by responsible Ministers of the Crown with regard to the R.A.F.

Time and again it has been said, with all possible weight of authority, that the functions of the Factory were to be purely experimental and for the purpose of executing repairs to machines already in commission. In no sense was it to be a competitor of the private firm in constructional work. Yet from time to time it has been alleged that the Factory was more of a constructional works than a repair factory. More, it has been said that one of its principal functions seemed to lie in picking the brains of others, with the ultimate purpose of embodying their ideas in a new type and claiming the credit for originality of thought. Our readers may remember that we challenged this last statement in a most definite and categorical manner, but that no satisfactory reply was ever made to the challenge, with the result that we can only regard that charge as being at least "Not Proven."

We have only referred to this aspect of the relations between Factory and private constructor as incidental to those relations, and to once more bring out the fact that all along there have been the gravest suspicions entertained in many responsible quarters of the *bona fides* of official assurances. It is not our purpose, however, to pass judgment on what has gone before, but rather to seek assurances as to the future.

Now, if official statements as to the functions of the R.A.F. are to be taken to mean anything at all, why is the Factory undertaking the construction of these R.E. machines to the exclusion of the private contractor? (We are assuming, of course, that our informant knows whereof he is talking when he assures us that the position is as he has said.) Either the R.A.F. is out to do constructional work or it is not. We have been assured, not once but many times, that it is not, and yet we receive the sort of information which is the subject of these remarks! Somehow things do not seem to fit together at all well!

As we have said, the ostensible reason for the departure from the official programme is that it is desirable to keep the details of the R.E. secret. That is only a good reason as far as it goes. Let there be no mistake in this.

We place the Imperial interests of the country as high as anyone, and if it can be shown that those interests clash with those of the aeroplane industry, then we are altogether at one with the authorities in placing them in the forefront, even though it should lead to the virtual wiping out of an industry with which we ourselves are to a great extent allied. But we are not content with the bare statement that the reason is as laid down. It is not as though secret and confidential work was not put out to contract in other directions. What about private shipyards, in which work of the most highly confidential character is carried out without injury to the interests of the State? What about the exceedingly delicate documents which are entrusted without a shadow of suspicion or doubt to the King's printers? And is there any reason to think that the privileges accorded to shipbuilders, ordnance manufacturers, and printers would be abused by the builders of aircraft? For our own part, we decline to think so and with no desire in the world to be captious—the records of these columns are sufficient index to that—we do think that some official explanation is due.

The facts of the case having been thus made public, we hope that such an explanation will be required across the floor of the House of Commons, and until that has been asked and given—or withheld, as the case may be—we prefer to suspend judgment.

⁂

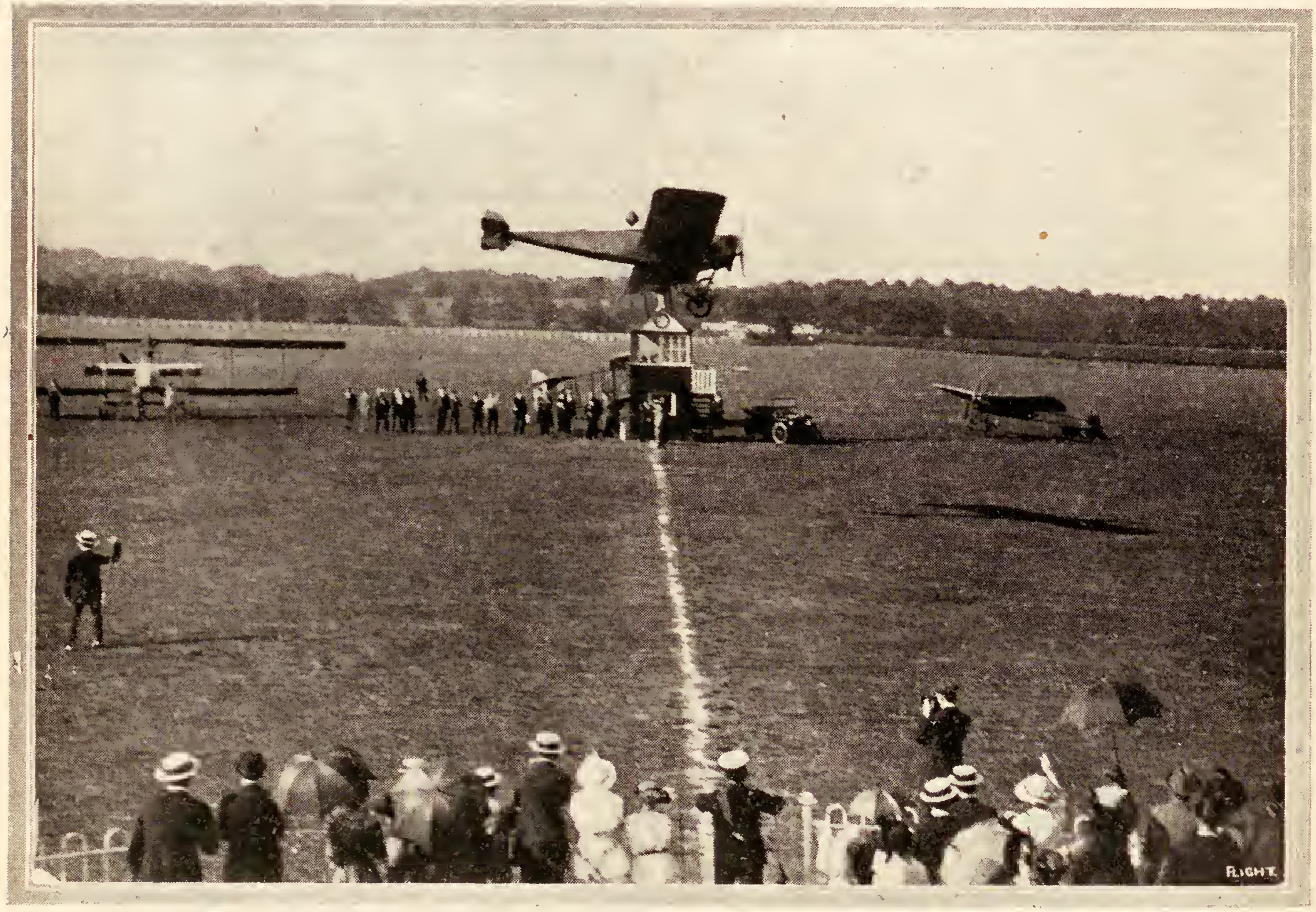
THE ROYAL FLYING CORPS.

In the last two issues of FLIGHT we have published an account of the work carried on at the Concentration Camp by the Military Wing of the Royal Flying Corps at Netheravon. Elsewhere in this issue, by way of a record, will be found photographs of the Officers, Warrant Officers, Flight Sergeants and Sergeants of the Aircraft Park, Headquarters Flight, and Nos. 2, 3, 4, 5 and 6 Squadrons of the Royal Flying Corps who were present at the Camp.

⁂

THE FATAL ACCIDENT TO LEGAGNEUX.

WITH the passing of Legagneux there disappears from French aviation one of its most popular heroes. It appears that on Monday the aviator was testing a Clement-Bayard waterplane above the Loire at Saumur, when just as a sideslip was being corrected the propeller burst and the machine fell into the river. By the time help reached the spot the pilot was dead, and subsequent examination led the doctors to conclude that he was killed while the machine was still in the air, through being thrown against the hood and breaking his neck. Legagneux, who qualified on a Sommer biplane in April, 1910, had also flown Voisin and Farman biplanes and Morane, Blériot, Nieuport and several other monoplanes.



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R. H. Carr winning the Cross-Country Race, with Miss Saunders as passenger, on the Morane-Saulnier mono. at Hendon on Saturday.

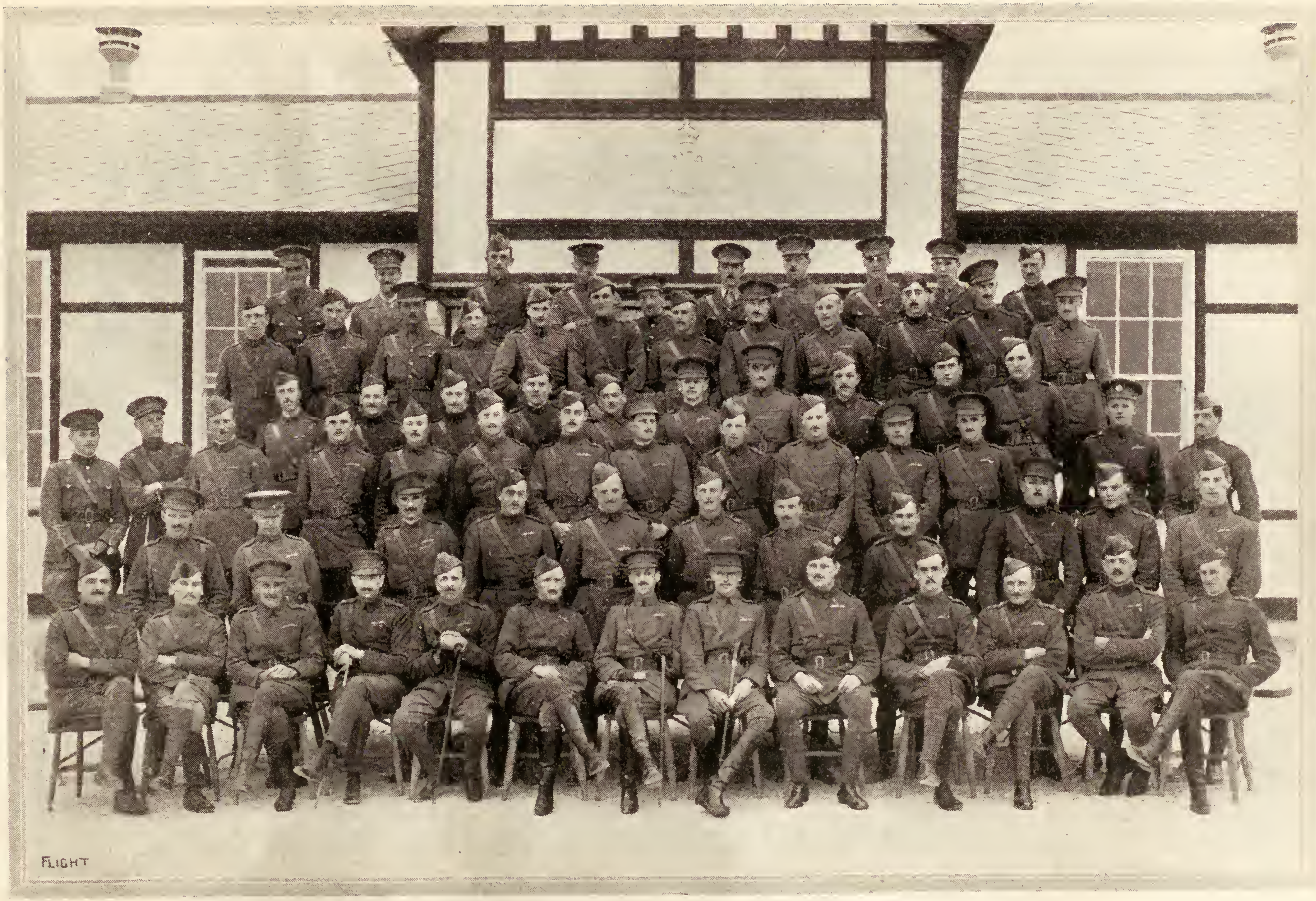
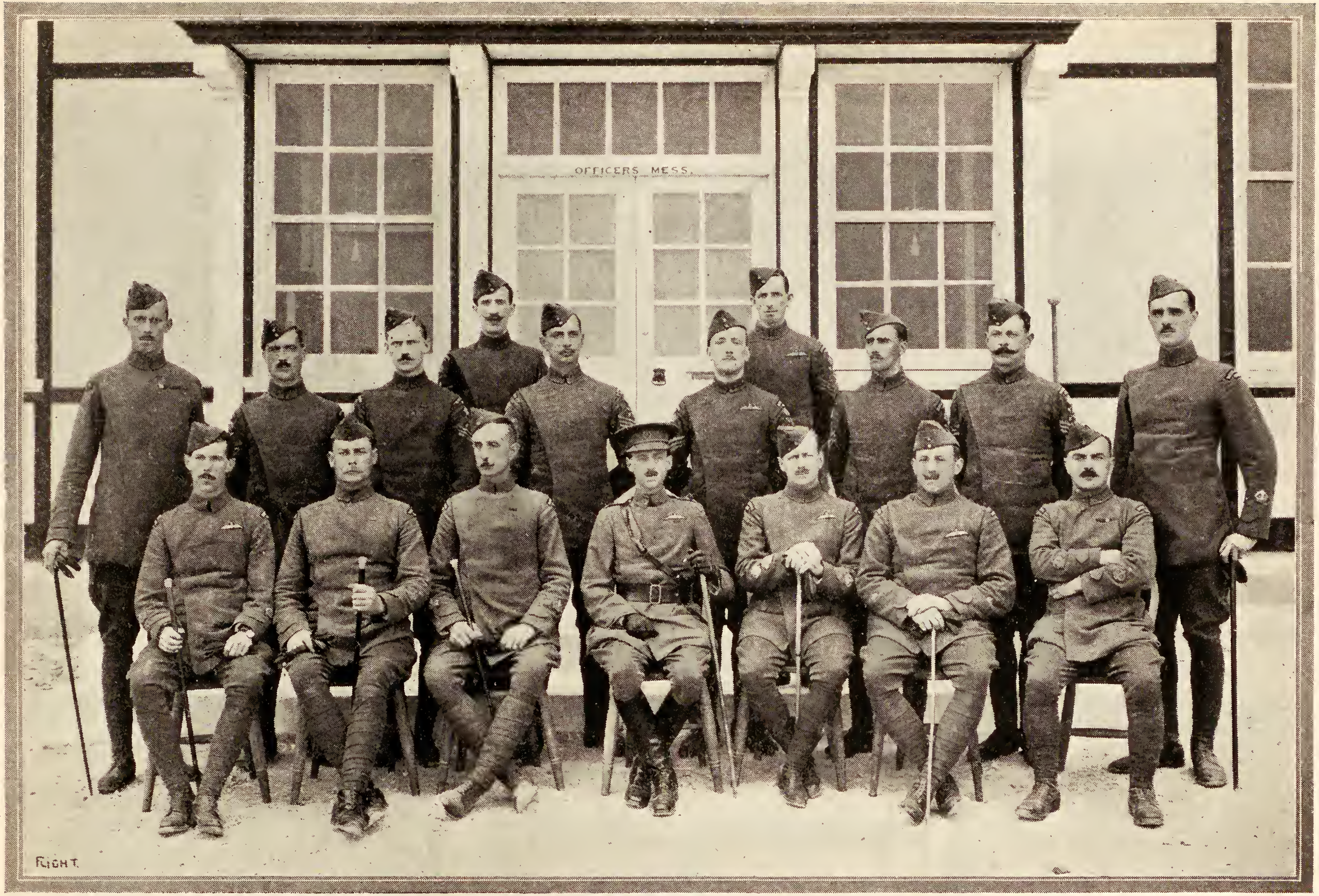
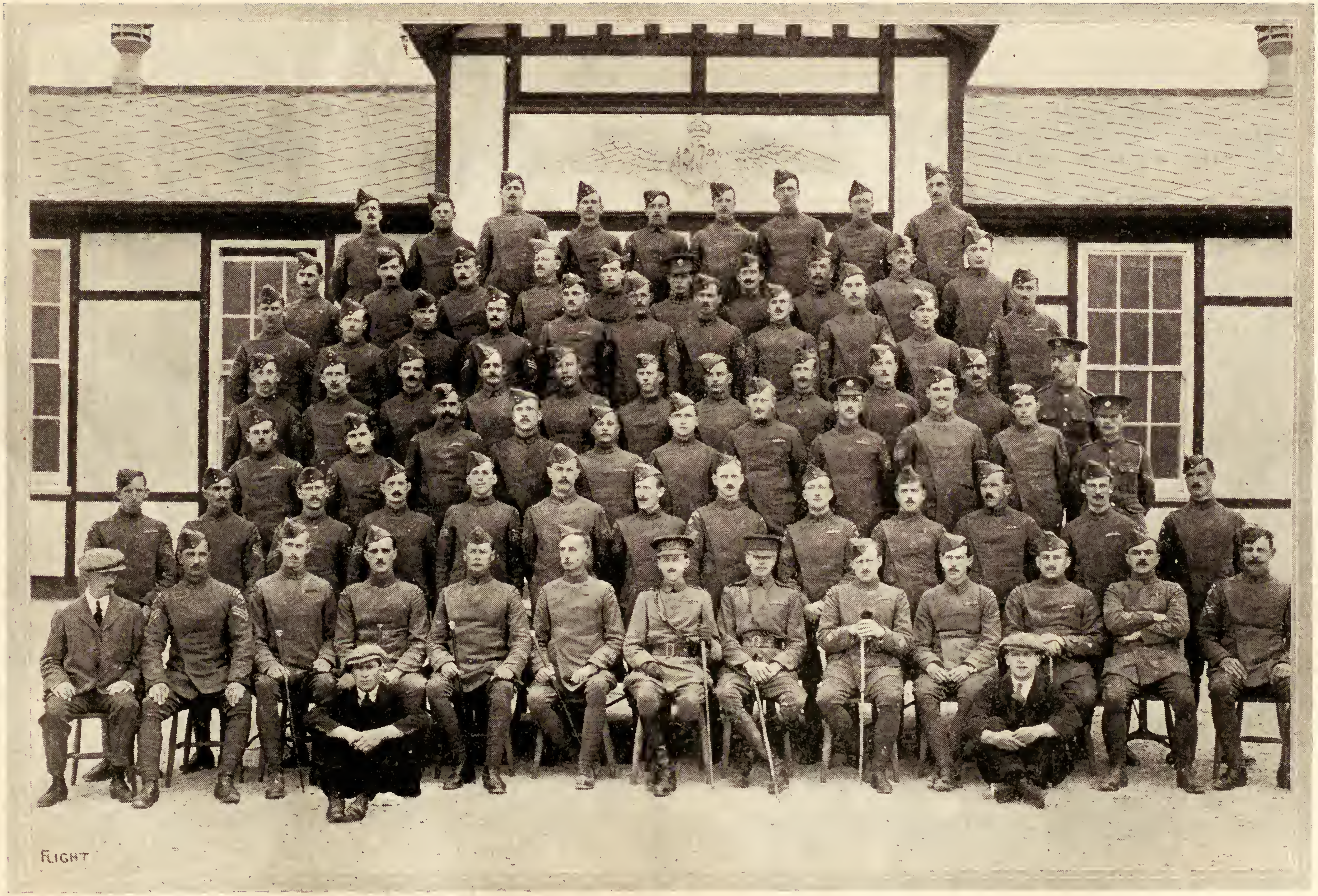


Photo by Gale and Polden.

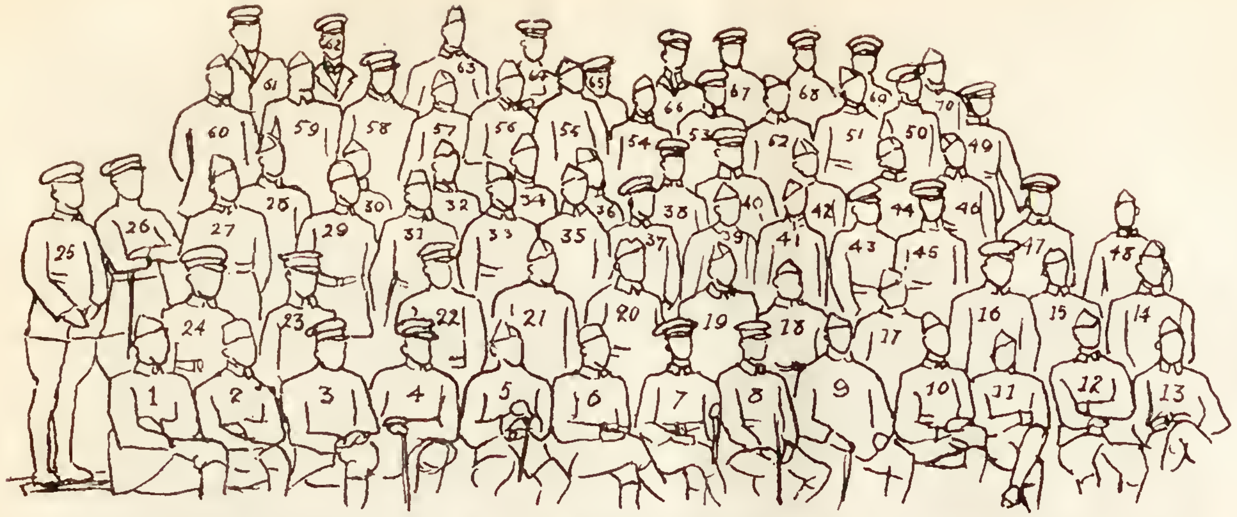
CONCENTRATION CAMP AT NETHERAVON.—Officers of the Royal Flying Corps. (For Key see page 726.)



CONCENTRATION CAMP AT NETHERAVON.—Warrant Officers and Flight Sergeants of the Royal Flying Corps. (For Key, see page 726.)



CONCENTRATION CAMP AT NETHERAVON.—Warrant and N.C. Officers of the Royal Flying Corps. (For Key see page 726.)



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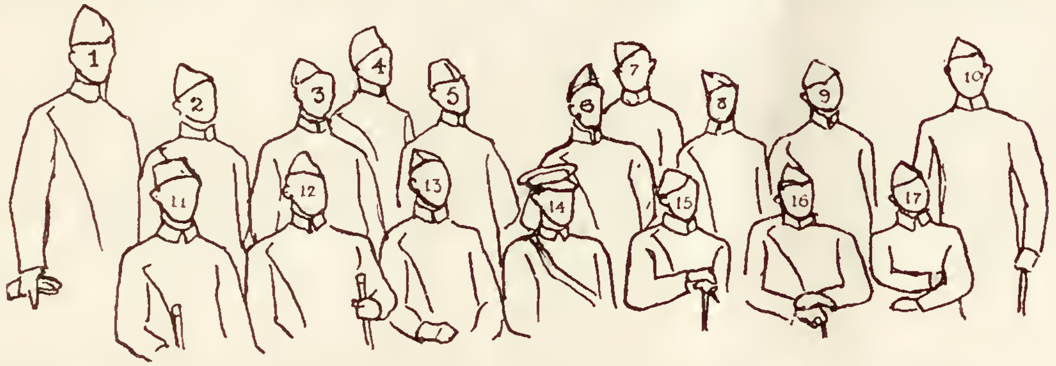

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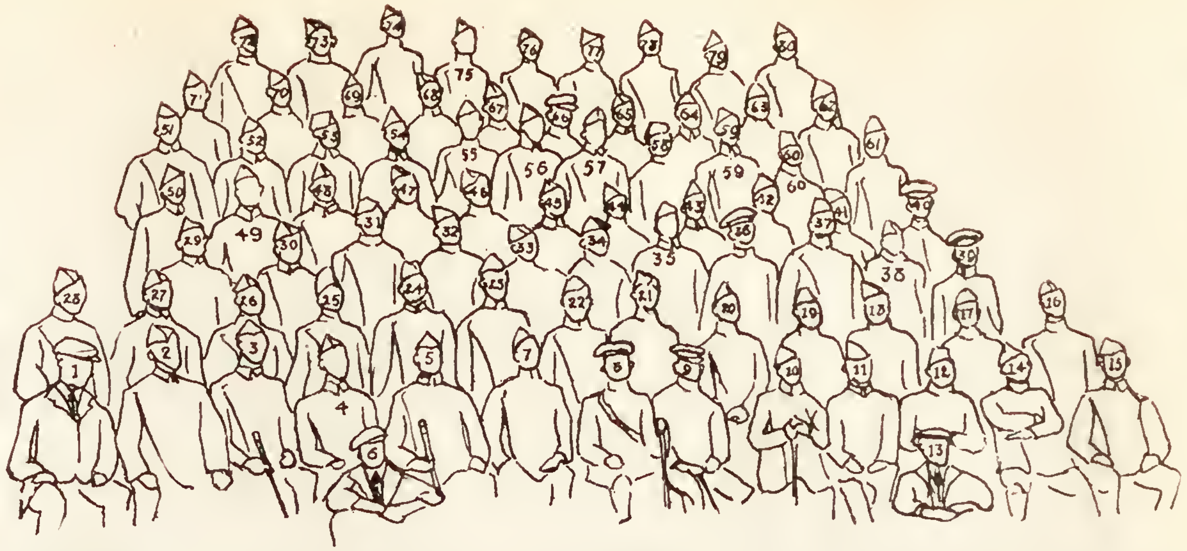

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Key plans to the photographs of the Officers of the Royal Flying Corps appearing on page 723, the Warrant Officers and Flight Sergeants on page 724, and the Warrant and N.C.Os. (on page 725) of the Royal Flying Corps.

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July 18—Saturday ...	Speed Race for Shoreham Cup.
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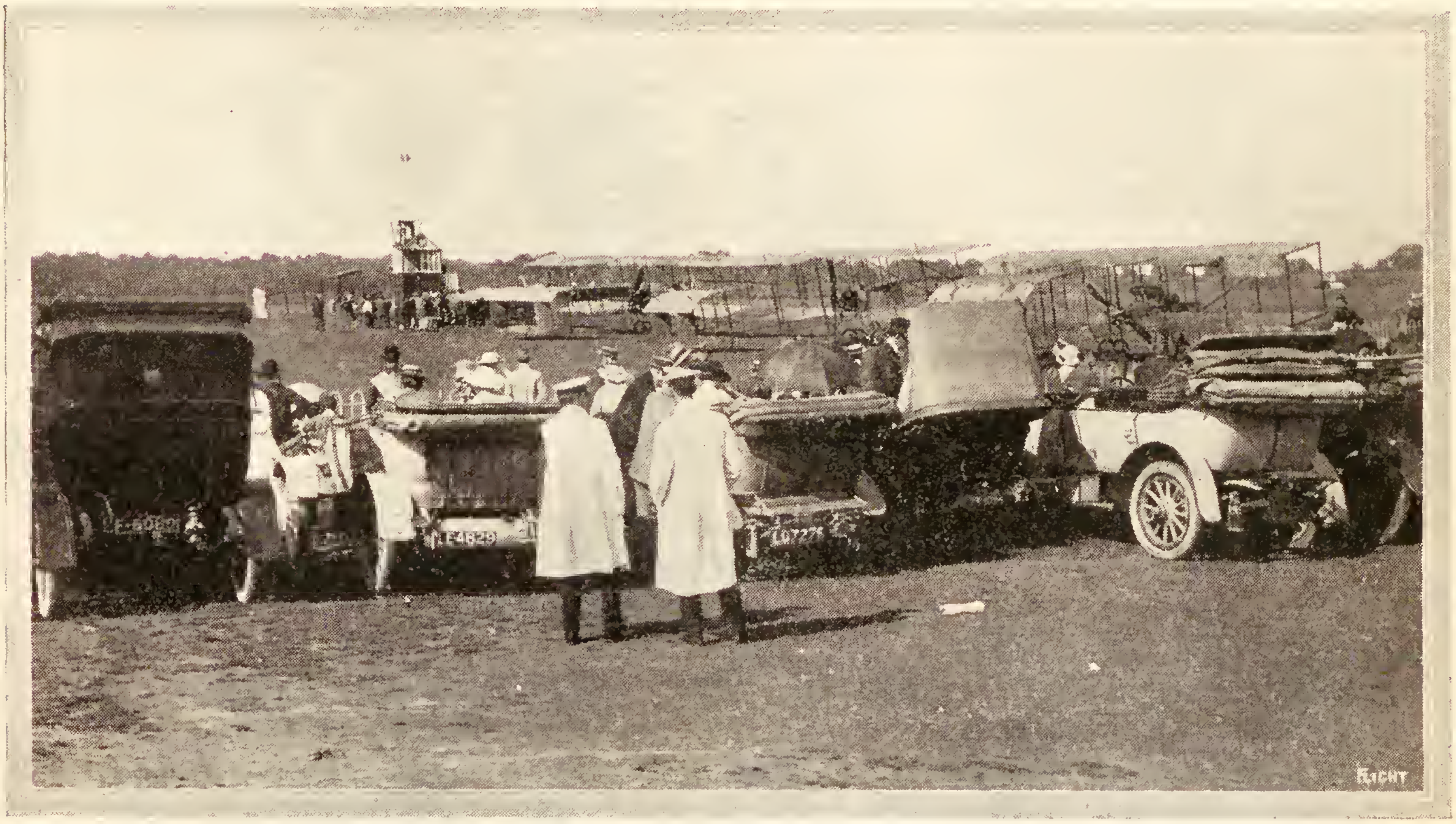
CROSS-COUNTRY RACE AT HENDON.



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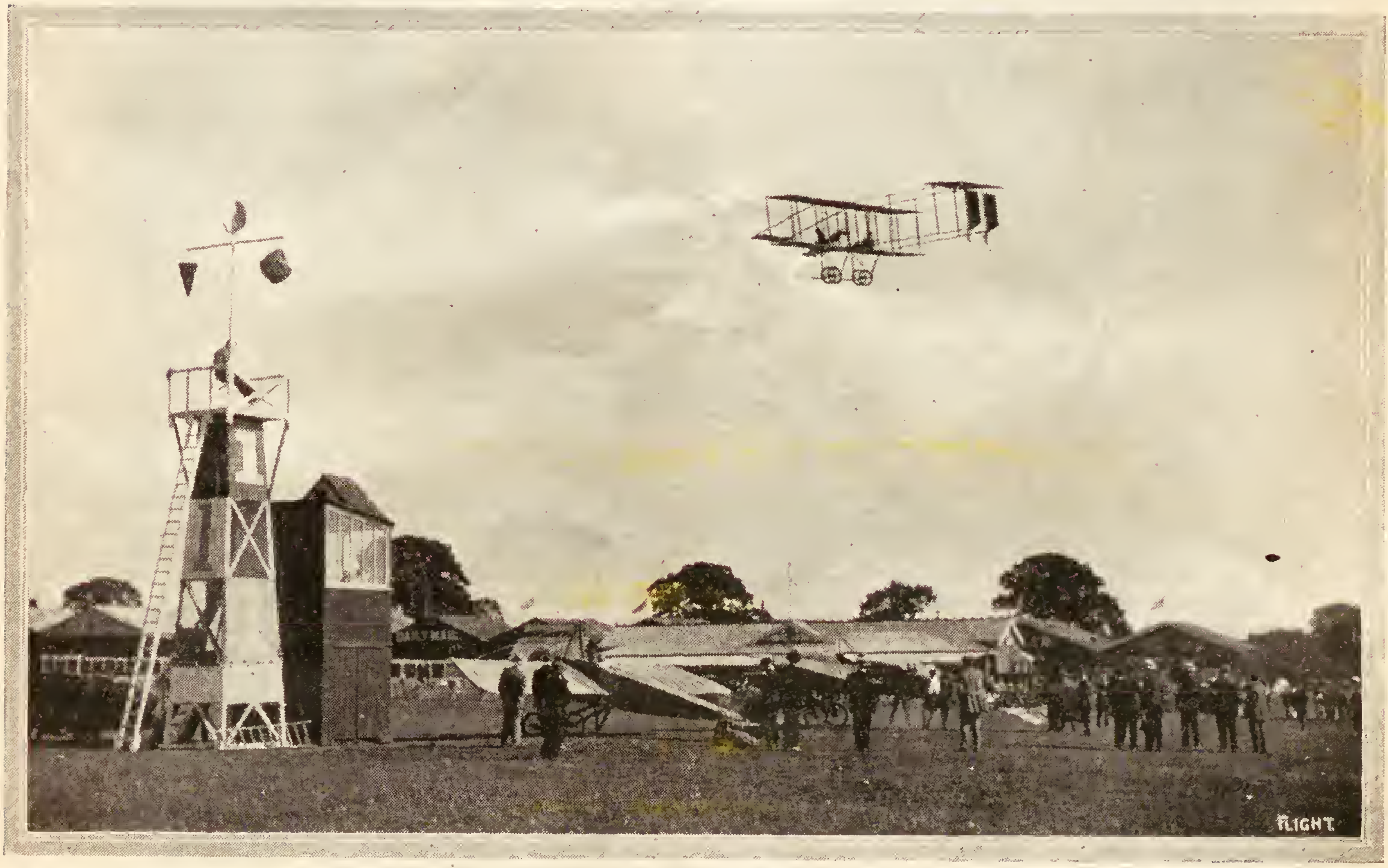
The start for the Cross-Country Race at Hendon on Saturday.



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R. J. Lillywhite, on the bi-rudder G.-W. 'bus, completing his first lap and passing over two machines still waiting to start in the Cross-Country Handicap at Hendon on Saturday.

FLYING AT HENDON.

THE flying on Thursday afternoon of last week started with an exhibition by W. Birchenough on the 70 h.p. Maurice Farman, R. J. Lillywhite following shortly after on the 50 h.p. G.-W. bi-rudder 'bus. Louis Noel then took over the Maurice Farman as soon as Birchenough had completed his flight, and put up some stunt flying, after which Birchenough resumed control and took up the first of the afternoon's consignment of passengers. The next up were J. L. Hall on his 50 h.p. Avro, and A. E. Barrs with a passenger on the 80 h.p. Blériot. Shortly after, Noel, R. H. Carr and Pierre Verrier each took up a passenger on the G.-W. Maurice Farman, the 80 h.p. Blériot, and the Aircraft-Maurice Farman respectively. Noel took up another passenger on the Maurice Farman a little later on, after which Carr gave a looping demonstration on the 50 h.p. G.-W. tractor biplane "Lizzie," making two loops each at an altitude of about 1,000 ft. N. Howarth then made a flight on the bi-rudder 'bus, and Lillywhite took up a passenger on the Blériot before the proceedings were brought to a close.

Before the "Ladies' Day" meeting opened last Saturday afternoon, the "inhabitants" of the aerodrome were treated in the morning to a private display of looping by B. C. Hucks on his new 50 h.p. Blériot. After executing a number of exceedingly clean loops he started off for Hurlingham, where he was giving demonstrations. The meeting opened shortly after 3 p.m. with numerous exhibition and passenger flights by W. Birchenough (passenger) on the Maurice Farman, R. J. Lillywhite (passenger) on the G.-W. bi-rudder 'bus, N. Howarth on one of the G.-W. 'buses, Louis Noel on the 80 h.p. Morane-Saulnier, R. H. Carr (passenger) on the same machine, Pierre Verrier (passenger) on the Aircraft-Maurice Farman, and P. Bjorklund on his 50 h.p. Blériot.

"Flight" Copyright.

THE GRAHAME-WHITE SCHOLARSHIP AT HENDON.—Mr. E. J. Golledge (Master of St. John's School, Ealing), Louis Noel, Mrs. Manio and the four boys who won prizes—the winner of the scholarship, Master Sidney Tompkins, being to the left of Mrs. Manio.

The principal event down on the programme was a 16-mile cross-country handicap for three trophies presented by the Women's Aerial League, Messrs. W. Parnell and Co., and Messrs. Mappin and Webb. In this race each machine was to carry a lady passenger, and the course was four laps of the Bittacy Hill circuit. There were five starters, but only four carried a fair passenger, one having to fly the course in miserable solitude. The competitors started as follows: R. J. Lillywhite, solo, on the 50 h.p. G.-W. bi-rudder 'bus (9 mins. 24 secs.); W. Birchenough, with Miss Puddephatt, on the 70 h.p. Maurice Farman (6 mins. 20 secs.); P. Verrier, with Miss Dorothy Arliss, on the 70 h.p. Maurice Farman (5 mins.); Louis Noel, with Miss Gladys Lightfoot, on the 80 h.p. Blériot (2 mins. 38 secs.); and R. H. Carr, with Miss Saunders on the 80 h.p. Morane-Saulnier (scratch). Lillywhite maintained the lead until the end of the last lap, when he was overhauled by Carr, who crossed the line three seconds ahead. Verrier was close behind Lillywhite at the end of the third lap, but engine trouble then developed and he had to descend. Noel came in third 20 seconds after Lillywhite, and Birchenough followed fourth some way behind. Immediately after the race the competitors foregathered in the committee enclosure, where the trophies were presented to the winners. After this Lillywhite and Birchenough each took up a passenger on the bi-rudder 'bus and the Maurice Farman respectively, whilst Bjorklund made an altitude flight on his 50 h.p. Blériot, reaching a height of about 3,000 ft. Another passenger was then taken up by Lillywhite, and Carr gave a looping demonstration on the 50 h.p. G.W. tractor biplane "Lizzie." Louis Noel then took up Mr. E. J. Golledge, the head-master of St. John's School, Ealing, one of whose pupils won the Grahame-White scholarship. Lillywhite and Verrier also took up passengers on the bi-rudder 'bus and Maurice Farman respectively. Noel next took up Mrs. J. B. Manio and Master Sidney Tompkins—the winner of the scholarship previously referred to—on the Maurice Farman, the young aviator-to-be sitting on Mrs. Manio's knee. After this Noel took up two of the three other boys of the St. John's School who won prizes in connection with the scholarship, both managing to squeeze into the seat, and immediately after he gave the remaining boy a flight. All four youngsters were highly enthusiastic over their experiences, and were very anxious to become aviators right away. In the meanwhile flights were being made by Hall on his Avro, Lillywhite (passenger) on the bi-rudder 'bus, and Verrier (passenger) on the Maurice Farman, whilst as soon as Noel had finished with his young passengers, Birchenough resumed work on the Maurice Farman with the full-sized article until the proceedings were brought to a close. During the afternoon a bevy of charming ladies were busy vending badges, &c., on behalf of the Women's Aerial League, so that one was reminded of "Wild Rose Day."

Result of 16-Mile Cross-Country Handicap Passenger-Carrying.

		Handicap.	Handicap Time.
		m. s.	m. s.
1.	R. H. Carr (80 h.p. Morane-Saulnier monoplane)	scratch	22 32
2.	R. J. Lillywhite (50 h.p. G.-W. biplane) ...	9 24	22 35
3.	Louis Noel (80 h.p. Blériot monoplane) ...	2 38	22 55
	W. Birchenough (70 h.p. M. Farman biplane)	6 20	—
	P. Verrier (70 h.p. Maurice Farman biplane)	5 0	retired

On Sunday the weather was dull and showery, but there was a fairly good attendance nevertheless, and plenty of flying. Louis Noel and N. Howarth took up passengers on the 70 h.p. Maurice Farman, whilst A. E. Barrs and R. J. Lillywhite did likewise on the 80 h.p. Blériot. Lillywhite also flew the 50 h.p. G.-W. 'bus, as did R. T. Gates and F. G. Dunn. Carr also gave a looping demonstration during the afternoon, executing two loops and a tail slide.

The Vaudeville Charity Carnival and Aviation Day in aid of the Music Hall Convalescent Home Fund, which took place at Hendon on Tuesday, was a great success. From 1 p.m. till 6.30 p.m. the fun went on without a break, and some of the events were indeed very amusing. Many well-known members of *the* "Profession" were present, and the attendance and weather were quite good. The proceedings opened with flying displays by the Hendon pilots—Louis Noel and W. Birchenough on the G.-W. Maurice Farman, R. J. Lillywhite on the G.-W. bi-rudder 'bus, P. Bjorklund on his 50 h.p. Blériot, R. H. Carr on the 50 h.p. G.-W. tractor biplane, "Lizzie," N. Howarth on the G.-W. 'bus, and P. Verrier on the Aircraft-Maurice Farman. Several passengers were also taken up. A running relay race for lady teams from the principal revues, such as "Hullo Tango," "Get Away You Boys," "Mam'selle Champagne," &c., then took place. The young ladies, looking quite smart, attired suitably for the event, ran exceedingly well—they were started, by the way, by the official timekeeper, Mr. George Reynolds — and the race resulted in a win for the team from "Hullo Tango," "Fancy Meeting You" being second. In the meanwhile, Verrier took up a passenger on the Maurice Farman, and "Gunboat" Smith put up a couple of rounds of boxing with his coloured sparring partner "Big Bob" Armstrong. The next event was, perhaps, the most exciting race seen at Hendon—a race for four-wheeled cabs. In spite of the fact that it was not necessary to call upon the official handicappers, the h.p., head resistance and other conditions being equal in each case, the race resulted in a dead heat for two out of four of the competitors, so these two had to race again; this time the winner got in an easy first. Another passenger was then taken up by Verrier, and the "Atlantic" machines, specially designed and constructed by the Grahame-White Co., were brought forth from their hangars. Some of the revue girls started off in a donkey race, one or two of the competitors getting in the others' back-wash, making rather bad landings. A record for Hendon was then put up, when W. L. Brock, R. H. Carr, R. T. Gates and Louis Noel all finished in a dead heat in the "Pilot's donkey race." A start was then made for the Atlantic flight by Harry Tate and Joe Elvin. The former, in a very complete aviator's outfit, started first, the mechanics having duly doped the engine and swung the propeller both ways, but unfortunately the machine struck a *remous* or something on starting, for it very completely collapsed. The unfortunate aviator was removed from the *débris* by the members of the St. John Ambulance Corps, and carried from the ground on one of the wings of his machine. Joe Elvin tried next. At first his engine refused to fire, so a mechanic came to the rescue with a box of matches, and it started with a healthy rattle, something like the sound of a Renault. In order to give the machine a start, several willing hands gave it a push off, but it made a dash for the enclosure, and disaster seemed inevitable until someone saved the situation by pushing the machine over. The third machine, the planes of which were covered with a special non-uninflammable fabric, caught fire and was totally destroyed. None of the pilots have yet reached America. Carr then gave a looping display on "Lizzie," making three loops at about 1,000 ft. and finishing up with a fine spiral descent. He received a hearty round of applause on landing.

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WOMEN'S AERIAL LEAGUE.—One of the sellers of patriotic badges who did a good trade at Hendon Aerodrome.

"Flight" Copyright.

THE FOUR LADY PASSENGERS IN THE HENDON CROSS-COUNTRY RACES ON SATURDAY.—Left to right: Misses Saunders, Puddephatt, Gladys Lightfoot and Dorothy Arless.

JOELVIN-PLANE.

FUN AT THE MUSIC HALL CONVALESCENT HOME FÊTE AT HENDON.—An Atlantic 'bus and the "pilot," who taxied it for ten yards before it was wrecked.

The next event was a passenger carrying air race (for the Wilkie Bard Cup) in which each pilot had to fly one circuit (with a lady passenger who bore a despatch), at the end of which the passenger alighted and rushed to her partner who received the despatch and ran to the machine, climbed in, and the engine having been started, another circuit completed. The winners were the pilot and passengers completing the course in the fastest time. The first competitor was Lillywhite on the bi-rudder 'bus, his passengers being Misses Ena Cowie and Eva Challis ("Fancy Meeting You" and "While You Wait"). His time was 6 mins. 21 secs. Noel on the Maurice Farman was next, his passengers being Misses L. Horner and V. Lindsey ("Hullo Tango" and "Mam'selle Champagne"). Time, 4 mins. 28 secs. Verrier who was next, on the Maurice Farman, completed his first circuit with Miss Dorothy Ward with a series of switchbacks and zig-zags, whilst with his second passenger, Miss Teddie Gerard, he flew right away outside the aerodrome, returning some time later. Noel, therefore, was the winner. In the next event, a 220 yds. running race for pilots, in which the following competed :—W. Brock, G. W. Beatty, A. E. Barrs, F. G. Dunn, R. T. Gates, N. Howarth, R. J. Lillywhite, Louis Noel, M. Ossipenko, and C. Weber, Brock and Noel finished in a dead heat, and so ran the race over again together. This time Noel crossed the line first by something in the neighbourhood of $\frac{1}{100}$th of a sec.—anyway, Mr. Reynolds' watch could not record it. After this a 6-mile air race (4 laps) for the "Performer" Cup, was flown, the starters being R. J. Lillywhite on the bi-rudder 'bus (2 mins. 21 secs.); Louis Noel on the Maurice Farman (1 min. 6 secs.); P. Verrier on a similar machine (45 secs.); and R. H. Carr on "Lizzie" (scratch). The finish was an exceptionally close one, Noel once again being the winner, with Verrier second, only 3 secs. behind. Lillywhite was third, 5 secs. behind Verrier and 4 secs. in front of Carr. Numerous passengers (mostly members of *the* "Profession"), were then taken up by Noel and Lillywhite, whilst a display of Japanese daylight fireworks was given by Messrs. J. Pain and Sons.

The proceedings were brought to a close with the presentation of the prizes by Miss Marie Kendall, assisted by Mr. Harry Champion. Prizes :—6-mile Air Race, 1st, "Performer" Cup: Louis Noel. Passenger-carrying Air Race, 1st, "Wilkie Bard" Cup: Louis Noel and Misses L. Horner and V. Lindsey. Pilots' Running Race, 1st (suit case): Louis Noel; 2nd, W. L. Brock. Mechanics' Running race, 1st: H. Carpenter. Other prizes were for Ladies' Relay Race and for largest amount of money collected during the afternoon.

The following are some of the principal forthcoming events at Hendon. On Saturday, July 18th, the July meeting will be held, and on Saturday, July 25th, the Blériot meeting will be held in honour of the fifth anniversary of the first cross-Channel flight by Louis Blériot. Special flying displays will be given on Thursdays, July 16th and 23rd, the principal event on the latter date being a biplane speed contest. The Ninth London Aviation Meeting commences on Saturday, August 1st, and ends on Bank Holiday, August 3rd.

FUN AT THE MUSIC HALL CONVALESCENT HOME FÊTE AT THE LONDON AERODROME.—Hendon pilots try out some new 'airy mounts, with some well-judged landings and spirals. On the left, preparations for preliminary straights during which R. T. Gates objects to Carr doping his 'bus's ear with petrol; and, on the right, Messrs. Brock, Carr, Gates, and Noel, the competitors, after rounding Pylon 1.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Diary of Events.

July 11 ... International Correspondence Schools Race, London–Paris–London. Hendon Aerodrome.
July 11 ... Balloon Race. Hurlingham Club, Fulham, S.W.
Aug. 10–22 *Daily Mail* £5,000 Circuit of Britain Race. Starting from Southampton Water.
Aug. 22–29 Gordon-Bennett Eliminating Trials. Upavon, Salisbury Plain.
Sept. 19–28 Gordon-Bennett Aviation Race. Buc, France.

HENDON AERODROME.

Members of the Royal Aero Club are admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards. The Membership Card admits the Member only—motor cars must be paid for.

DAILY MAIL £5,000 CIRCUIT OF BRITAIN RACE.

This Race will be open from 6 a.m. on Monday, August 10th, 1914, the starting place being Southampton Water.

The following are the entries, with the official numbers to be displayed on each aircraft :—

(1) Sopwith Aviation Co., Ltd. (Pilot : H. G. Hawker.)
(2) Wm. Beardmore and Co., Ltd. (Pilot : To be nominated.)
(3) Sopwith Aviation Co., Ltd. (Pilot : C. Howard Pixton.)
(4) Grahame-White Aviation Co., Ltd. (Pilot : To be nominated.)
(5) Eastbourne Aviation Co., Ltd. (Pilot : F. B. Fowler.)
(6) White and Thompson, Ltd. (Pilot : Capt. Ernest C. Bass.)
(7) A. V. Roe and Co., Ltd. (Pilot : F. P. Raynham.)
(8) Blackburn Aeroplane Co., Ltd. (Pilot : Sydney Pickles).
(9) White and Thompson, Ltd. (Pilot : A. Loftus Bryan.)

The Official Controls have been fixed as follows :—

Southampton (starting place), Ramsgate, Yarmouth, Scarborough, Aberdeen, Fort George, Oban, Kingstown (Dublin), and Falmouth.

Arrangements at Southampton.

The Royal Motor Yacht Club has kindly postponed the moving of the "Enchantress" until Monday evening, August 10th. Members wishing to witness the start of the Race on Monday morning may do so from the "Enchantress." A number of cabins are available for the week-end commencing August 8th, and members wishing to stay on board are requested to apply to the Secretary of the Royal Aero Club at the earliest possible moment.

Controls.

Scarborough.—On Thursday last, Mr. H. E. Perrin visited Scarborough and had a conference with the Mayor and several members of the Corporation regarding the arrangements for the control at Scarborough. The details for the control of the boats in the harbour were discussed, and the following Committee was appointed to take in hand the local arrangements :—The Mayor (Mr. C. C. Graham), Councillor G. W. Tindall, Councillor F. P. Morgan, Mr. R. Cole, Mr. W. E. Nichol, and the Town Clerk (Mr. S. Jones).

Falmouth.—On Saturday, Mr. Perrin visited Falmouth and met the officers of the Royal Cornwall Yacht Club and the Mayor of Falmouth. The alighting place was fixed, and the following Committee was formed to take in hand the local arrangements :—Sir Francis Layland-Barratt, Bart., Commodore, Royal Cornwall Yacht Club ; Col. Falkner Brown, Vice-Commodore, Royal Cornwall Yacht Club ; Mr. R. R. Appleby, Rear-Commodore, Royal Cornwall Yacht Club ; Mr. Claude Foster, Chairman, Royal Cornwall Yacht Club ; Mr. Arthur W. Chard, J.P., Mayor of Falmouth ; Alderman F. J. Bowles, Superintendent of the Falmouth Dockyard ; Capt. E. J. Nicholls, Dock Master ; Capt. G. Green, Harbour Master ; Mr. R. G. Borne, Local Secretary.

INTERNATIONAL CORRESPONDENCE SCHOOLS RACE. LONDON–PARIS–LONDON.

(*Under the Competition Rules of the Royal Aero Club.*)
Organised by the Royal Aero Club and the Aero-Club de France.
Starting and finishing at the Hendon Aerodrome, Hendon, N.W.
SATURDAY, JULY 11TH, 1914.

PRIZES.

Fastest Time... 1st Prize : £500. Presented by the International Correspondence Schools.
Handicap .. 1st Prize : £300. Presented by the Royal Aero Club. 2nd Prize : £150. Presented by the International Correspondence Schools. 3rd Prize : £50. Presented by the International Correspondence Schools.

List of Competitors with Official Numbers.

1. **John Carbery.** Bristol Biplane or Morane-Saulnier Monoplane, 80 h.p. Le Rhone.
2. **R. Garros.** Morane-Saulnier Monoplane, 80 h.p. Le Rhone.
3. **A. Piquet.** Morane-Saulnier Monoplane, 80 h.p. Le Rhone.
4. **Pierre Daucourt.** Clement-Bayard Monoplane, 80 h.p. Gnome.
5. **A. Parmelin.** Deperdussin Monoplane, 80 h.p. *monosoupape* Gnome.
6. **Walter L. Brock.** Morane-Saulnier Monoplane, 80 h.p. Gnome.
7. **Louis Noel.** Morane-Saulnier Monoplane, 80 h.p. Gnome.
8. **R. H. Carr.** Morane-Saulnier Monoplane, 80 h.p. Gnome.
9. **A. Malard.** Nieuport Monoplane, 100 h.p. *monosoupape* Gnome.
10. **R. R. Skene.** Martinsyde Monoplane, 120 h.p. Austro-Daimler.
11. **Maxime Lenoir.** Ponnier Monoplane, 80 h.p. Gnome.
12. **Eugene Renaux.** Maurice Farman Biplane, 120 h.p. Renault.
13. **Pierre Verrier.** Farman Biplane.
14. **Thomas Elder Hearn.** Blériot Monoplane, 80 h.p. Gnome.

Members of the Royal Aero Club will be admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards.

Hedges Butler Challenge Cup Race.

Hurlingham, July 11th, 1914, at 3 o'clock.

The Long Distance Balloon Race for the Hedges Butler Challenge Cup will start from Hurlingham Club, Fulham, London, S.W., to-morrow, at 3 o'clock.

The following are the competitors in order of start :

	Competitor.	Balloon.
1.	A. Mortimer Singer	"Planet" (80,000 c.f.).
2.	Lionel H. Mander	"Meteor" (50,000 c.f.).
3.	Lieut.-Col. E. M. Maitland	"Pompadour" (50,000 c.f.).
4.	Capt. Lionel L. Atherton	"Thistledown" (12,000 c.f.).
5.	John Dunville	"Polo" (50,000 c.f.).
6.	Mrs. John Dunville	"Banshee II" (80,000 c.f.).

Members will be admitted free to the Hurlingham Club on presentation of their Club Membership Cards.

Langley Memoir on Mechanical Flight.

The Smithsonian Institution of Washington has made the following presentation to the Club Library :—

"Langley Memoir on Mechanical Flight."

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—Monday, last week, quite a lot of flying was done, the following machines being up several times during the day :—Nos. 154 D.F.W. Arrow, 152 Short Sociable, 49 and 50 B.Es., 31 Henry Farman, 43 and 153 Bristol tractors, 66 Short gun machine, 3 Short, 64 Short.

Tuesday, another fine day for flying. 51 Henry Farman, 62 Short, 152 D.F.W. Arrow, 70 Maurice Farman, 49 B.E., 43 Bristol tractor, 152 Short soc. were up several times.

Wednesday, fine. Nos. 43 and 153 Bristol tractor, and 1 and 2 Shorts the only machines up.

Thursday, fine. Nos. 31 Henry Farman, 43 Bristol tractor, 1 and 64 Shorts, 152 Short soc.

Friday, wet morning and fine after. No. 152 Short Sociable only machine out, making a trip to the Isle of Grain and back.

Saturday, fine. Lieut. Spencer Grey, who seems to be quite recovered from his accident, had a flight on No. 152 Short Sociable.

Civilian Flying.—Sunday. Mr. F. McClean had 2 flights on his 70 h.p. Short biplane with a lady passenger.

Brooklands Aerodrome.

ON Monday morning, last week, the Blériot, Vickers and Bristol pupils were out, as also Mr. MacGordon on the 80 Sopwith; in the afternoon, Mr. Hawker to Farnborough on the Sopwith "Scout," engine test by mechanics of Lord Edward Grosvenor's waterplane, Mr. Dukinfield Jones on D.F.W. solo and with lady passengers, Mr. Knight on Vickers biplane, and Messrs. Jullerot, Merriam and Stutt on Bristol biplanes. Bristol, Blériot and Vickers pupils at work.

Vickers, Bristol and Blériot pupils out Tuesday morning, circuits by pupils at latter school, Mr. MacGordon on Sopwith 80; in the afternoon, Mr. Barnwell with passenger for a couple of flights on new Vickers gun 'bus, Mr. Dukinfield Jones for several flights on D.F.W., Messrs. Jullerot and Stutt on Bristol biplanes. Too windy for school work.

Wednesday morning, Mr. R. H. Charlesworth passed his *brevet* tests (altitude 650 ft.) in good style on a Bristol biplane, Bristol, Blériot and Vickers pupils out; in the afternoon, Mr. Gower on 50 h.p. Blériot and Mr. MacGordon on 80 h.p. Sopwith.

Mr. Gower on 50 h.p. Blériot, Thursday afternoon, and Mr. Jullerot on Bristol biplane. Too windy for school work.

Friday morning, Bleriot, Bristol and Vickers pupils out; in the afternoon another Sopwith "Scout" arrived and two standard 80 h.p. Avro biplanes.

Bristol and Blériot school work Saturday morning; in the afternoon, engine test of Martinsyde, Mr. Hawker on 80 h.p. Sopwith "Scout," Mr. Dukinfield Jones solo and with lady passengers on D.F.W., Mr. Skene on Martinsyde.

Mr. Hawker went up to an altitude of 11,000 ft. and was able to clearly distinguish the Isle of Wight owing to the clearness of the atmosphere.

On Sunday afternoon it was raining on and off all the time and ultimately a downpour set in and lasted until the small hours of Monday morning, but those spectators whose keen interest in aviation impelled them to brave the elements were amply rewarded by witnessing one of the finest exhibitions seen at Brooklands—by Mr. Hucks on his Blériot monoplane, who gave two demonstrations of looping the loop and flying upside down, which evoked the heartiest applause. Fine exhibition flights were also given by Mr. Hawker on the Sopwith scout, Mr. Skene on the Martinsyde, and Mr. Dukinfield Jones on the D.F.W. biplane, on which he took up a number of passengers, including the winner of the ballot for the free passenger flight, Mr. George Steggles, of 9, Sydenham Road, Guildford. Mr. Hawker will loop the loop with passengers next week.

Mr. Leonard Parker, who obtained his pilot's certificate at the Bristol Flying School, Brooklands.

Blériot School.—Rolling and straights on Penguin and 28 h.p. Anzani-Blériot. A. Crick, 43 mins.; H. O'Hagan, 24 mins.; W. South, 8 mins.; E. L. Pitt, 1 hr. 23 mins.; Lieut. Noott, 8 mins.; Lieut.-Col. Fraser, 30 mins. Circuits and figures of eight on 45 h.p. Anzani-Blériot. H. O'Hagan, 16 mins.; W. South, 38 mins.; Lieut. Noott, 1 hr. 36 mins. E. L. Gower cross-country flights on 50 h.p. Gnome-Blériot.

Bristol School.—Monday, last week, passenger tuition to Mr. Godwin, Mr. Collins (4 flights), Mr. Treloar (1), Capt. Napier (4), Capt. Bernard (2), Lieut. Coles (3), Mr. Rutledge and Mr. Adamson, Solos by Mr. Adamson (4), Mr. Treloar (6), Mr. Charlesworth (5), Mr. Godwin (5), Mr. Rutledge (2).

Mr. J. Wilson who passed for his pilot's certificate at the Vickers School, Brooklands, on June 9th.

Tuesday, passenger tuition to Mr. Treloar (2), Capt. Napier, Capt. Bernard, Lieut. Coles, Mr. Collins, Mr. Rutledge, Lieut. Britten. Solos by Lieut. Coles (3), Lieut. Britten (2), Mr. Rutledge (3), Mr. Godwin (2), Mr. Charlesworth (3), Mr. Treloar (5), Mr. Adamson (3).

Wednesday, passenger tuition to Lieut. Britten (3), Mr. Lucas (2), Mr. Collins and Lieut. Coles. Solos by Lieut. Coles, Mr. Charlesworth (two each) and Mr. Godwin (3). Wind then stopped further tuition.

Thursday, tuition impossible owing to bad weather.

Friday, Mr. Collins as passenger. Mr. Treloar, Mr. Godwin and Lieut. Coles on solos. Further tuition impossible.

Saturday, Mr. Adamson one passenger flight and four solos.

Vickers School.—Monday, last week, with instructor: Lieuts. Clemson, Gillman and Haskins. Capt. Kane and Lieuts. Clemson, Warrand and Gillman solos. Mr. Klingenstein with instructor.

Tuesday, with instructor: Lieuts. Clemson, Haskins and Gillman, and Mr. Klingenstein. Capt. Kane, Lieuts. Clemson and Gillman solos.

Wednesday, with instructor: Lieuts. Haskins, Clemson and Wells (new pupil). Capt. Kane solo.

Friday, Lieut. Clemson with instructor. Capt. Kane solo.

Liverpool Aviation School, Waterloo.

On Wednesday, last week, Osborn Groves was out rolling morning and midday. Saturday, Groves again rolling and did a fine hop but slowed engine too much and pancaked. Damage slight and machine ready by same evening.

Monday last, Melly took up Crean for tuition flight of 9 mins., and Groves put in some very excellent hops of several hundred yards each.

Melly, on Tuesday, took up Miss Danson and Mr. Spillane for cross-country flights of 12 and 9 mins. respectively, and Crean resumed rolling ractice after an absence of about six weeks.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Messrs. Upton, Liu, Wyles, Courtney, Whitehead, Gruning straights with Instructors Howarth, Birchenough and Barrs in passenger seat. Mr. Shepherd solo straights. Mr. Toolis rolling with instructor.

Tuesday, Messrs. Liu, Courtney, Upton, Toolis straights with Instructors Howarth and Lillywhite. Mr. Shepherd solo straights.

Wednesday, Messrs. Wyles, Toolis, Liu, straights with Instructor Howarth in passenger seat. Messrs. Palmer and Shepherd solo straights.

Thursday, Messrs. Toolis, Liu, Courtney, Wyles and Upton straights with Instructors Howarth and Barrs. Shepherd solo straights.

Beatty School.—Monday morning, last week, Messrs. Allen (5), Cheung (15) and Lieut. Browning-Paterson (8) up with Baumann on the Gnome-Wright. At afternoon school Messrs. Bentley (16), Cheung (8), Ruffy (3), Allen (5) up with Baumann, and Messrs. Cheung (8) and Browning-Paterson (18) up with Watts on the 40 h.p. Wright. Tuesday, Lieut. Maguire up with Watts for 22 mins., and Messrs. Bentley (23) and Cheung (10) up with Baumann.

Mr. A. Maskell, who has secured his R.Ae.C. certificate at the Shoreham Flying School.

Wednesday, Princess Ludwig of Lowenstein-Wertheim (13), Lieut. Maguire (15), Boyesen (17), Cheung (6) and Bentley (47) up with Baumann, and Messrs. Hodgson (12), Allen (10) and Cheung (8) up with Watts. Friday, Mr. Allen (19) and Lieut. Maguire (41) up with Baumann, and Mr. Cheung (10) and Lieut. Browning-Paterson (4) up with Watts.

Saturday no school was held owing to the pupils not turning up. During Saturday morning the Handley Page monoplane was tried with its new chassis which appears to be quite ideal for school work.

British Caudron School.—On Monday, last week, school out at 5 o'clock, under the instruction of W. T. Warren and R. Desoutter. W. T. Warren 20 minutes flight, reaching to a height of 1,000 ft. R. Desoutter 20 minutes flight, reaching to a height of 1,200 ft. Mrs. Buller two 15 minutes flights, reaching to a height of 600 ft., all on 35 h.p. Caudron biplane. Mr. Abbott getting in a good hour's practice, doing hops and improving.

Mr. P. H. Maskell, who has recently obtained his *brevet* at the Shoreham Flying School.

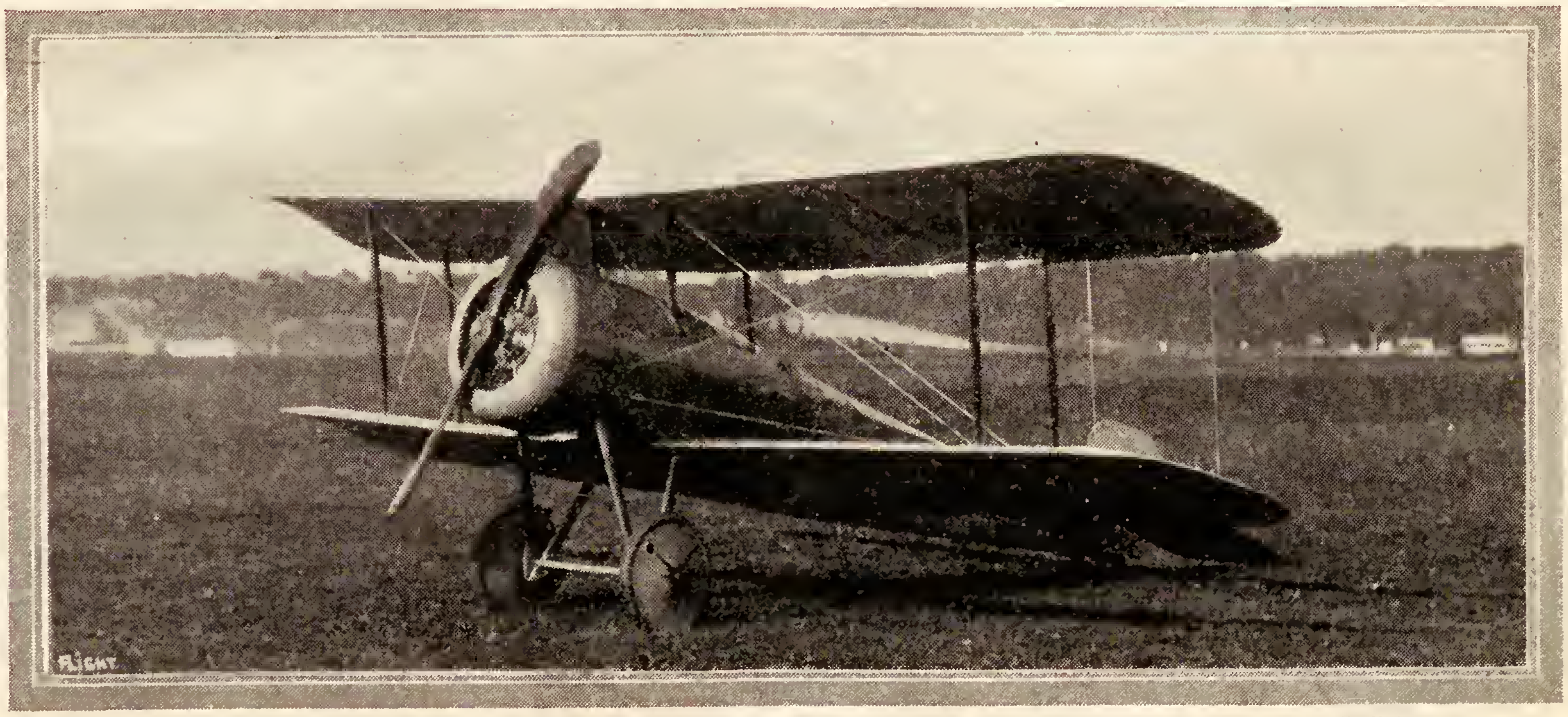
Tuesday, school out at 5 o'clock under instruction of W. T. Warren and R. Desoutter. W. T. Warren ten minutes flight. Mrs. Buller ten minutes flight. Rene Desoutter flight on 60 h.p. Caudron biplane. Mr. Abbott doing straights about 15 ft. up, on machine one hour. Wednesday, school out at 5 o'clock. W. T. Warren two 15 mins. flights, R. Desoutter two flights, one on 60 h.p. Caudron biplane. Mrs. Buller two flights. Mr. Abbott doing good long hops.

Thursday too windy for school to go out.

Friday, school out at 5. W. T. Warren test flight. R. Desoutter flight. Mrs. Buller flight. Mr. Abbott doing straights, 16 ft. up.

Saturday, too windy.

Hall School.—Monday, last week, Miss D. Clifford on Avro with J. L. Hall 10 minutes. Later, J. L. Hall out testing No. 2 Caudron for pupils. Thursday, windy; J. L. Hall flying high on Avro. Saturday, J. L. Hall out on Avro; exhibitions and passenger carrying. Friday and Sunday pouring with rain.



"Flight" Copyright.

The extremely business-looking 80 h.p. Bristol Scout. Note the method of carrying the shield all round the engine.

LONDON–PARIS–LONDON RACE.

It is the early risers who will witness the start for the London–Paris–London Race from the Hendon Aerodrome to-morrow (Saturday) morning, as the competitors will leave Hendon in the order of their handicap time, starting with the first man at 6.30 a.m., the others following at ten minutes' intervals up to 8.30. All going well it is anticipated that the winner will arrive back at Hendon, after having completed his course, about 4.30 p.m.

There are no compulsory stops en route between London and Paris or vice versa, but the competitors after leaving Hendon on the outward journey must, in order to avoid flying over the thickly-populated West London district, leave the church at Harrow and the Grand Stand on the racecourse at Epsom on their left. From Epsom the course lies either *via* Folkestone or in a direct line to Boulogne, where the pilots will pass over the harbour, leaving the Napoleon Column, a striking

No. 1. Lord Carbery.

No. 2. R. Garros.

No. 4. P. Daucourt.

No. 5. M. A. Parmelin.

No. 6. W. L. Brock.

No. 7. L. Noel.

No. 8. R. H. Carr.

No. 9. M. Mallard.

No. 10. R. R. Skene.

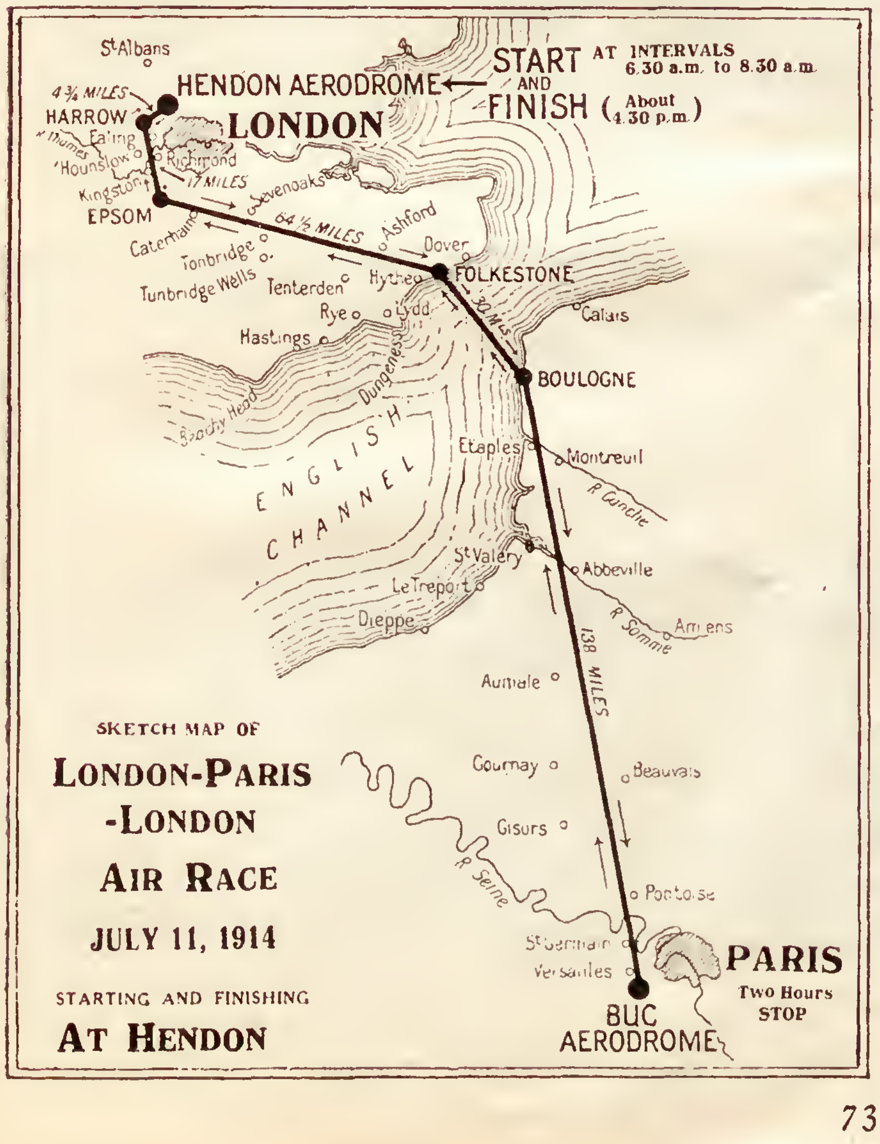
No. 12. E. Renaux.

No. 13. P. Verrier.

No. 14. T. Elder Hearn.

landmark on the outskirts of the town, on their right, and make for Buc Aerodrome, Paris.

Each machine will be restarted from Paris at the expiration of two hours after its arrival, and on the homeward journey the competitors will fly in a direct line leaving Boulogne well on their right, to Folkestone, where they must pass over the quay and Harbour, and return to Hendon *via* Epsom and Harrow, these two points being left to the right. The distance of the double journey is 502 miles, and it is anticipated that the flying time of the winner will be less than 5½ hours. Each pilot will have his official number boldly displayed on the under-side of the wings of his machine and he must pass the controls at Harrow, Epsom, Folkestone and Boulogne at a sufficiently low altitude to enable the figures to be clearly read by the official observers. It is interesting to note that an exemption has been granted by the Home Office, permitting competitors to enter and leave England without alighting in a prescribed landing area.



SKETCH MAP OF
LONDON-PARIS-LONDON AIR RACE
JULY 11, 1914
STARTING AND FINISHING
AT HENDON

An inspection of the table of entrants will show that several of the best known pilots of France and this country are competing so that it is safe to prophesy that some very good performances will be put up.

The cash prizes offered are £500 and a trophy for the pilot who completes the course in the shortest time, presented by the International Correspondence Schools, who are also giving £200 in prizes for the second and third pilots in the sealed handicap. The first prize for the handicap, a sum of £300, has been presented by the members of the Royal Aero Club. When the entry list closed the fourteen pilots and machines had been duly entered as below. The numbers given are the official flying numbers :—

1. Lord Carbery (80 h.p. Bristol biplane). B.
2. Roland Garros (80 h.p. Morane monoplane). F.
3. M. Hirth (80 h.p. Morane monoplane). F.
4. P. Daucourt (80 h.p. Clement-Bayard monoplane). F.
5. M. A. Parmelin (80 h.p. Deperdussin monoplane). S.
6. W. L. Brock (80 h.p. Morane monoplane). U.
7. Louis Noel (80 h.p. Morane monoplane). F.
8. R. H. Carr (80 h.p. Morane monoplane). B.
9. M. Mallard (100 h.p. Nieuport monoplane). F.
10. R. R. Skene (120 h.p. Martinsyde monoplane). B.
11. M. Lenoir (80 h.p. Ponnier monoplane). F.
12. E. Renaux (120 h.p. M. Farman biplane). F.
13. P. Verrier (70 h.p. M. Farman or 80 h.p. H. Farman biplane). F.
14. T. Elder Hearn (80 h.p. Blériot monoplane). B.

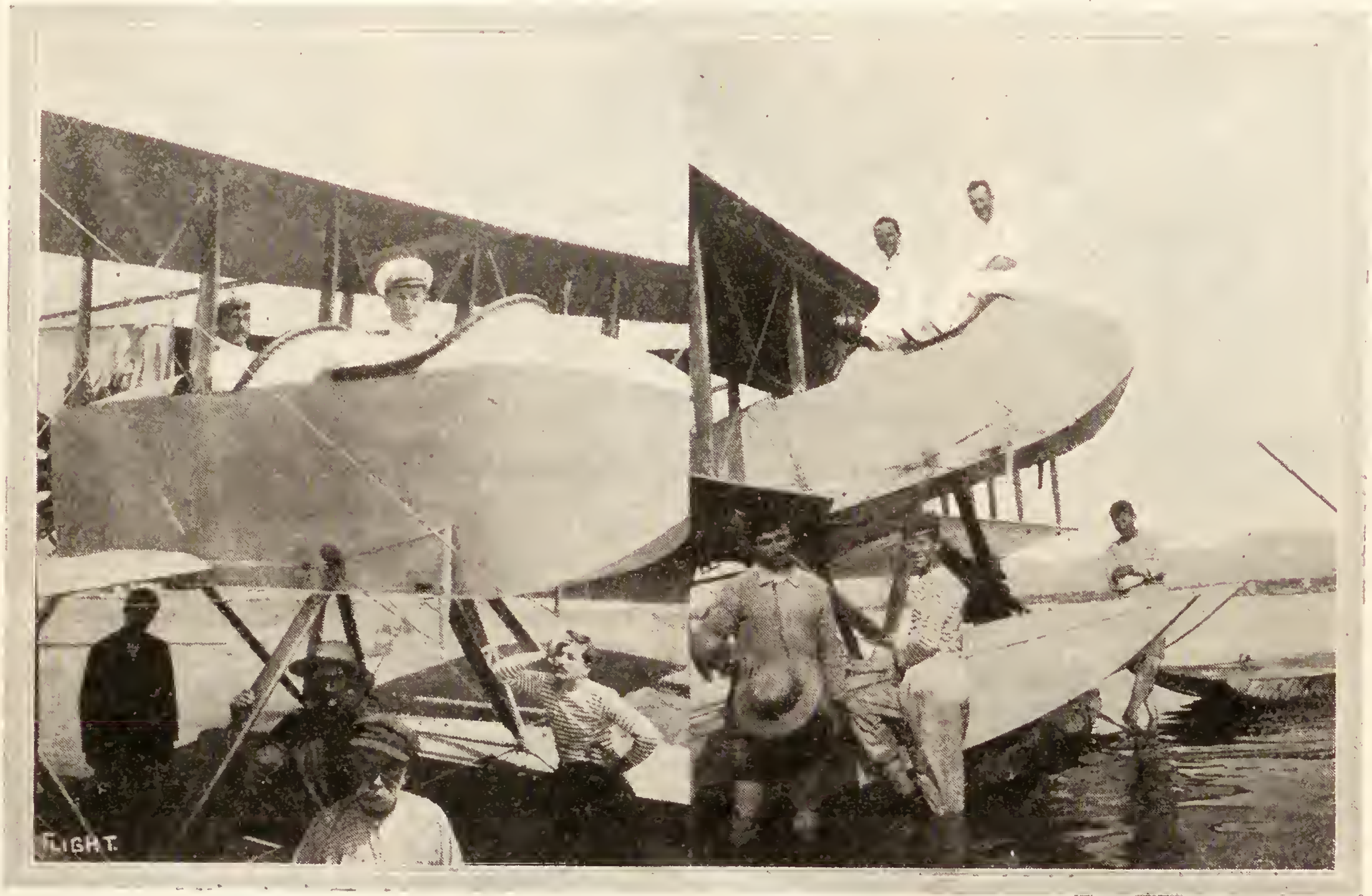
B. = British. F. = French.
U. = United States. S. = Switzerland.

It will be seen that of the fourteen competitors four represent Great Britain, eight France, one the United States and one Switzerland. There are only three biplanes entered, including a Bristol tractor of the "Scout" type, which, it will be remembered, has the planes staggered and is fitted with *ailerons* instead of warping; the other two are Farmans, one of the M. Farman type having a 120 h.p. engine. Of the 11 monoplanes, five are Morane-Saulniers, three fitted with 80 h.p. Gnome engines and two with 80 h.p. Rhones, which the remaining six monoplanes represent the Blériot, Nieuport, Deperdussin, Ponnier, Clement-Bayard, and Martinsyde types, the last-mentioned, with its 120 h.p. Austro-Daimler engine, being the most powerful.

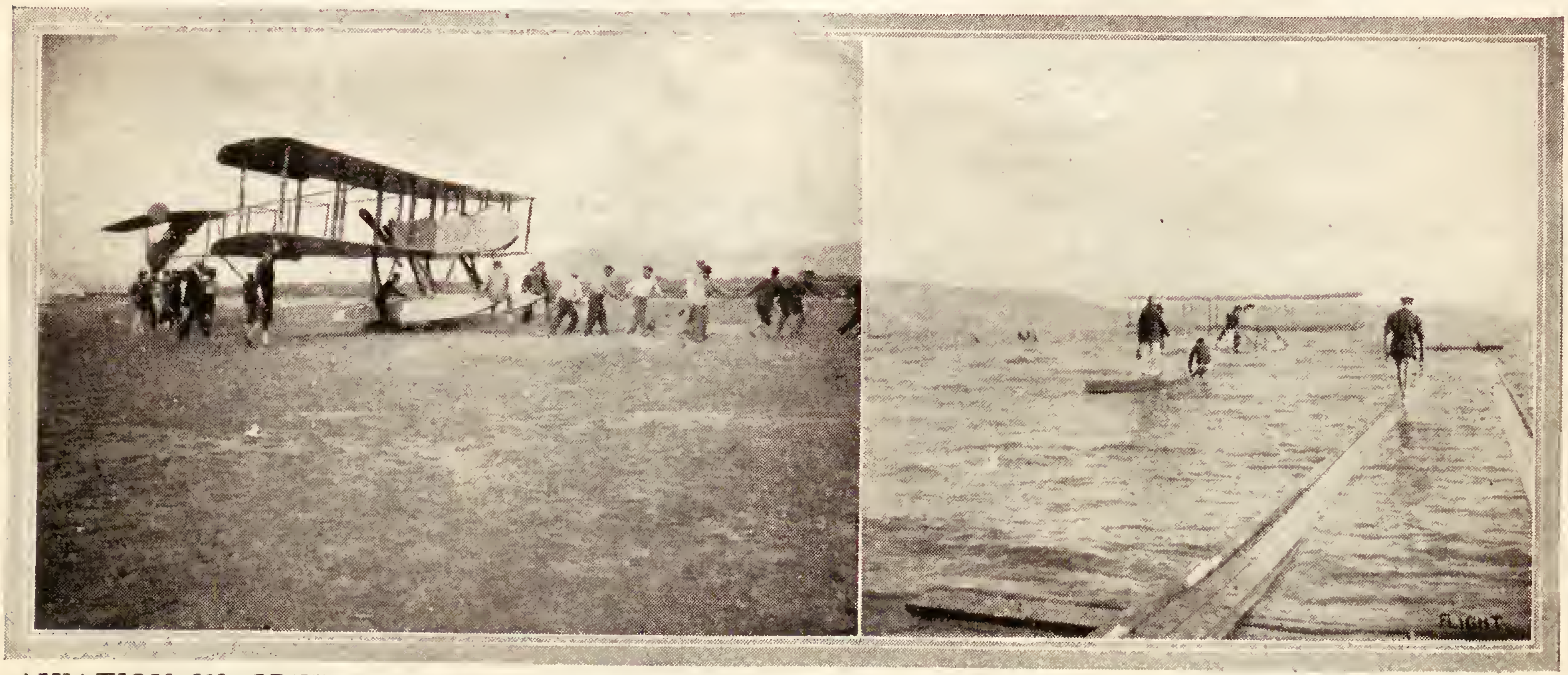
Among those who are taking part in the race who have already flown across the Channel are Lord Carbery, Roland Garros, Louis Noel, Eugene Renaux, Pierre Verrier and T. Elder Hearn, while R. H. Carr has crossed as a passenger with Mr. C. Grahame-White.

EDDIES.

SOME details are to hand regarding the work of Capitaine de Freigate Collyns P. Pizey, who before his appointment to the Marine Royale Hellenique, was so well known to our readers from his connection with the Bristol Co. A very flattering report is given of the work of the Anzani-engined Sopwith "pusher" seaplane, which in one month was flying for some 40 odd hours. Five Greek officers have been trained on it, and they are now ready for solo flights. This is probably the first time that naval officers have been taught to fly directly from the sea without first doing land flying. The names of the first five officers to join the corps that Mr. Pizey is organising for the Greek Government are:—Lieut. Moriatinis, Lieut. Papageogin, Lieut. Panioton, War. Officer Meletopoulos



AVIATION IN GREECE.—On the left Mr. Collyns P. Pizey in the Sopwith "pusher" seaplane with his first pupil, Lieut. Moriatinis. On the right, Mr. Pizey and Capt. Leigh, of the British Mission, and pilot of Farman schools.



AVIATION IN GREECE.—On the left, bringing in the Anzani-engined Sopwith "pusher" seaplane at the Eleusis Air Station after morning flying by Mr. Collyns P. Pizey of the Royal Hellenic Marine Service. On the right Admiral Mark Kerr with Mr. Collyns P. Pizey, punting out on Astra float to the Sopwith seaplane. The man on the slipway is Lapray, one of Mr. Pizey's English "boys."

and War. Officer Courbelis. The conditions under which the school is working are anything but favourable, as there are no sheds or shops, but in spite of that good progress is being made. Some time ago Mr. Pizey made several flights over the British fleet anchored in Phaleron Bay, and among the passengers taken up was Admiral Mark Kerr. In connection with his work Mr. Pizey has the assistance of four keen British "boys"—Lapray, Gaskell, Simms, and Radley—who rank as warrant-officer mechanics.

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The inauguration of the summer season at the Brighton-Shoreham aerodrome is fixed for to-morrow (Saturday), and the programme arranged includes looping by Mr. J. L. Hall and a 24-mile speed race round the aerodrome for the Brighton Cup and a cash prize of £100 put up by the "Shell" Co. On Sunday Mr. Hall will attempt to improve the British altitude record and will also make exhibition flights. Pylons have been placed round the aerodrome marking out a course which is two miles round, and arrangements have also been made for a judge's box and observing stand opposite the main enclosure. Half a dozen new hangars have been put up, and another six are in course of erection. A bandstand has been put up, and a band has been engaged for each meeting. The comfort of the visitors to the aerodrome has not been overlooked, and seating accommodation on the lawns surrounding the course is being provided, while facilities for refreshments, both on the lawns and in the marquees has been arranged. Such enterprise deserves solid support, and we wish the management a splendid success.

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Evidently Pegoud does not intend to be outflown by his numerous imitators, for on Sunday last at the Blériot aerodrome, Buc, he inaugurated a series of evolutions the like of which had never before been seen. Climbing to 1,000 metres, Pegoud commenced to perform all his old evolutions besides these new ones, such as cart wheels, corkscrews, vertical climbs and upside-down flights with engine stopped, all of which were executed without the use of straps or safety belts of any kind. Pegoud was then seen to leave his seat and climb up on the *fuselage* of his Blériot whilst holding on to the top pylon and bracing cables. First he stood on one wing then on the other, and finally standing upright with his legs apart, without touching the controls, and with engine stopped the machine came floating down from a height of 1,000 metres, like a dead leaf, the pilot only resuming the controls when a short distance above the ground. The reception accorded him when he landed, needless to say, was extremely enthusiastic, and was intensified during a drive round the enclosures in a motor car.

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I learn from Mr. Pemberton-Billing that "P.B. 7" is progressing rapidly, and that he hopes to have the boat finished in about two weeks' time. It is intended to give this unit an extended trial first as a high speed motor boat, a speed of 40 knots being anticipated. A 130 h.p. Salmson engine is being fitted instead of the Sunbeam for which the boat was originally designed, as Mr. Billing finds that he cannot get delivery of the Sunbeam in time.

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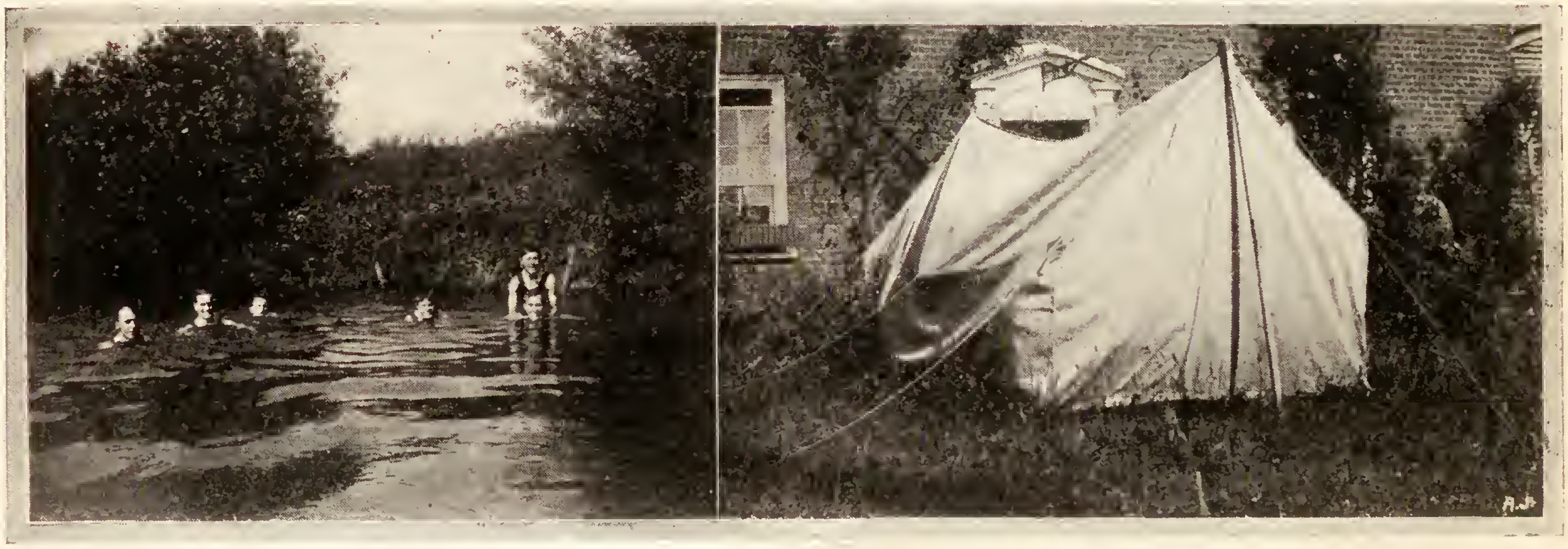
Pupils soon realise, when learning to fly, that in order to take advantage of every suitable moment in the early morning hours, it is advisable to live near to, if not on the aerodrome. As no rooms were available one resourceful pupil at Brooklands has got over the difficulty by pitching his tent behind the hangars and having his meals at the "Bluebird." The coolness of this tent during the recent heat wave was very alluring, but I don't envy him his sleeping quarters when rainstorms are careering around like those experienced in South and West London a little while back.



A "Wey" the Brooklands' pilots have of trying to dodge the glare of the sun's rays during the hot weather; and on the right the simple life sleeping quarters instituted by one of the pupils at Brooklands.

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A new and very interesting machine is nearing completion at the Grahame-White works at Hendon. It is a small biplane of the tractor type, and possesses several new and original features. The *fuselage* is somewhat similar to the Morane, and the planes have a very pronounced stagger. The method of strutting is highly ingenious, and only one set of bracing cables is employed on each side. The machine may be expected to make its appearance very shortly.

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I have always been under the impression that the testing of a new machine was a thing to be essayed under the most favourable weather conditions, but evidently this is not always the case, for the other day at Brooklands I watched Mr. Barnwell put a new Vickers gun 'bus through her trials in a wind that would have kept many a pilot on the ground with an old and tried-out machine. Starting from the Vickers sheds, he took the machine into the air at once without any preliminary straight hops, and immediately commenced a left-hand turn whilst climbing. It seemed a risky thing to do, but I have no doubt that a pilot of such ability as Mr. Barnwell was able to tell if the machine was properly balanced the instant he got her off the ground. He was so pleased with his new mount that after a short rest he was in the air again doing right and left hand turns.

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Mr. A. V. Roe, whom I met at Hendon on Saturday last, told of great doings at the Manchester factory. So much work is being done for the Admiralty and Government that the enterprising Avro firm are continually expanding their premises to meet the growing requirements and taking on more men in order to enable the ever-increasing number of orders to be executed; even then, I am told, they find themselves unable to give delivery to the appointed time, and as for carrying out of certain experimental work which Mr. Roe has been contemplating for some considerable time, this is quite out of the question at present. As soon as certain arrangements can be completed, it is intended to transfer the Avro works from Manchester to Southampton.

Fun at the Music Hall Convalescent Home Fête at Hendon.—A close finish between Noel (on right) and Brock when running off their dead-heat in the pilots' sprint race.

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In addition to the standard 80 h.p. machines, of which a large number are in the course of construction, the Avro firm are building two large waterplanes for the Navy. One is a 160 h.p. tractor biplane, whilst the other is a large machine of the "pusher" type, measuring 80 ft. across the wing tips. Two Austro-Daimler engines, each of 120 h.p., will drive the two separate propellers situated behind the main planes. The engines are not interconnected in any way, as Mr. Roe contends that it will be possible to fly the machine with one engine running by using the rudder and *ailerons*.

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A visit to Brooklands recently on a rainy day when ordinary school work was out of the question, revealed a method of teaching flying pupils that I had never previously come across. I found that well-known instructor at the Bristol Flying School, Mr. F. Warren Merriam, busily engaged teaching his pupils a variety of juggling tricks. On enquiring as to the odd behaviour of his pupils I was told by Mr. Merriam that although it might look at first sight as if he were training them for the "Halls," the real secret of the performances was that he had found that a few hours of juggling practice gave the pupil a very keen sense of balance which proved of great benefit later when the flying stage had been reached. Although his methods have not been generally known the results of the Bristol school under Mr. Merriam's management both as to the quantity and quality of the pupils turned out bear good testimony to the success of his system. It should not from this be gathered, however, that Mr. Merriam's success as an instructor is due solely, or even mainly, to his accomplishments as a juggler. Nobody who has seen him handling the school machines can have failed to appreciate his capabilities as a pilot. One of his star turns for which he has quite a reputation, consists in making a spiral from 3,000 ft., with his engine stopped, and landing on a certain mark every time. Less known is the fact that Mr. Merriam is equally skilful in handling the Bristol tractor biplanes and monoplanes, as he has proved on numerous occasions, when the Bristol school at Lark Hill, Salisbury Plain, was in operation.

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Mr. F. P. Raynham, who is giving exhibitions for the *Daily Mail* on his Avro waterplane, is much impressed with the stability of that machine. On numerous occasions Mr. Raynham has let go of the controls for several minutes at a stretch, and has given his entire attention to the taking of photographs. The machine required no manipulation beyond that of steering for the direction in which he wished to go. Stability is not the only good feature possessed by the Avro waterplane, however, for when Mr. Raynham was starting out for a flight at Scarborough recently, the waves were very high and the spray was seen frequently to break over the top plane, so that evidently the Avro spring suspension of the floats, as shown at the last Olympia Aero Show, is proving its worth in actual practice.

"Æolus."

"REVEILLE."—**FLIGHT photographer "in camp" at Netheravon.**

THE FLYING MACHINE FROM AN ENGINEERING STANDPOINT.

By FREDERICK WILLIAM LANCHESTER, M.Inst.C.E.

(*Continued from page* 714.)

13. *Acentric Types of Machine.*—The type of machine here suggested would be liable to certain objections on the ground that the line of the propeller thrust is acentric, being situated considerably above the centre of gravity and probably also above the centre of resistance of the machine, conversely the centre of gravity would be considerably below the centre of resistance; these are objections which have been raised with regard to some existing machines. It is undoubtedly desirable, where other considerations permit, to bring the centre of propulsion, centre of resistance, and centre of gravity, to approximately the same level. There is no fundamental difficulty in flying a machine in which this condition is not complied with since any pitching moment that results from the want of concentricity can be corrected by suitably arranging the centre of gravity. Serious difficulty, however, is liable to arise in the event of a sudden change in the mode of flight such as is brought about when the engine is cut out. Under these conditions the machine being propelled in gliding flight by a component of gravity instead of by the propeller thrust, a change of pitching moment takes place equivalent to the total resistance of the machine multiplied by the vertical distance between the line of propulsion and the centre of gravity. In a machine of the type above suggested such a change of moment would be the equivalent of a movement of the centre of gravity through a distance of nearly two feet, a change which we must regard as of dangerous magnitude.

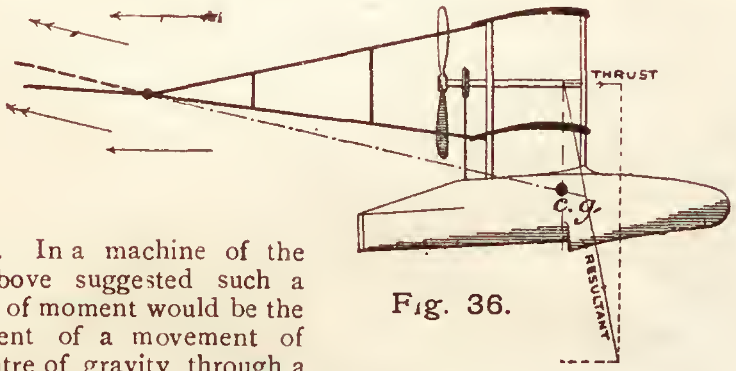


Fig. 36.

The position is that shown diagrammatically in Fig. 36, in which it will be seen that the resultant of gravity and the propeller thrust passes some considerable distance in front of the centre of gravity, whereas in gliding flight the resultant of the lifting and propelling forces *is* the force of gravity, and so passes through the centre of gravity.

It has been suggested that by arranging the tail plane (and elevator) in the wake, in the propeller slip stream, in fact, and giving it an upward rake, in other words, by employing a negatively loaded tail, the tail may be made to supply a countervailing pitching moment when the propeller is at work, thus whilst the direct effect of the propeller is to tend to lift the tail and depress the nose of the machine, the indirect effect brought about by the action of the slip stream on the upturned tail will be the inverse. It might be possible in this way to correct a small want of concentricity of the propeller axis, but such a method would scarcely be applicable to the case in point.

In order that the method in question should be effective, the slip stream must be discharged radially from the centre of gravity of the machine, that is to say, the general body of air discharged in the slip stream must be so deflected that its moment of momentum about the centre of gravity is zero. Roughly speaking, this means that the tail, as shown dotted in Fig. 36, must be set at such an angle as, if produced, would pass through the centre of gravity of the machine; the double-headed arrows show the slip stream diverted as theory requires.

The method is evidently impracticable; not only is the tail angle as necessitated altogether excessive, but also the whole story has not been told—the tail would require to be "feathered" immediately the propeller ceases its function, otherwise it would continue to supply a moment of some magnitude when no longer required.

It is of interest to examine in greater detail the behaviour of a machine such as we are considering under flight conditions. It is clear that if at any instant the engine is switched off two things happen, firstly, as in a machine of the concentric type, the supply of energy being withdrawn the datum of the phugoid chart takes a downward trend, its down slope is that of the gliding angle, Fig. 37, datum 2. Secondly, since the withdrawal of the thrust, reaction is in effect equivalent to a movement backward of the centre of gravity, the angle of attack of the aerofoil is increased and the natural velocity of the machine is reduced, and H_n is diminished to a corresponding degree. The conditions are thus represented by the upper diagram in Fig. 37; the reduction of H_n being calculated, we consult the phugoid chart and select the curve to correspond; as shown this has been taken as curve G from Fig. 2. In the lower diagram (Fig. 37) a similar construction has been shown for a machine nearly concentric as to its thrust; the resulting phugoid here corresponds to that labelled C in Fig. 2. The case of least disturbance is that in which the original flight path picks up the new flight path at its point of inflection; this is the case if the propeller axis is slightly below the centre of gravity, since then on cutting out the engine the value of H_n is slightly increased; this is as actually represented on the lower diagram.

At present there are difficulties, of the character and extent outlined, standing in the way of development in the direction indicated. they are difficulties that will without doubt be eventually overcome,

14. *Stability and control.*—In the present lecture all questions of stability in the ordinary sense have been taken for granted. The problems of longitudinal stability, lateral and directional stability, and spiral or rotative stability, though of vital import to the aeronautical engineer, are primarily matters for the physicist and mathematician; the engineer can well afford to leave questions of this character in the hands of the specialist.

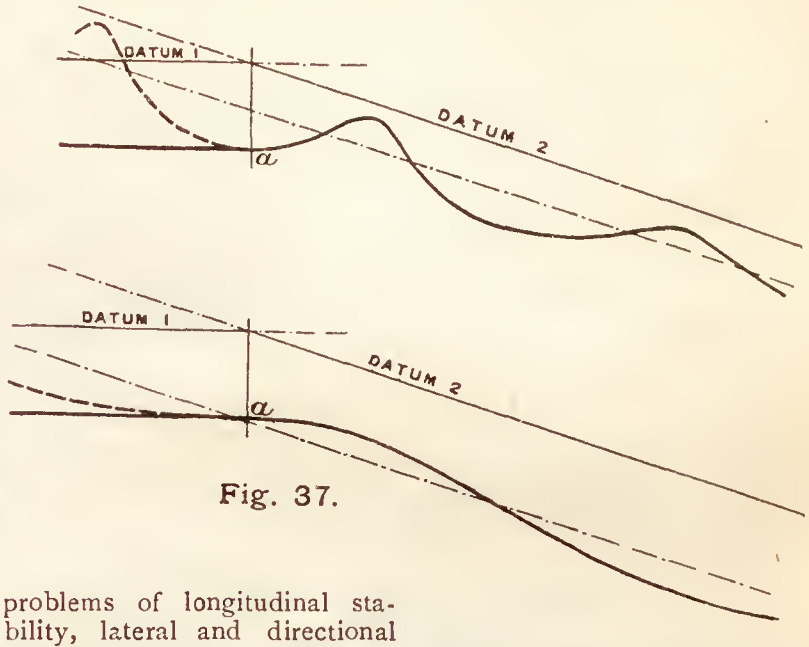


Fig. 37.

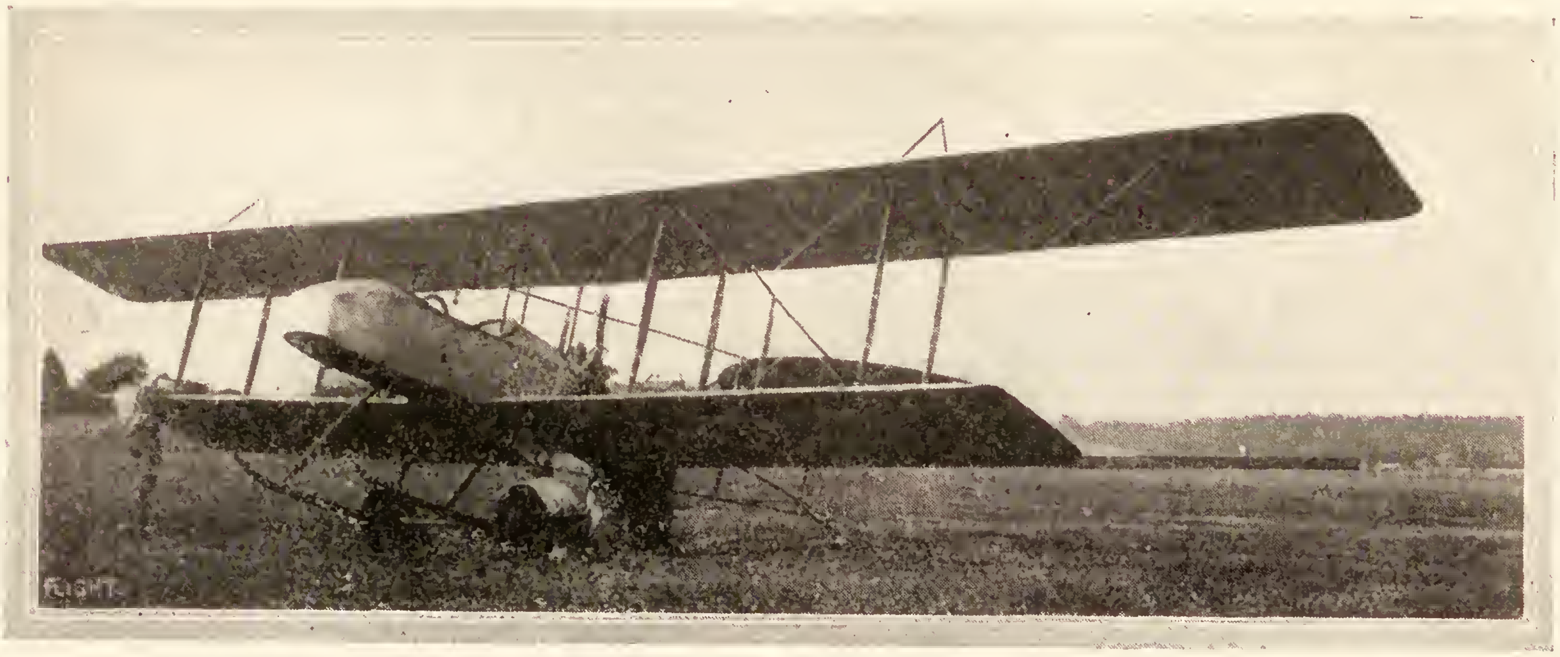
There is perhaps less excuse for the absence of all mention of controlling mechanism, a great deal might be added on that subject without going beyond the scope of the title; however, since the question of control is closely wrapped up with considerations relating to stability, and since it is necessary to draw a line at some point, the omission is one of expediency rather than logic.

The question of stability is not, as is frequently supposed, one that is in any sense obscure; in fact, from the scientific point of view, the present position is at least satisfactory; it can be said without exaggeration that we have a great deal more knowledge on the subject than we are at present able to utilise.

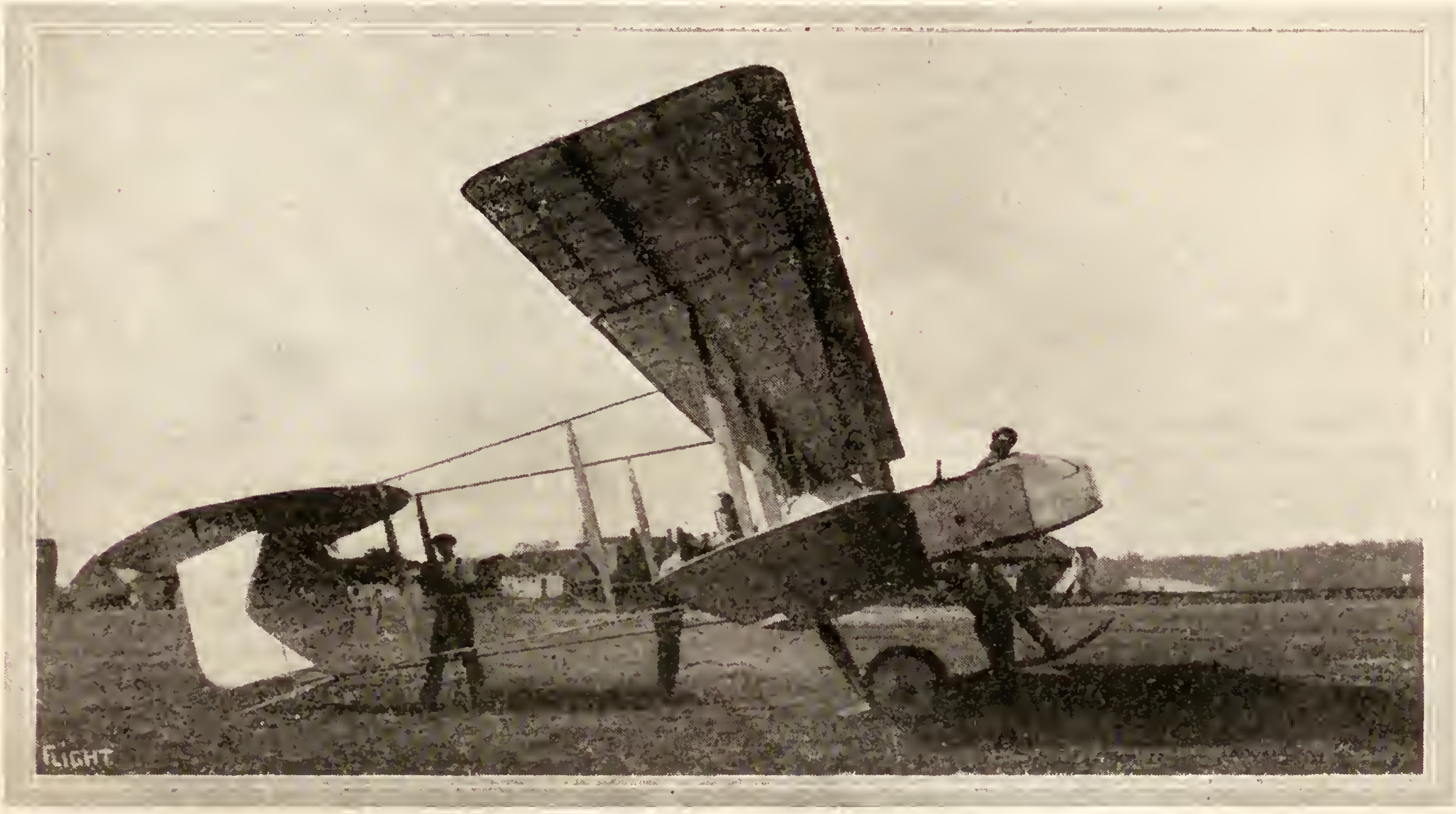
There is very little of importance, specifically relating to the stability of the flying-machine, that has been written, either before or since, that will not be found either in the work of Dr. Bryan (G. H. Bryan, *Stability in Aviation*), or in *Aerial Flight.* A few notes have appeared in the various reports of the Advisory Committee for Aeronautics, but not very much; two short notes of a somewhat trivial character appear in the report of 1909–10, in addition to an excellent abstract of Soreau's *Etat actuel et avenir de l'Aviation*, (*Mémoires, Société des Ingenieurs Civils de France*). In the Reports for 1910–11 and 1911–12 there is nothing; in the Report for 1912–13 there are two or three interesting communications, mainly due to the staff of the National Physical Laboratory, notably memoranda 77, 78 and 79. No. 77 (L. Bairstow, Melville Jones, and A. W. H. Thompson) is, in the main, an examination and extension of existing theory following the methods initiated by Dr. Bryan; No. 78 (L. Bairstow and L. A. MacLachlan) mainly relating to the determination of the various coefficients required for the application of Dr. Bryan's method of treatment. No. 79 (L. Bairstow), dealing with the more detailed application of the same method. These communications are conspicuous by the fact that their authors appear to be really *au courant* with the previous literature of the subject.

(*To be continued.*)

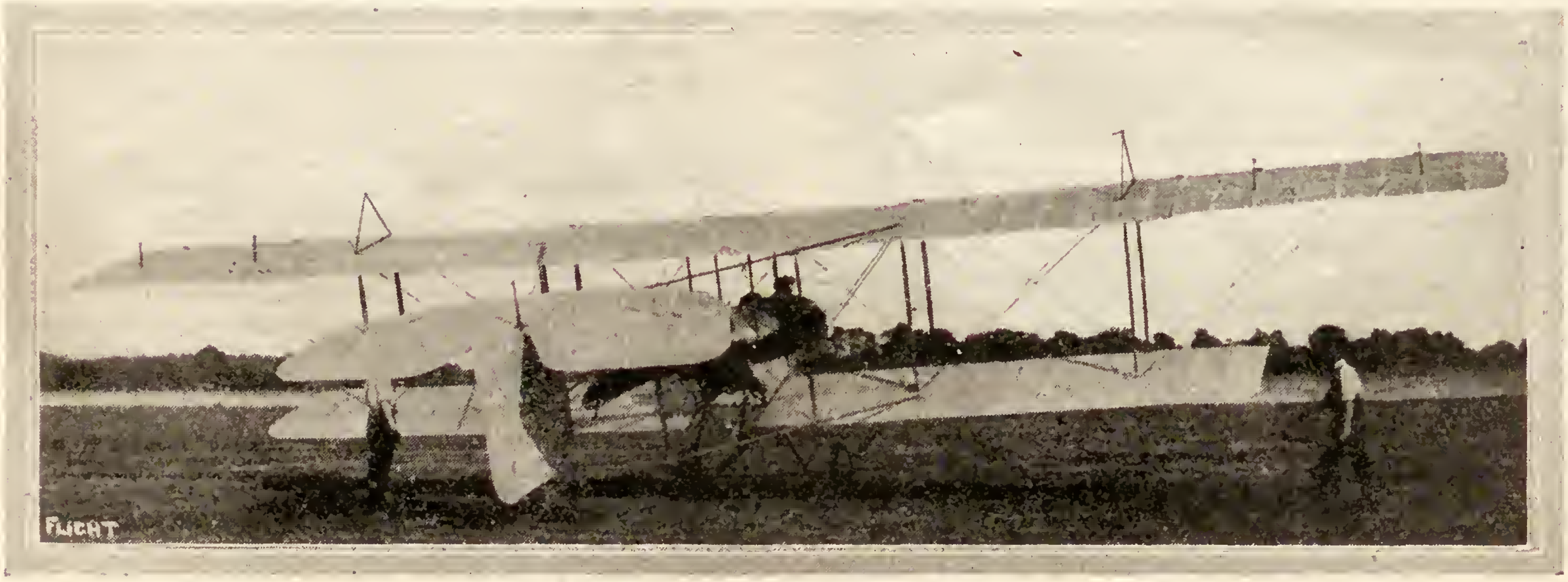
THE NEW VICKERS GUN-CARRYING BIPLANE.



Three-quarter front view.



Side view of the new Vickers gun-carrying biplane.



View from behind of the new Vickers gun-carrying biplane.

THE NEW VICKERS GUN-CARRYING BIPLANE.

A NEW Vickers biplane of the gun-carrying type made its initial appearance at Brooklands last week under weather conditions which were anything but favourable. When Mr. Barnwell took the machine out there was a strong wind blowing, and matters were not improved by the heat eddies set up by the glaring sun. In spite of these disadvantages, however, the machine behaved excellently, and appeared to be well balanced both longitudinally and laterally, Mr. Barnwell commencing to do right- and left-hand turns after once having got the "feel" of the machine. On subsequent flights the engine was switched off in order to test the gliding angle, which appeared to be exceptionally good.

A good idea of the general arrangement of the machine may be gained from the accompanying photographs. The *nacelle*, it will be seen, is comparatively shallow at the nose, thus greatly reducing the side area in front, whilst the rear vertical surface, formed by the rudder and fixed fin, is of ample proportions, so that there is little doubt that the machine will prove to be spirally stable. The main planes—of which the upper one has a considerable overhang with the weight taken by cables running over king posts—are separated by six pairs of struts. With the exception of the four inner struts, made of steel tubes, which pass through the *nacelle*, all the inter-plane struts as well as the struts in the tail outrigger are of wood.

Four steel tubes, forming a V, as seen in plan, carry the tail planes, and practically all the cross bracing is effected by stranded cable in preference to piano wire. The engine fitted is a 100 h.p. Gnome *monosoupape* driving a Vickers propeller. In its constructional details such as clips and sockets the machine incorporates a number of highly ingenious ideas, and the workmanship throughout the machine is of very high quality.

ROYAL FLYING CORPS.

THE following was announced by the Admiralty on the 2nd inst.:—

Flight-Lieut. A. W. Bigsworth, promoted to the rank of Flight Commander, with seniority of July 1st, and appointed to "President," additional, as Flight Commander for Calshot Naval Air Station.

The following was announced by the Admiralty on the 7th inst.:—

Commander E. A. D. Masterman, to the "President," additional, for Naval Air Department, temporary, to date July 1st.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending June 27th:—

Concentration Camp.—Headquarters, Nos. 2, 3, 4, 5 and 6 Squadrons, Aircraft Park and Headquarter Flight.—On Monday, June 22nd, two composite Squadrons took part in the King's Birthday Parade Reviews at Aldershot and Salisbury Plain. The composite Squadrons consisted of flights of the following machines: B.E., Blériot, Sopwith and Henry Farman. In each case the machines and detachments were inspected, and then flew past the saluting point.

The training programme consisted of aircraft and M.T. exercises, speed, climbing and landing tests. Experiments, lectures and discussions were carried out daily during the remainder of the week. The camp was visited on June 26th by the Prime Minister, who was accompanied by Mr. Harold Baker, M.P., Financial Secretary of the War Office. General Hubert Hamilton and several members of the Headquarter Staff of the Southern Command were also present.

The party motored from Andover to one of the temporary landing grounds selected in connection with the aircraft exercise for the day.

The Prime Minister examined various observers' reports, and then watched the machines leave for Netheravon. Motoring on to Netheravon he inspected the sheds and workshops. After luncheon he witnessed flights by various types of machines, and after inspecting No. 2 Squadron, and visiting several barrack blocks, the Institute, and Sergeants' Mess in camp, the party left for Upavon to visit the Central Flying School.

The annual athletic sports were held on June 20th, Headquarters winning the Inter-Squadron Cup.

During the week No. 5 Squadron won the Inter-Squadron Boxing Challenge Cup and No. 2 Squadron the cross-country run. The final of the Inter-Squadron Cricket Cup will be played early next week.

War Office summary of work for week ending July 4th, 1914:—

Concentration Camp.—The training programme was continued up till Thursday, on which day the Camp broke up. On Monday, June 29th, the Camp was visited by Lord Roberts, the First Lord of the Admiralty, and a party of Military Attachés. After the Aircraft exercise in the morning, Lord Roberts presented cups for the various Inter-Squadron Competitions. In the afternoon a number of machines were paraded, and, ascending at intervals of one minute, flew a circuit of the Plain.

On June 30th the Aircraft exercise consisted of machines searching for a disabled aircraft represented by a balloon. The balloon ascended at 10 o'clock, from an unknown point some 30 miles from Netheravon. The balloon was located by 50 per cent. of the machines, each machine on seeing it having to circle round so that the number on its tail could be seen by the pilot of the balloon. The day was hazy, with the result that the balloon could only be seen at a maximum distance of 8 miles. The altitude of the balloon varied from 2,000 to 5,000 ft.

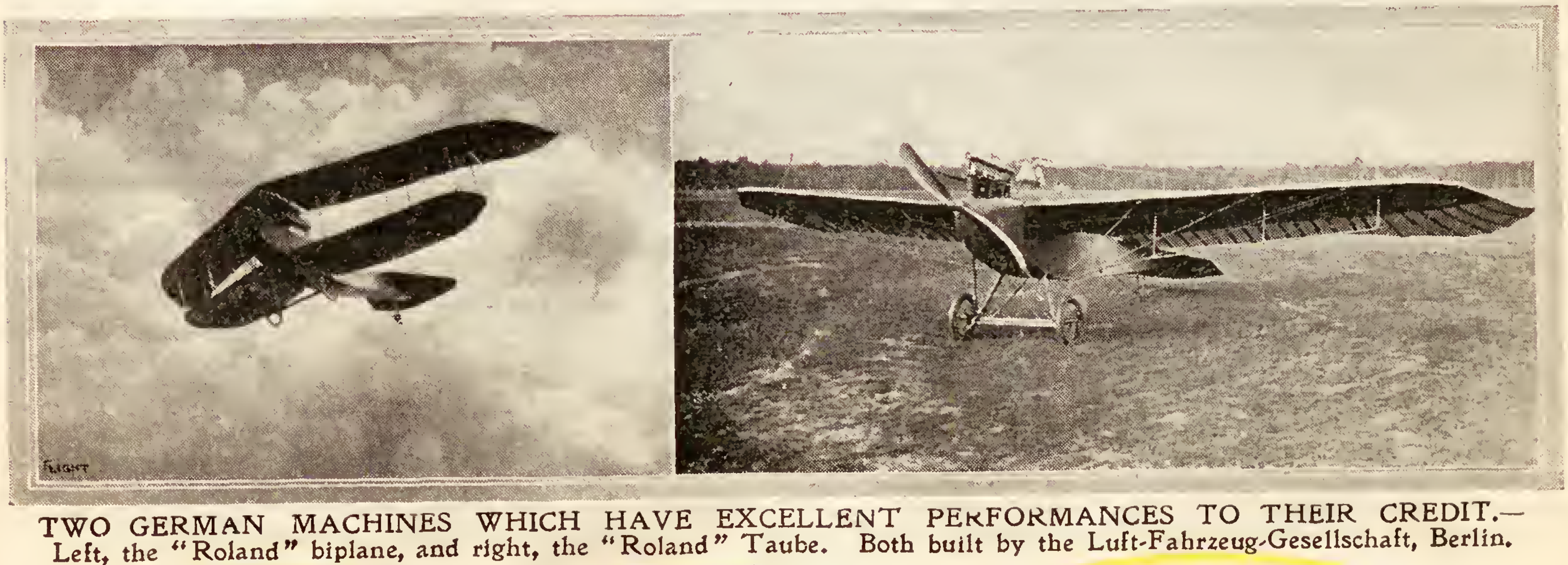
On the morning of the 2nd inst. the Commanding Officer held a final conference attended by all officers. The main features of the work which had been done during June were touched on—the Aircraft and M.T. exercises, speed, climbing and landing tests with machines of various types and ages, experiments, night flying, lectures and discussions. The Concentration has been of much value from many points of view.

The following letter has been received from the War Office:—

"I am to inform you that the Secretary of State for War has expressed his appreciation of the excellent arrangements made for the Concentration of the Military Wing of the Royal Flying Corps at Netheravon, and of the good work which has been carried out by the Corps during the past month."

Headquarters, Headquarter Flight, Aircraft Park and No. 6 Squadron returned to Farnborough on Thursday; Nos. 3 and 4 remain at Netheravon, their permanent station. No. 5 Squadron moves to Fort Grange, Gosport, a new station, on Monday next, and No. 2 will start their journey back to Montrose on the 13th.

The training during the ensuing months leading up to manœuvres will consist of reconnaissance work with the cavalry, with brigades and divisions, observation of artillery fire, experiments and long cross-country work. The development of the two new Squadrons, Nos. 1 and 7, is being continued at Farnborough.



TWO GERMAN MACHINES WHICH HAVE EXCELLENT PERFORMANCES TO THEIR CREDIT.—Left, the "Roland" biplane, and right, the "Roland" Taube. Both built by the Luft-Fahrzeug-Gesellschaft, Berlin.

FOREIGN AIRCRAFT NEWS.

Garaix Secures Another Record.

AT Chartres on the 2nd inst. Garaix on the Schmitt biplane, fitted with 160 h.p. Rhone motor and Integral propellers, succeeded in regaining for France the duration record for pilot and three passengers which had been held by Gsell with 3 h. 11 m. 30 s. The new record made by Garaix is 4 h. 3 m. 29 s.

Records Made at Vienna Meeting.

THE Austrian Aero Club has decided to apply to the F.A.I. for recognition of three new world's height records made during the Vienna Meeting, which is described on the next page. The new records claimed are :—

Pilot and one passenger, 6,170 metres, by Lieut. Bier.
Pilot and two passengers, 5,440 metres, by Lieut. Bier.
Pilot and three passengers, 4,470 metres, by Von Loeszl.

The Security Competition.

ON the 1st inst. the "Concours de la Sécurité en Aeroplane" came to an end, and the committee then met to consider the merits of the devices which had been submitted to it. Altogether the committee since the opening of the competition on January 1st, witnessed trials by 21 competitors out of the 56 who had entered. After a very long sitting it was decided, as was anticipated, not to award the Grand Prix of £16,000. Two prizes were awarded, one of £2,000 to the Sperry Gyroscopic Co. and the other of £1,200 to the Paul Schmitt biplane with variable angle of incidence. It was also decided to award seven consolation prizes as follows: £600 to Caudron Brothers for their two-seater biplane, £400 to the Doutre stabiliser, £400 to the Société Avi-Auto for the Lelarge carburettor, £320 for the Eteve stabiliser, £200 to the Moreau monoplane, £80 to the Robert parachute, and £40 to MM. Philippe and Perron for their "demarreur."

Flying from Buc to Malmoe.

STARTING from Buc very early on June 29th, Capt. Sunstedt, on a Henry Farman biplane, accompanied by a passenger, flew to Revener in Holland, and then on to Bremen in Germany. The next morning he was away from Bremen at 6.30 and reached Malmoe in Sweden at 10.45. In a straight line the distance from Buc to Malmoe is about 720 miles.

Rheims to Issy on a Dep.

ON the 3rd inst. Parmelin, on his Gnome-Deperdussin, with his brother as passenger, flew from Rheims to Issy in ten minutes over the hour.

Fine Flying on a Voisin.

SOME fine flying was carried out by Lieut. Levassor, on a Voisin fitted with a 130 h.p. Salmson engine, during last month. Flights were made from Mourmelon to Dunkerque, Lille, Verdun, Nancy, while a non-stop trip from Mourmelon to Poitiers took 4 hrs. 10 mins.

More Purchases by Turkey.

IT it stated in Paris that orders have recently been placed by the Turkish Government for a large number of machines, including a dozen Morane-Saulnier monoplanes and thirty Nieuports.

Nancy to Buc and Back.

THREE biplanes from the military centre at Nancy, piloted by Surgeon Perrin, Sergt. Homerain and Sergt. Poinsard, on Saturday week went to Buc, and returned *via* Mailly, the round trip of 450 miles being made in 11 hrs. flying time.

Night Flying at Chalons.

SEVERAL trips after dark were made at Chalons Camp on the 1st inst. by Capt. Mauger-Devarenne on his M. Farman biplane. After a solo flight of 20 mins. duration at a height of 700 metres, he made a similar flight with Lieut. Varcin, and then took up Lieut. Personne for half an hour, during which an altitude of 1,100 metres was reached.

Paris to the Sea and Back.

BY way of completing the qualifying tests for his military *brevet*, M. Auge, on the 2nd inst., on his Maurice Farman, went from Buc to Deauville and back, while a similar flight was made by Capt. Challes on a Henry Farman machine.

A Joy Ride for M. Farman.

ON Sunday last on one of the latest M. Farman biplanes, Dick Farman took his brother Maurice from Buc for an excursion to Juvisy, then going on to Ville-Sauvage, Dourdan, and back to Buc.

Two French Military Pilots Killed.

AFTER a flight of about four hours over the neighbourhood of Rheims, on the 3rd inst., a military monoplane piloted by Corporal Mirat fell near Betheny. The steering gear appeared to fail when the machine was flying at a height of 250 metres during a heavy shower of rain. The passenger, Corporal Godefroy, was killed in the smash, whilst the pilot only survived his injuries a few hours.

A Fatality in Russia.

WHILE Capt. Bojaroglo was flying in the district of Pskof, on the 1st inst., his machine fell. The pilot was killed on the spot, while the passenger was seriously injured.

Fatal Accidents in Holland and Belgium.

THE Belgian pilot, Liedel, who, as recorded in last week's FLIGHT, was seriously injured in a smash at the Martelange on the 27th ult., succumbed to his injuries later in the week. The first fatal accident in the Dutch Flying Corps occurred on the 2nd inst., at Soesterberg, the day following the celebration of the first anniversary of the establishment of the aerodrome. The machine had only reached a height of 50 metres when apparently something went wrong with the engine and the machine fell. The pilot was so seriously injured that he died in hospital the next morning.

From Berlin to Servia.

IN an attempt to fly from Berlin to Constantinople, Schuler, accompanied by a passenger, on the 1st inst., on a Lloyd biplane, got as far as Palanka, on the Servian-Bulgarian frontier, and then had to come down owing to failure of his petrol supply. The distance covered in a straight line was about 750 miles.

Long Flight in Russia.

LIEUT. RASSI PEREDOF, with his mechanic, on the 3rd inst., flew the 375 miles from Kieff to Odessa in four hours.

Long Flight in Argentina.

DETAILS are just to hand of a fine flight made in Argentina in the early part of June by Lieut. Goubat on a Rumpler monoplane. Starting from the Palomar military ground near Buenos-Aires, he flew the 320 kiloms. to Canada de Giniez in 3 hrs. and then after replenishing went on to Cordoba, making a total distance of 700 kiloms. He returned on the following day to Canada de Giniez, and, owing to the wind and rain, could not progress any further until the next morning, when he returned to Buenos-Aires in fast time.

"Z 6" Replaces "Z 1" at Cologne.

To take the place of the "Z 1," which owing to its accident a fortnight ago had to be dismantled, the "Z 6" on the 1st inst. left Leipzig at 10.30 p.m., and eight hours later arrived safely at Cologne, where she will be stationed until a new Zeppelin is ready.

When Werner Landmann, the German pilot, beat the world's duration record on June 29th last by a flight of 21 hrs. 49 mins. duration on his Albatros biplane, he was kept informed of his progress by figures painted in black on an aeroplane wing, as shown in the photograph.

THE VIENNA FLYING MEETING.

The third international flying meeting, which was held at the Aspern Aerodrome, Vienna, from June 21st to 28th, brought together a great number of well-known pilots, representing the following countries: England, France, Russia, Germany, Austria and Hungary, and embracing the following entries of pilots and machines:—

England.—S. V. Sippe (Bristol biplane).

France. — Bathiat (Bathiat - Sanchez monoplane), Chanteloup (2 Caudron biplanes), Poulet (2 Caudron biplanes), Prévost (Deperdussin monoplane), Bielovucic (2 Ponnier monoplanes), Audemars (Morane monoplane), Gilbert (1 Morane mono. and 1 Deperdussin mono.), Chevillard (H. Farman biplane), Garros (Morane monoplane).

Russia.—Slaworossof (Chabardini monoplane).

Germany.—Stöffler (Aviatik biplane), Ingold (Aviatik), Amerigo (Aviatik), Stiploschek (Jeannin Taube), Hirth (Albatros biplane), Loeszl (Albatros biplane), Schulz (A.F.G. biplane).

Austria.—Banfield (M.L.G. biplane), Konschel (M.L.G. monoplane), Sparmann (M.L.G. monoplane), Lilly Steinschneider (M.L.G. mono.), Widmer (Lohner biplane), Wittmann (Lohner), Warchalowski (Lohner), Cihak (3 Cihak monoplanes), Bier (Lloyd biplane).

Hungary.—Schüler (2 Lloyd biplanes).

On the first day of the meeting, June 21st, Garros won the prize for the first out, and looping exhibitions were given by Chanteloup, Chevillard, Garros, Gilbert and Audemars. In the duration competition the German pilot Ingold secured the lead with a flying time of 4 hrs. 7 mins. 2 secs. Stiploschek was second with 3 hrs. 29 mins. 49 secs. The figure eight competition was won by Chevillard, who completed his figure of eight in 16 secs. Chanteloup wus second in 17 secs. In the altitude competition Lieut. Bier, who was flying a Lloyd biplane, succeeded in not only beating his rivals but also in establishing a new world's altitude record with three passengers, by climbing to a height of 4,120 metres. The previous record of 3,700 metres was held by Thelen. The speed race on this day was won by Garros.

The second day of the meeting had been postponed from June 24th to June 25th. On this day the prize for the first out was won by Audemars. In the duration competition Stiploschek secured first place, whilst in the "get-off" competition, which required a height of ten metres, with the shortest horizontal run to be reached, Poulet and Chevillard were first with runs of 30 metres, and Gilbert and Chanteloup 3rd and 4th respectively. The climbing contest was won by Gilbert, who reached 1,000 metres in 2 mins. 51 secs. In the altitude competition (with two passengers), Hirth was first (3,920 m.); Audemars second (3,130 m.), and Legagneux third (2,850 m).

On the third day—June 27th—Bielovucic secured the prize for the first out; the duration contest was won by Stiploschek and the speed race by Gilbert. Audemars had a smash during the speed race, his petrol pipe breaking, the consequent stopping of his engine necessitating a forced landing, during which his machine turned over, fortunately without injury to the pilot. A forced landing contest was won by Chanteloup, who thus again proved the qualities of the Caudron biplane for landing on bad ground. During the day three world's altitude records were established. Lieut. Bier reached a height of 6,170 metres, accompanied by a passenger. Loeszl beat the previous record of 4,120 metres established by Lieut. Bier a few days earlier by going up to an altitude of 4,770 metres accompanied by three passengers. Hirth succeeded in raising the record for pilot and two passengers to 4,900 metres.

June 28th was the last day of the meeting, and on this day the speed race from Aspern to Poysdorp and back was flown, with the result that the three first prizes were divided equally between Garros, Gilbert, and Prévost, whilst the fourth prize was won by Hirth. In the speed race for Austrian competitors, Sparmann was first, Konschel and Wittmann second and third respectively. The "get-off" contest (Austrians only) was won by Konschel, who got his machine up to 10 metres after a run of 75 metres.

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THE LATEST "BODDY" LIFE-SAVING JACKET.

Since we last described the "Boddy" life-saving jacket—the invention of G. M. Boddy which has been approved by the Board of Trade—several improvements have been introduced. The principal feature of the Boddy jacket is that the supporting medium is "kapok," the down containing the seeds of the Javanese silk-cotton tree. These seeds are in the form of minute air cells coated with natural oils, which besides having great buoyancy qualities also serve as a protection from the cold. The jacket, which slips over the head, is made up of six pads of "kapok" in strong drill casing, so arranged that two small pads are at the back of the neck, two large ones over the chest and two smaller ones underneath. Two tapes of strong webbing, 1½ ins. wide, are secured to the lower corners of the large front pads and rove through a hem on both sides of the jacket to the back pads so as to tie in front, thus drawing the front pads to the chin and the back ones well on the shoulders and neck. The smaller front pads can also be tied round the body by means of tapes. This arrangement of pads enables the wearer, should he be unconscious or injured, to automatically be turned on his back with his head well out of the water. Another feature of the Boddy jacket is that it is suitable for large or small persons, and can be worn without alteration by men, women, or children. The Boddy life-saving jacket should, in fact, be a *necessity* on *every* boat for *every* human being carried, and should certainly be worn by all aviators when crossing any stretch of water. Several of the pilots taking part in Saturday's air race from Hendon to Paris and back, including W. L. Brock, R. H. Carr, and Louis Noel, are wearing the Boddy jacket. In conclusion we might mention that one of the great shipping firms has ordered a large supply of these jackets, and that a smaller model is made for the use of bathers, which besides being a great help to those learning to swim, is a means of providing plenty of amusement in the water.

"Flight" Copyright.

Mr. Brock with the Boddy life-saving jacket as worn.

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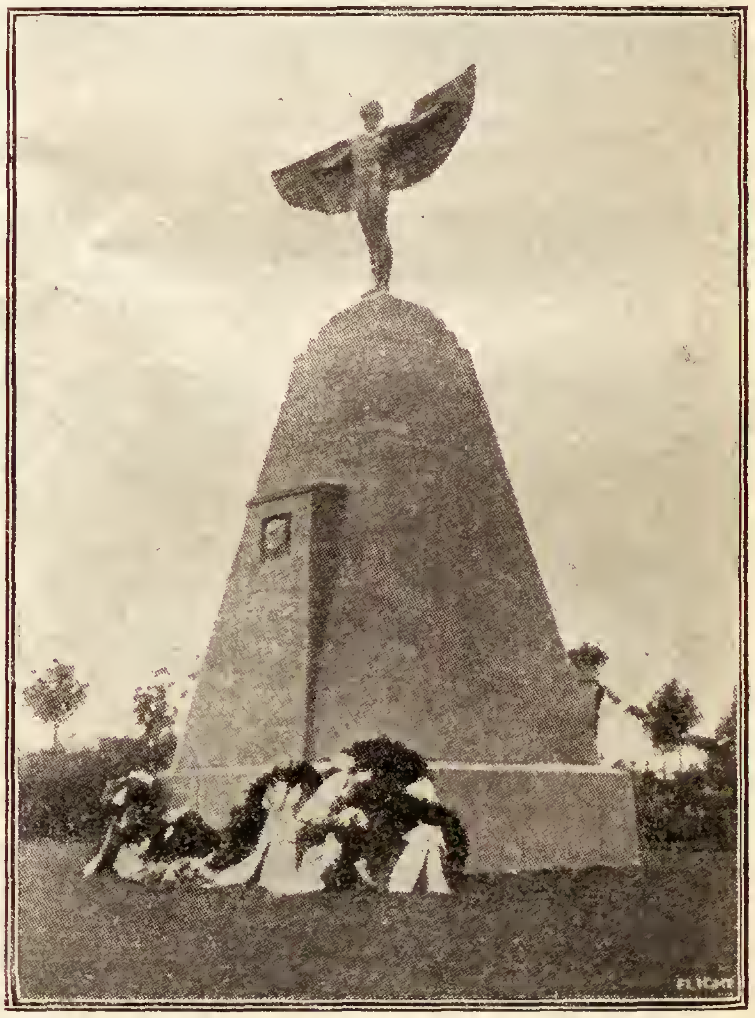


The Lilienthal Memorial which has recently been inaugurated at Gross-Lichterfelde.

Models

Edited by V. E. JOHNSON, M.A.

The *Model Engineer* Competition. Mr. H. G. Bond's Model.

THE following particulars and accompanying illustration of the winning model in the above competition will, we are sure, not be without interest to the readers of FLIGHT :—Loading, 6·5 ozs. per sq. ft. ; length of model, 42 ins. ; wing span, 39 ins. ; chord, 4·75 ins. Driven by 7 strands of ¼ in. strip rubber. Diameter of propellers, 11 ins. Chassis and apex of hard aluminium. B.G. lubricant was used on the rubber motor. Dimensions of elevator, 11 ins. by 3 ins.

Mr. H. G. Bond, the winner of the *Model Engineer* Competition, and his model.

Model Drawings.

Mr. G. Morgan, Southampton Street, Ringwood, Hants, would be glad to accept Mr. Wyatt's offer of drawings of his models and of his compressed air motor, recently described in FLIGHT.

Mr. W. G. Billinghurst's Model Flying Boat as Exhibited at Olympia, 1914.

The *boat or fuselage* is composed of a framework of silver-spruce 30 ins. long, 2 ins. in width and 1⅜ ins. deep, covered with silk given a varying number of coats of varnish in accordance with the part where applied.

There are four longitudinals having an uninterrupted run for the whole length of the boat, the upper ones being $\frac{3}{16}$ in. square and the lower ones ¼ in. by $\frac{1}{16}$ in. (lying flatwise). There are three steps, spaced equidistant apart, with a distance piece at the rear of each, cut out for lightness. The foremost of these is extended upwards to form the foundation of a dashboard.

Built into the boat is a strong framework to which the planes are attached, which at the same time provides a clearance of 1¼ ins. for the planes from the water line.

The *planes* are set at a positive angle of 3°, and are constructed of 18 gauge steel wire covered with Jap silk and varnished three times. The dimensions are as follows :—

	Span.	Chord.	Max. Camber.
Upper plane	36 ins.	5½ ins.	¾ in.
Lower plane	24 ,,	5 ,,	½ ,,
Tail plane	10 ,,	5¼ ,,	Nil

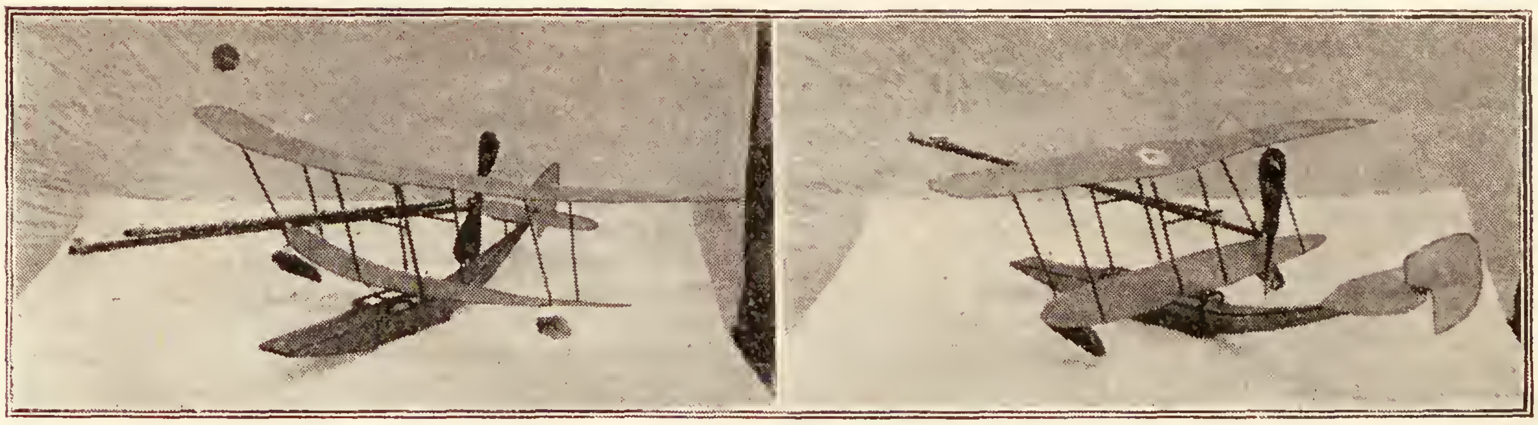
The *two main planes* are separated by eight streamline wood struts, which provide a vertical gap of 6 ins. and a stagger of 2 ins., and are cross-braced with fine straining wire.

The *tail* is set at a slight negative angle of incidence, and tends to further enhance the longitudinal stability by means of its action relative to the propeller slip-stream in which it is working. As is obvious in this type of model the centre of thrust is considerably higher up than the centre of gravity and centre of resistance. This being so, immediately the propeller is started the nose of the machine tends to go down, but the slip-stream depresses the tail and so counter-balances that effect. When the propeller stops, and a glide is commenced the weight swings forward, but the tail—now minus the extra depression—rises to bring the model back to its normal flying attitude.

Power is provided by 8 strands of ¼-in. strip rubber carried on a ⊔ section motor rod 33 inches long, and driving a single 8-in. propeller (by J. Bonn and Co., Ltd.) at 1,500 r.p.m.

The tests of the model have been exceedingly interesting, and many valuable and educational points have been discovered, mainly with regard to the boat. Short hand-launched flights have been obtained, but it has, as yet, refused to quit the water entirely under its own power, although this accomplishment only appears to be a matter of more experiment. On the strength of the information

MR. L. H. SLATTER'S MODELS.—Left, his r.o.g. machine in flight; centre, his hydro-aeroplane flying on Wimbledon Common; and on the right his weight-lifting model in flight.



Two views of the Billinghurst model flying boat.

derived from these tests, I am shortly starting on the construction of a second model of this type, embodying all the latest ideas, &c., which have suggested themselves, and have little doubt of its ultimate success.

Should any of your readers wish to view the model, it may interest them to know that it will be on exhibition at the Anglo-American Exposition at the White City, Shepherd's Bush, from May till October.

* * *

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration ...	J. E. Louch ...	95 secs.
Twin screw, do.	Distance ...	R. Lucas	590 yards.
	Duration ...	G. Hayden ...	137 secs.
Single screw, rise off ground	Distance ...	W. E. Evans ...	290 yards.
	Duration ...	J. E. Louch ...	68 secs.
Twin screw, do.	Distance ...	L. H. Slatter ...	365 yards.
	Duration ...	J. E. Louch ...	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance ...	C. C. Dutton ...	266 yards
	Duration ...	J. E. Louch ...	91 secs.
Do., off-ground	Distance ...	C. C. Dutton ...	190 yards.
	Duration ...	J. E. Louch ...	94 secs.
Single screw hydro., off-water	Duration ...	L. H. Slatter ...	35 secs.
Single-tractor, do., do. ...	Duration ...	C. C. Dutton ...	29 secs.
Twin screw, do., do. ...	Duration ...	L. H. Slatter ...	60 secs.
Engine driven off grass ...	Duration ...	D. Stanger ...	51 secs.

Inter-Club Contest for the Farrow Shield and Baden-Powell Medals.—This competition took place on July 4th and the following clubs enter the second round on August 22nd, viz.: Paddington, Croydon, Leytonstone, Reigate and Redhill and Aero Models. The contest between Wimbledon and Paddington on the Paddington ground resulted in Paddington winning, and the result may be of interest to model readers. It was as follows:—

WIMBLEDON.

Team.	Trials.			Total.	Average.
	1st.	2nd.	3rd.		
T. D. C. Chown	62	55	42	159	53
D. Easdale ...	5	73	65	143	47⅔
F. W. Powell...	89	79	7	175	58⅓
G. Hayden ...	55	38	64	157	52⅓
D. Laing ...	5	5	33	43	14⅓
A. F. Houlberg	3	7	4	14	4⅔

PADDINGTON.

Team.	Trials.			Total.	Average.
	1st.	2nd.	3rd.		
W. E. Evans ...	45	2	45	92	30⅔
C. C. Dutton...	5	50	65	120	40
R. Bird ...	27	35	58	120	40
D. Driver ...	42	47	80	169	56⅓
F. W. Johnson	59	34	50	143	47⅔
H. Wooley ...	51	35	21	107	35⅔

The official observers in this competition were Messrs. H. A. Lyche, A.F.K.M.A.A., and M. Levy assisted by the secretaries of the two clubs, Messrs. Chown and Evans.

Competitions.—The Steering Competition and Junior Duration Competition takes place to-morrow (Saturday) afternoon on Wimbledon Common at 3 p.m. All entries for the Baden-Powell Kite Contest must be posted to reach Mr. Lanchester by Saturday, July 11th. Also, all entries for model record trials must reach Mr. Lyche same date.

Official Trials.—The monthly trials take place on Wanstead Flats on July 18th at 3 p.m.

Kite Contest.—The Association's Altitude Challenge Trophy can be competed for on July 18th. For full details see page 7 of programme. It should be noted that in this contest competitors may have assistants, it not being limited to two assistants on account of the work entailed with the winch. It is to be hoped that the well-known fliers Messrs. C. Brogden and B. S. Varnals will be among the competitors for this handsome trophy.

Petrol Engines for Models.—Now that a petrol engine weighing under 3 lbs. has been produced, it is hoped that several modellists will enter for the handsome trophies offered by Sir John and Lady Shelley for models applicable to full-size machines. It is claimed for this new engine that the makers guarantee 2,900 revs., and the makers claim it is the smallest official petrol motor in the world. It is hoped by open competition to prove this is the small motor we have been waiting for. The following is a brief description given by the makers:—"In order to get the greatest simplicity and reliability the two-stroke system was adopted, and the motor has no valves, spring, &c., which reduces liability to breakdown to a minimum. The carburettor can be fitted at any angle by a special device. The oil reservoir mounted on the feed-pipe is transparent to allow the amount of oil to be always visible. The air inlet and the sparkling are adjustable." Full details of engine can be obtained from any advertiser in official programme.

Official Badges.—Many members have sent their annual subscription to the gen. hon. sec. of 5*s*., but their attention is called to the new subscription, which is 6*s*. and includes the badge. Will all those members remit at once the sum of 1*s*. 1*d*. to the sec., so that they may have the official badge of the year sent them without further delay, as it might disqualify them in any competition they might enter, as all members must wear the badge in the competitions?

27, Victory Road, Wimbledon. **W. H. AKEHURST, Gen. Hon. Sec.**

AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (30, Corringham Rd., Golders Green).

July 11th, practice for all types, 3 o'clock, Hampstead Garden Suburb Fields.

Leytonstone and District Aero Club (64, Leyspring Road).

July 12th, flying on Wanstead Flats at 6.30 and 10.30 a.m.

Paddington and Districts (77, Swinderby Road, Wembley).

July 11th, competition for single propeller models, minimum weight 4 ozs., minimum loading 4 ozs. per sq. ft. Average duration r.o.g.

UNAFFILIATED CLUBS.

Finsbury Park and District (66, Elfort Road, Highbury, N.).

July 11th, flying, Finsbury Park Kite Ground, from 3 p.m.

Ilford Model Ae.C. (83, Endsleigh Gardens, Ilford).

July 12th, flying at the Aerodrome, Hog Hill, Hainault Forest, Chigwell Row, 10 a.m. Members are specially requested to meet at the club's temporary workshops on Saturday, July 11th, at 2.15 p.m. to assemble the machines for the Ilford Hospital Carnival.

S. Eastern Model Ae.C. (1, Railway Approach, Brockley).

Usual flying meetings this week-end. July 12th, an important committee meeting will he held on Blackheath.

* * *

CORRESPONDENCE.

Brakes for Aeroplanes.

[1876] May I further trespass on your valuable space in support of my recent letter on the above subject? Mr. Mair in his letter of last week fails to convince me of the practical utility of the type of brake he suggests. As he remarks, it is common knowledge that the brakes of a moving body should be applied gradually, but as the centre of gravity of an aeroplane is so high compared to the small size of the wheels, it appears, that in order to prevent a nose dive, the application of the brake will of necessity have to be exceptionally slow. In that case, the machine will travel a considerable distance before appreciably losing speed, and so the brake will not fulfil its purpose. It is evident also, that a large force will be required to quickly stop a machine of half a ton weight, moving at 30 m.p.h., and especially as this has to be done by applying brakes to wheels of only seven or eight inches radius.

I cannot fail to think, however, that disaster would soon be encountered by the inexperienced aviator, who, in the excitement of a difficult and forced landing, locked his wheels a second too soon, or applied his brake a little too harshly. Mr. Mair suggests that with an air brake the speed of the machine would actually be increased when landing in a following wind, but possibly he forgets that an aviator seldom alights with a following wind (and especially one of greater velocity than the landing velocity of the machine), as he is well aware of the danger he exposes himself to by so doing.

I do not consider that the time is yet at hand when the effect of brakes on the surface of the ground should be held to be of great importance, as they are mostly needed in cases of emergency, when, I think Mr. Mair will agree, the question of life still claims the whole of our attention. It has been found best, in the case of moving bodies, to apply brakes from behind, and I see no reason why aeroplanes should provide any exception to this custom.

"Mechanic" is by no means the first to suggest a reversible engine with which to apply brakes to a machine, and probably he is unaware of the difficulties that have to be overcome before this can be done. Might I ask how he would reverse his engine against the torque of the revolving propeller without adding to the weight of the engine? The stability of the machine, of course, would not be affected by reversing the engine, as this would not be done until the aeroplane had touched the ground.

In any case, it is not probable that this type of brake will be employed before the time of more powerful and heavier machines.

HERMAN SHAW.

Royal College of Science, South Kensington, S.W.

Climbing Speeds of Machines.

[1877] With reference to letter 1864 by Mr. Alfred Coate, I should like, with your permission, to state that I am unable to understand why a head or following wind should affect in any way the efficiency of the propeller.

Since the machine is in all cases travelling *en bloc* with the wind, there will, it is clear, be no change in the conditions under which the propeller is working; therefore how can the efficiency of the propeller be changed?

To quote letter 1854, Mr. Coate writes as follows: "But when rising with the wind, the machine will not reach 100 m.p.h." There is no reason whatever why the machine should not reach 100 m.p.h., or wind speed + flying speed. Practical as well as theoretical experience proves this.

If Mr. Coate can *prove* the accuracy of these statements by any means I should be pleased to alter my opinions.

My reference to the weight of the machine in climbing was extraneous to the argument; I should like to withdraw it until, with your permission, I may prove my statements.

Bedford Park. S. C. SHEPLEY-PART.

Use of Models in the Development of the Aeroplane.

[1878] I have been much interested in reading your article on Model Aeroplanes in June 19th and 26th issues, and venture to put one or two considerations before you.

It seems to me that if models are to be of any use in the design of full-size machines, it is necessary to work in some particular direction; that is to say, it is of no use merely to build a model which will fly, and which is as nearly as possible a replica of a full-size machine, but it is necessary to set before oneself the particular point to be aimed at in the design. Now the preliminary difficulties are extremely great. Hundreds of experiments are really necessary to arrive at any certain result, and the difficulty of making a model which can be flown hundreds of times without coming to grief, especially if a tractor, is almost insurmountable. A great deal of useful time seems to be wasted in making models which will rise off ordinary grass. Now, a real machine, I should imagine, would hardly start in a hay field before the grass was cut, and this is not an unfair comparison when you consider the shortest turf compared with the model.

The only conditions which can be set to approximate to the real thing are those when rising from the water, and even then something like 25 per cent. of the full available energy of a rubber engine is absorbed in rising, whereas with a real machine, for all practical purposes, the total amount of energy is inexhaustible, and in a flight of 2 or 3 hours the few minutes taken in rising are negligible. The r.o.g. models, then, are really nothing but a toy, and the useful model should be launched either from the smoothest possible of surfaces, or by hand or by mechanical means, so that the useful energy stored up in the engine is used in actual flight, and not in rising.

Further, it is, I should imagine, quite certain that with a rubber engine the exact conditions of a full-size machine cannot be reproduced. Doubtless it may be possible to get the centre of gravity in the same position as in a real machine, but a large portion of the weight must be distributed along the wings even if it is not distributed along the *fuselage*.

Another difference which it is impossible to overcome is the fact that the torque at the start is so enormously greater than it is at the finish, and seeing that with a given angle of incidence of the planes an increase of power causes the model to rise, there is actually no single moment where the conditions really tally with those of a full-size machine. One must ask oneself the question—What is it one really wants to find out by means of a model? If you would answer this question it would go a long way towards setting modellists to work in the right direction.

There is one point which would be of great assistance, and that is, if, when publishing drawings of models, you would give the position of the centre of gravity. I think I am correct in saying that this has never been given in any of those published within the last 12 months. In my own limited experience I should say that the centre of gravity and the centre of pressure never coincide.

I have recently made a model having two skeins of rubber parallel to the wings, and one parallel to the *fuselage*, using bevel wheels, and two propellers turning in opposite directions on the same shaft. My present model is too heavy, and requires a very large amount of rubber, but will fly for a short distance quite steadily and straight. As soon as I have made a second model with the weight considerably cut down and have obtained reasonable success, I will send you up photographs and particulars, as I think it may be of interest, because I have not observed drawings of any similar machine so far in your excellent paper.

Blackhorse Lane, Walthamstow, N.E. E. N. BRAY.

[Referring to Mr. Bray's interesting letter and the various points which he raises. Whether rising from short grass or from water (if against a breeze) nothing like 25 per cent. of the energy of the rubber is consumed; 5 per cent. would be a far more accurate estimate. At the same time, when flying a model for the sole purpose of making observations *during actual free flight*, by all means use a special rising surface or launching apparatus, the former for preference. As Mr. Bray says, with a rubber motored model the exact conditions of a full-sized machine cannot be reproduced, and it is in such experiments where this is necessary that the (so-called) powered or engined model scores. We desire to find out, by means of models, anything and everything that might be useful to the cause of aviation. The model laboratory competition to be held later under the auspices of the Aeronautical Society, to ascertain the best lift to drag ratio at a wind speed of 18 miles, will, it is hoped, supply us with some useful data. Any series of experiments, if carefully and scientifically carried out and accurately observed and noted down, might be of great use at some future date. The results arrived at by full-sized workers have not unfrequently been known to aeromodellists some time before. With reference to Mr. Bray's remarks concerning the position of the centre of gravity on models, I have often in the past pointed out in letters to correspondents the necessity for marking plainly the position of the c.g.; it is not unfrequently impossible to answer the query asked because this has not been done.

The only model that I have so far actually seen with two skeins of rubber parallel to the wings was one in which these two skeins were used to drive two horizontally revolving propellers situated at the extremity of the main plane; the model showed remarkable lateral stability, in spite of the increased lateral moment of inertia. I shall be pleased to receive further particulars of our correspondent's model.—V.E.J.]

* * *

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CONTENTS.

Editorial Comment: PAGE
- London-Paris-London ... 747
- Another Landmark in Flight ... 747
- "The R.A.F. and the Private Constructor" ... 747

London–Paris–London Air Race ... 750
Royal Aero Club Official Notices ... 755
Flying at Hendon ... 756
From the British Flying Grounds ... 757
Flying at Shoreham ... 758
Eddies. By "Æolus" ... 761
The East German Race ... 764
The Langley Machine Tests ... 765
British Notes of the Week ... 766
Foreign Aircraft News ... 767
The Flying Machine from an Engineering Standpoint. By F. W. Lanchester 768
Models. Edited by V. E. Johnson, M.A. ... 770
Correspondence... ... 772

EDITORIAL COMMENT.

London–Paris–London.

Although there is a disposition to allow the almost day-to-day records of aviation to pall upon the imagination, it is impossible to allow the result of the race from London to Paris and back last Saturday to pass without some remark. To our mind it was one of the most useful events that has taken place for a very considerable time, since it served to bring home very vividly the tremendous possibilities of aircraft for the purposes of international communication, and the manner in which the development of aviation has to all intents and purposes eliminated the artificial barriers of frontiers. Over and above that, we have seen how enormously superior in speed is the aeroplane to all other modes of locomotion. When we regard the fact that the fastest time in which the single journey from London to Paris can be accomplished by the more orthodox means is six and three-quarter hours, while Brock's net time for the *double* journey was only a trifle over seven hours—less than twenty minutes over the single trip time by train and boat—the reflection cannot be avoided that the aeroplane is destined to play a far greater part in the future of rapid communications than is imagined by most people.

Another Landmark in Flight.

We had almost made up our mind to allow the ordinary records of flight to pass unnoticed save to note them in our columns as simple matters of news, so prolific has been the recent past in new figures relating to all phases of aviation. One, however, that has been set up during the past few days calls, we feel, for exception from the rule. This is Herr Böhm's really wonderful feat of flying for over twenty-four hours without descending. Ascending from the flying ground at Johannisthal shortly before six o'clock on Friday evening of last week on an Albatros biplane, he made short excursions to Berlin and Potsdam, but for the most part contented himself with circling the aerodrome, and finally landed at five minutes past six on Saturday evening, having been in the air for just twenty-four hours and twelve minutes.

Such a marvellous feat of endurance must give one to think that the possibilities of such flights as that across the Atlantic are not, after all, so remote as many imagine. In fact, the possibilities of flight appear to be almost illimitable.

* * *

"The R.A.F. and the Private Constructor."

Apropos our comments under the above heading in last week's issue of FLIGHT, we have received the following letter from Mr. Mervyn O'Gorman, with explicit permission to publish it. He says:—

> "I am surprised at the Editorial in FLIGHT of 10/7/14, and that the official organ of the Royal Aero Club should take no steps to verify and should build up a structure of prejudice on the bare statement of an unnamed constructor who, as you say, 'for obvious reasons' desires oblivion and he deserves it.
>
> 'In repudiating his statements you will perhaps quote with name and date some of the 'many statements of responsible ministers' whom you allude to; you will mention that the Director General of Military Aeronautics and his Staff who alone control the Factory's output, as well as myself as Superintendent of the Royal Aircraft Factory, have always been accessible to you, and explain how it is that no enquiry was made of any of these before you imputed bad faith to them all in an article which you close by saying that you 'suspend judgment.' In a weekly journal there can scarcely be such urgency as to excuse and still less warrant this neglect of verification."

We are rather at a loss to know why Mr. O'Gorman should be annoyed, as he appears to be. We submit that no impartial person who reads our article to which exception is taken could possibly impute to us any desire to "build up a structure of prejudice" or to "impute bad faith" to the Aeronautical Staff of the Army or to

Mr. O'Gorman himself in his capacity of superintendent of the R.A.F. On the contrary, we simply put a question for the single purpose of giving the authorities an opportunity to deny the statement which was being made regarding the construction of the R.E.'s at the R.A.F.

The letter suggests that we failed to take all proper steps before giving currency to a rumour which was, admittedly by ourselves, wanting in confirmation. We did not seek any information from the authorities at the War Office or the R.A.F. before our article was written, and for this we had what we conceive to be a very good reason. In the past so many rumours have gained credence regarding the policy of the R.A.F., rumours which we ourselves, be it said, have always combatted, and which in course of time have been magnified into grave misstatements of fact, that in this present instance we considered that the fullest justice would be done to everyone concerned by stating exactly how the report had reached us and giving to the authorities the fullest possible chance to deny its truth. Thus, and thus only, in our judgment could the lie—if it were a lie—be prevented from circulating and being magnified in process of circulation. In the eyes of Mr. O'Gorman this may have been an error of judgment, but we still think the best method of running a false statement to earth is to give it publicity in the plainest of possible ways.

In regard to names and dates of statements of responsible Ministers as to the functions of the R.A.F. we hardly think it is necessary for us to go into details, as, unless Mr. O'Gorman suggests that the Ministers making such statements were not "responsible," the utterances referred to by us have appeared in the pages of FLIGHT and are no doubt well in the mind of most of our readers who have followed the development of the official side of aviation.

After all, the very best justification of our having acted as we did in the matter is contained in the fact that we have now received from an absolutely authoritative quarter a most unqualified statement that our informant was entirely wrong in his supposed facts. We are able to say that so far from it being the intention to construct the machines in question at the R.A.F., tenders have been—or shortly will be—issued to the trade for their construction. Thus we see that a false report, which might easily have obtained the widest currency and credence under other circumstances, has been run to earth as a result of its ventilation in our columns. Which, to our way of thinking, is a very satisfactory outcome of the incident.

ROYAL FLYING CORPS.

THE following announcement appeared in the *London Gazette* of the 10th inst. :—

R.F.C.—Military Wing.—Capt. Charles Darbyshire, 4th Batt. Lancashire Fusiliers, from a Flying Officer, to be appointed to the Reserve ; July 4th, 1914.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending July 11th :—

No. 2 Squadron. Montrose.—The Officers, N.C.Os. and men of this Squadron had a few days' leave prior to leaving Netheravon on the return journey to Montrose on Monday, the 13th inst. The journey will be made in the same way as the journey down, viz., aircraft, M.T. and personnel moving together by daily stages. The actual route followed, however, will be slightly varied.

Nos. 3 and 4 Squadrons. Netheravon.—The week has been occupied with cross-country reconnaissances and in observation of artillery fire. On Monday, 13th inst., a class of 10 officers will commence the first of a series of courses of instruction in observation. These officers are drawn from various branches of the service, and many of them have served on the Staff.

No. 5 Squadron. Fort Grange.—No. 5 Squadron moved to their new quarters at Fort Grange, Gosport, on the 6th. The Squadron is gradually getting settled in. A few of the machines are there and the remainder will be flown over from Farnborough and Netheravon in the course of a few days as the tents are erected to accommodate them. The construction of the permanent sheds and workshops will be commenced shortly. The new station is an excellent one from every point of view.

No. 6 Squadron. Farnborough.—Reconnaissance work across country was carried out daily. This squadron is approaching its complement of personnel, having received parties of recruits and transfers during the week.

Nos. 1 and 7 Squadrons. Farnborough.—The week was chiefly directed to the technical instruction of recruits recently posted.

Aircraft Park. Farnborough.—Repair work to aircraft and M.T. was carried out, also the technical instruction of recruits.

Headquarter Flight. Farnborough.—Experiments on various lines were continued and a quantity of flying carried out.

Recruit Depôt. Farnborough.—A squad of 21 recruits were passed off the square by the Commanding Officer on the 8th inst., and were posted to various squadrons. Recruiting has been good during the last few weeks, and the advantages which the corps offers are beginning to be better realised in the manufacturing districts.

Aircraft at the Naval Review.

AIRCRAFT will figure largely in the Naval Review at Spithead this week-end, and the official programme calls for the employment of 4 airships, 25 seaplanes and 13 aeroplanes. To-morrow, Saturday, the aeroplanes will fly from Calshot to moorings off Fort Monkton, afterwards returning to Calshot, while on Monday all the seaplanes are to "fly past" the Royal Yacht.

THE NEW HEIGHT RECORDS.

AFTER remaining at 6,120 metres, where it was set by Legagneux on December 27th last, the world's altitude record was improved on by no less than 480 metres on the 9th inst., by Linnekogel, while on Tuesday last Oelerich put on another 900 metres, so that, subject to verification, of course, the record now stands at 7,500 metres.

For his record Linnekogel started from Johannisthal at 3.15 a.m. on the 9th inst. on a Rumpler monoplane with 100 h.p. 6-cylinder Benz motor and Integral propeller. He was out of sight for a long time, and when he emerged from the clouds on his descent, he was above the Tiergarten, and he landed on the Templehof parade ground. His barograph recorded that he had ascended to an altitude of 6,600 metres.

Oelerich's record on Tuesday was made at Lindenthal, near Leipzig. He used a D.F.W. biplane, fitted with a 120 h.p. Beardmore Austro-Daimler engine and Integral propeller.

24 Hours in the Air.

USING the same Albatros biplane, fitted with a 75 h.p. 6-cyl. Mercedes engine and Integral propeller, which was used by Landmann in making the previous duration record of 21h. 48m. 45s., Reinhold Böhm on Friday and Saturday last succeeded in remaining in the air for over twenty-four hours at a stretch. He set out from Johannisthal at 5.52 p.m. on Friday evening, and eventually landed at 6.4 p.m. on Saturday afternoon, having been in the air for 24 hrs. 12 mins. The machine carried at the start 600 litres of fuel and 50 litres of oil. For the first few hours Böhm circled slowly at a low altitude round the aerodrome, not going above 100 metres. Then he gradually went higher, and just before midnight varied the monotony by excursions across the German capital to Potsdam. Then for another twelve hours the machine regularly and monotonously circled round the Johannisthal ground, until in order to try and get into a cooler atmosphere Böhm went up to an altitude of 2,000 metres. Having completed twenty hours in the air the machine was gradually brought down to 300 metres for the remainder of the flight. The record wins for Böhm one of the national prizes of 5,000 marks.

New Passenger Records.

FLYING a Voisin biplane fitted with 130 h.p. Salmson engine, at St. Petersburg, Laporte on the 12th inst. made a new passenger duration record by flying with two passengers for 9 hrs. 16 mins. ; the previous best was Schirmeister's 6 hrs. 16 mins. 30 secs. On the 7th inst. Laporte made a new Russian record by taking two passengers up to 2,650 metres in 27 mins. and he improved on this on the 11th by taking two passengers to 3,850 metres in 36 mins.

On the 11th inst. at Issy, Rugere on a similar Voisin machine to the above, took up three passengers to a height of 3,400 metres, thus beating the French record of Garaix for pilot and three passengers by 150 metres.

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E. Baumann at Hendon Aerodrome passing over Pylon I on the Wright biplane.

THE LONDON–PARIS–LONDON AIR RACE.

ONCE more has Walter L. Brock "chewed" his way to victory, for the third of our big aviation events this year has fallen to this remarkable American flyer. As in the case of the Aerial Derby round London, and the London–Manchester–London races, Brock, as his fellow countrymen would put it, went straight for it and "got there" without any fuss or bother, and on each occasion he flew over the courses—which in two cases were quite unknown to him—under more or less unfavourable weather conditions with a remarkable degree of accuracy. This "hat trick" of his has, therefore, proved that he is undoubtedly a master of his art, and that his victory is not merely a question of luck alone. Credit is also due to his 80 h.p. Gnome-Morane-Saulnier and its makers, the Grahame-White Aviation Co. Although following the general design of the French machines, Brock's Morane—which, by the way, has done over 1,000 miles without any extensive repairs—possesses several modifications, mostly as regards dimensions. Brock's win is also remarkable in that out of the six actual starters he and Garros alone completed the double journey the same day. Although only these two finished—with Renaux classed third on Sunday—it was none the less an interesting race, with several exciting incidents, whilst not a single serious accident marred the proceedings. Considerable interest was attached to the race on account of the entry of seven well-known continental flyers.

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LONDON-PARIS-LONDON RACE.—Brock's superb landing at Hendon on his return from Paris.

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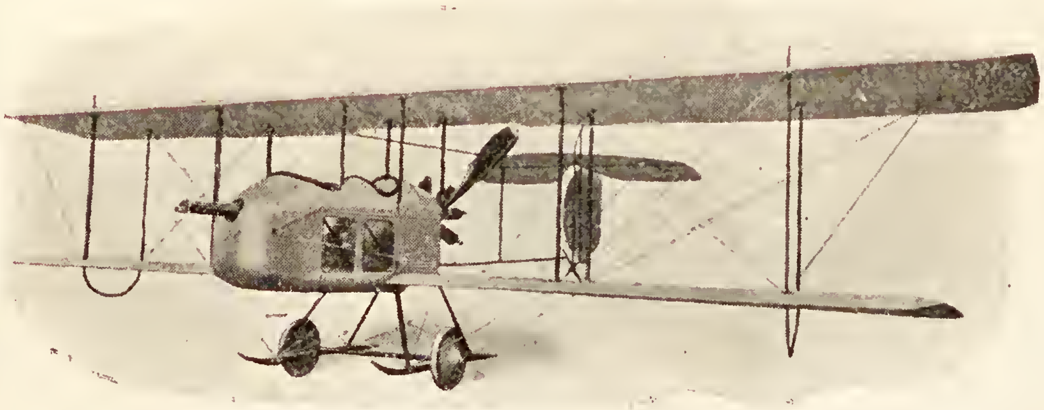
LONDON-PARIS-LONDON RACE.—Brock standing up in his machine immediately on his return to Hendon after his splendid achievement in the Paris flight.

The first of these to arrive over here was Eugene Renaux, who flew over from Paris on a 120 h.p. Renault-Maurice Farman ("headless" type) with a passenger on Thursday, the 9th inst. Roland Garros, one of the favourites of the race, started from Paris at 4.20 a.m. on Friday on his 80 h.p. Le Rhone-Morane Saulnier, arriving at Hendon at about 10 a.m., after having made descents, owing to engine trouble, at Calais and in Kent. Helmuth Hirth, of Albatros fame, also started off on an 80 h.p. Le Rhone-Morane-Saulnier in company with Garros, and he too had engine trouble and descended near Surbiton, arriving at Hendon in the afternoon. The machine flown by Garros differed somewhat from the other



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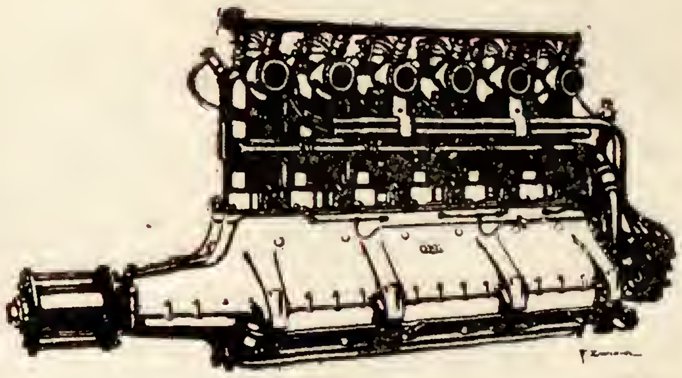

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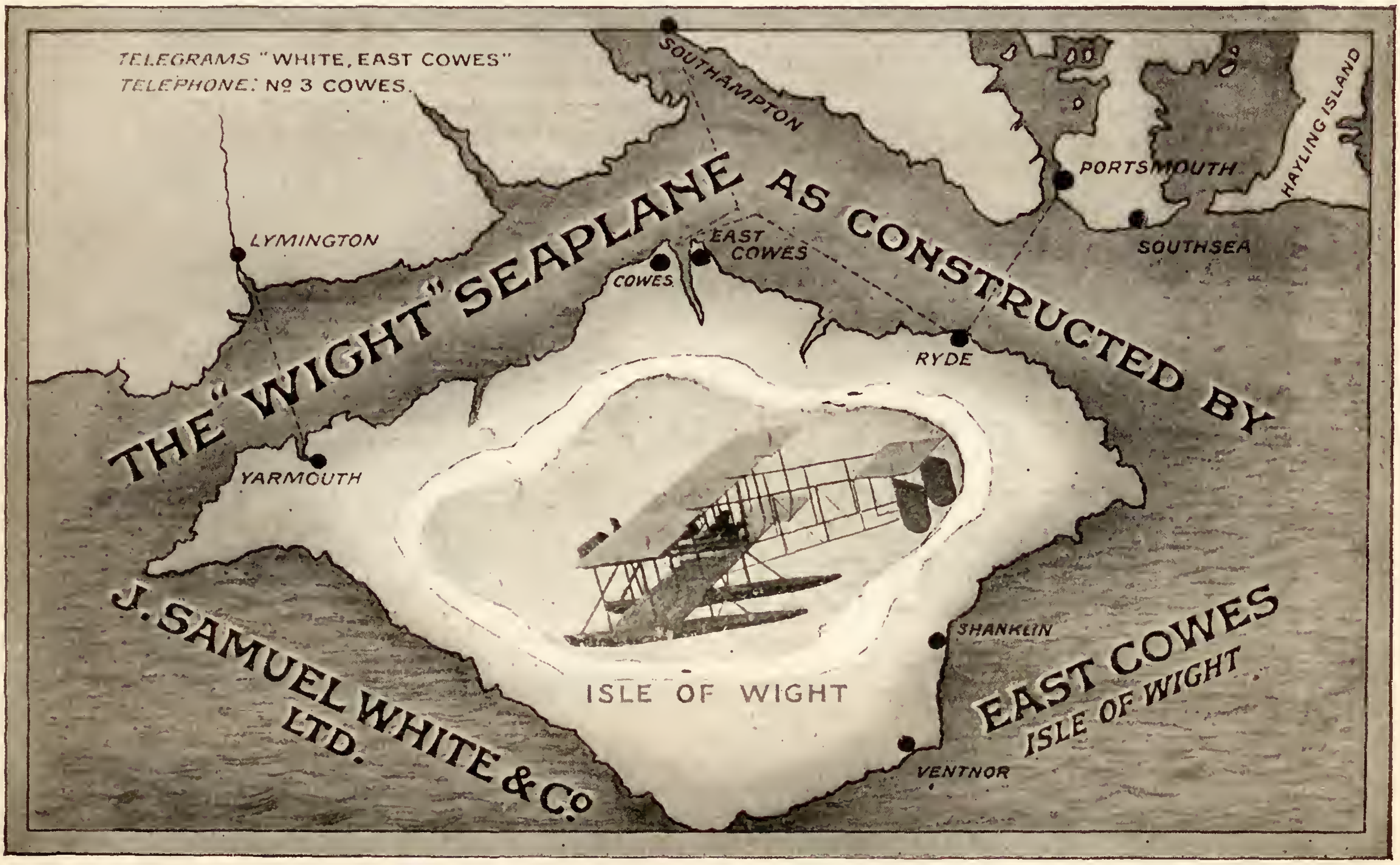

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Brock being congratulated by Lady Reid on his London-Paris-London flight, and on the right by Sir George Reid.

Morane-Saulniers in the race, having a slightly modified chassis and a peculiar wing section not unlike that of the Nieuport, whilst Hirth's machine was similar to the one flown over here by Brindejonc de Moulinais. P. Daucourt, flying the 80 h.p. Clement Bayard monoplane, got as far as Crotoy, but was unable to continue to London. Lenoir on the 80 h.p. Ponnier monoplane damaged his machine at Courtenay on his way to London, whilst M. A. Parmelin on the 80 h.p. Deperdussin monoplane, after departing from Villacoublay for London, fell and smashed his machine when only just outside the aerodrome, fortunately without injury to himself.

Several test and speed flights were made at Hendon on Friday last by Garros, Carbery (80 h.p. Le Rhone-Bristol scout biplane), R. H. Carr and W. L. Brock. The former's machine developing engine trouble, mechanics, superintended by M. Saulnier himself, worked on the engine up to a late hour. R. R. Skene left Brooklands for Hendon on the 120 h.p. Martinsyde, but descended at Potter's Bar owing to engine trouble. Early in the afternoon, whilst Louis Noel was looking over his machine, he discovered that the petrol tank was leaking, and the rest of the evening was spent in putting it right.

Everyone was agog early on Saturday morning, and by 5.30 a.m. a good many people were on the ground. The weather was not at all promising, and it looked as though the elements were going to be unkind for the third time. Although there was a slight breeze and the sun was making every effort to show itself, a thick mist and clouds hung around the aerodrome at a low altitude, so low, in fact, that when Garros went up for a test flight at 5.45 a.m. he disappeared among the clouds at an altitude of scarcely more than 100 ft. Shortly before 6.30 a.m. Hirth made a test flight on his Morane-Saulnier, but his engine was running so badly that on landing it was partly taken down in order to locate the trouble. As there was but little improvement in the weather, the start was postponed to 7.30, and even at this hour it was as bad as ever. Reports from Dover being favourable, however, it was decided to make a start. Skene was expected at any moment, but by now there was little hope of any of the missing continental pilots arriving. The starting times and handicaps of the remaining competitors were as follows :—

No.	Pilot and Machine.	Handicap.	Clock Start (a.m.).
		h. m.	h. m.
14.	T. E. Hearn, with Mrs. Hearn as passenger (80 h.p. Blériot monoplane)	3 18	7 30
12.	E. Renaux, with Miss Unwin as passenger (120 h.p. Maurice Farman biplane) ...	2 21	7 35
7.	Louis Noel (80 h.p. Morane-Saulnier mono.)	1 43	7 40
6.	W. L. Brock (80 h.p. Morane-Saulnier mono.)	1 36	7 45
8.	R. H. Carr (80 h.p. Morane-Saulnier mono.)	1 30	7 50
3.	H. Hirth (80 h.p. Morane-Saulnier mono.) ...	1 18	(non start)
10.	R. R. Skene (120 h.p. Martinsyde mono.) ...	0 32	(non start)
2.	R. Garros (80 h.p. Morane-Saulnier mono.)...	0 32	8 5
1.	Lord Carbery (80 h.p. Bristol biplane) ...	scratch	8 10

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LONDON-PARIS-LONDON RACE.—Brock's reception at Hendon after winning the race. On the left, the Pilot, the Press and the People; on the right Brock being "carried" round the enclosures after his victory.

Hearn, who employed a Rubery Owen quick release, did not get more than a few hundred yards before his engine stopped, and after a short interval he made another start, but descended on completing a couple of circuits of the aerodrome, and retired from the race. Renaux and his passenger were soon lost to view in the mist, but he had not been gone very long when he was seen returning. On landing he informed us that he was unable to find his way, as he could not see the ground at all, and so he decided to return. He made a second start, however, about an hour later. Carr, Brock and Noel all got away in fine style, but Hirth still had trouble with his engine, and so retired. The next man to start, therefore, was Garros, as Skene had not turned up. Garros misunderstood the signal to start, and lost a few seconds in getting away, whilst his engine still appeared to give trouble. The last to go off was Carbery on the Bristol, and he got away in a very shaky manner, the machine being heavily loaded with petrol and oil. With the exception of Renaux and Garros all the starters wore Boddy life-saving jackets, which made them look somewhat like skippers of flying life-boats.

"Flight" Copyright.

The presentation of the cup to Brock by Lady Reid for his win in the London–Paris–London Race.

The last of the competitors having gone, it remained but to await news of progress along the route, and in the meantime to partake of breakfast, which, thanks to the excellent catering arrangements on the ground, was an easy and pleasant matter.

"Flight" Copyright.

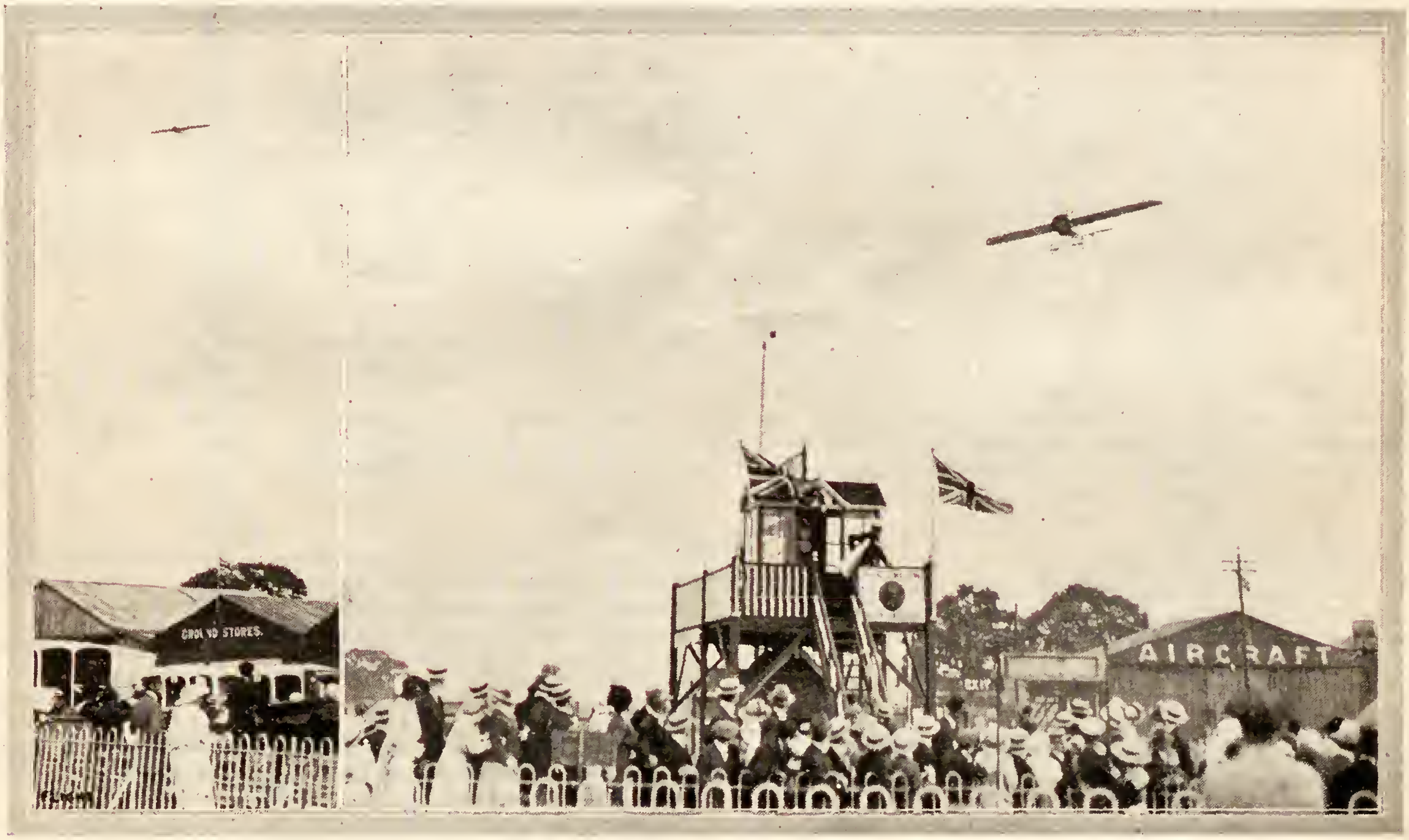
THREE CHEERS FOR THE WINNER.—Brock being toasted by Mr. Claude Grahame-White, Mr. R. T. Gates, and Hendon enthusiasts after his splendid win in the London–Paris race. On the right "the men in overalls" who, unseen, do so much to contribute towards success in flying races, join in the congratulations to Brock.

By now the weather was clearing, and giving promise of a hot and sunny day. Very shortly news came to hand that Brock had passed over Epsom at 8.2 a.m. and was flying well, whilst Garros was seen circling over Epsom Downs as though he was uncertain of his direction. A little later we heard that Carr had lost his way and had descended at Kenton, near Harrow, and that Noel had come to grief at Camber, near Rye. Noel had already started on the Channel trip when the petrol pipe broke, so he immediately turned and glided back to shore, just managing to land some 300 yards from the sea. After waiting about an hour at Kenton, Carr resumed his journey and descended once more near Dymchurch, near Hythe, where he decided to abandon the race and return to Hendon, and on landing at Ashford (Kent) on the return journey he damaged the landing chassis. There were now only four in the race, and many began to doubt if any would get to Paris, let alone return to Hendon.

"Flight" Copyright.

Garros in his machine in which he obtained second place in the London–Paris–London Race.

Renaux landed at Epsom to enquire his way, and also at Gravesend. Brock passed over Boulogne at 9.15 a.m., Garros at 9.50 a.m., and Carbery at 10.19 a.m. Brock landed at Hardelot at 9.24 a.m. to fill up with petrol, and departed 15 mins. later, arriving at Buc 11.18 a.m. Carbery was the next to reach Paris, landing at 12.4, five mins. ahead of Garros. Brock got away immediately his two hours' compulsory stop was up, but Garros lost some considerable time in starting on the return journey, as the engine had to be overhauled (a new magneto and propeller were fitted). On the return journey Brock reached Hardelot at about three o'clock, where he stayed 12 mins. in order to fill up with petrol, and passed over Folkestone at 3.45 p.m., Epsom at 4.28 p.m., arriving at Hendon at 4 h. 48 m. 6 s., his *average* speed for the whole journey being 71 m.p.h. Needless to say, the reception he got was tremendous, and the scene immediately after his landing was one to be remembered. Long before the machine came to rest it was surrounded by an enthusiastic crowd that overwhelmed him with greetings and questions. The machine at last came to rest close to No. 1 pylon, and Brock stood up in his seat, silent, but smiling and chewing. First he took off his "Boddy" jacket, and then felt in his pocket and produced a letter, which he delivered to someone in a casual sort of way. His next procedure was to return his small pocket camera, which together with his foot rule he always carries with him wherever he goes, to its case. He then produced a large packet of records, and another letter, which he duly handed over to an official, and then surrendered himself to those awaiting to chair him. All this time he was silent, smiling, and chewing! Brock, guess you're some marvel! Although Brock was the first home, it was still a matter of 15 minutes before he could be declared the winner of the trophy, for Garros started that much behind him, and so the Frenchman had a chance of winning if he reached Hendon within that time. However, it soon became apparent that Garros would not be able to get in soon enough, for it was announced that he had passed over Folkestone at 5.12 p.m., and so Brock was presented with the trophy by Lady Reid, the



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LONDON-PARIS-LONDON RACE.—Garros, the second man, arriving from Paris. On the left he is seen coming into the aerodrome on his first return, when, being informed he had missed the turning point at Harrow Church, he at once took wing again and flew back and rounded this point. On the right he is returning after this little episode, and thus formally ranking as second in.

wife of Sir George Reid, High Commissioner for Australia. Speeches were made by Claude Grahame-White, Sir George Reid, and—a very, very short one—by Brock. Grahame-White referred to the nationality of the event, a British-built machine of French design piloted by an American, and said that this kind of flight would in a very short time be quite a common occurrence—lunch in Paris and back in London for tea. He also made brief reference to the all-British attempt for the Atlantic flight.

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Three Officials of the London-Paris-London Race.—From left to right: Mr. Douglas W. Thorburn, Major F. Lindsay Lloyd (Stewards), and Mr. Harold E. Perrin.

An amusing and perhaps alarming incident occurred whilst the speech-making was in progress, for Verrier, who was "stunting" on his Maurice Farman, suddenly swooped down over the presentation group, causing several to scatter in all directions. At about 6.20 p.m. Garros was sighted approaching in the direction of the Welsh Harp, which seemed to indicate that he had not passed Harrow, so when he landed he was asked if he had, and not being sure, he started off immediately to do so, returning soon after, and crossing the line at 6 h. 28 m. 47 s., thus obtaining second place. In the meanwhile it had been announced that Carbery had left Hardelot at 4.55 p.m., and should arrive at Hendon at about seven o'clock. News also came to hand that Renaux had arrived at Paris at 2.48 p.m., having passed Folkestone at 11.8 a.m., and Boulogne at 11.39 a.m. After a stop of two hours he resumed his journey, and landed at Boulogne at 7.45 p.m., still with his passenger. For some time after the hour at which he was expected, there was no news of Carbery, and some considerable anxiety was felt as to his safety. The Admiralty was communicated with, as it was feared that he had fallen into the Channel. Shortly before nine o'clock it was ascertained that this was the case, but happily the pilot was safe and sound. It appeared that whilst crossing the Channel, engine trouble developed, so the pilot made for a tramp steamer, and as he did so his engine gave out. He planed down and alighted on the water as close to the steamer as possible, and was soon picked up by the latter dry and unhurt. The machine, in a damaged condition, was also salved. Later Lord Carbery was transferred to H.M.S. "St. Vincent," where he was well looked after by the officers, and eventually landed on Folkestone Pier.

E. Renaux, with Miss Unwin as passenger, left Boulogne on Sunday at 9.30 a.m. for Hendon, *via* Calais, arriving at Hendon at 12.25 p.m. He was thus the third pilot to return, and was therefore allotted third prize in the handicap. Thus ended the first London-Paris-London Air Race.

Notes of the Race.

Each of the starters carried a letter from the French Ambassador in London to the British Ambassador in Paris. Brock brought back from Paris a reply which was delivered to M. Morand.

On arriving at Paris, Brock handed over a number of postcards, stamped and addressed, and asked someone to post them for him. He soon found an old friend in Sabelli, and had a chat with him over old times whilst partaking of some refreshment. Throughout the whole journey, Brock never flew higher than 2,000 ft.

At Buc aerodrome there were many well-known personages connected with aviation, amongst whom may be mentioned M. and Mme. Blériot, MM. C. T. Weymann, P. Prier, Jules Védrines, Molla, Deutsch de la Meurth, Farman (sen.), and Sanchez, &c.

The following is a complete time-table of the race from start to finish, whilst elsewhere will be found further particulars of the flying at Hendon on Thursday, during the race, and on the Sunday following :—

Result of First London-Paris-London Air Race.

Prizes.—**Fastest Time:** Trophy and £500 presented by the International Correspondence Schools.
W. L. Brock (80 h.p. Gnome-Morane-Saulnier monoplane).

Handicap.—1st, £300, presented by the Royal Aero Club; 2nd, £150; and 3rd, £50. Presented by the International Correspondence Schools.

Times of Competitors.

	Hendon Dep.	Pass Epsom.	Pass Boulogne	Paris.		Pass Folkestone.	Pass Epsom.	Hendon Arr.
				Arr.	Dep.			
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m. s.
W. L. Brock	7 45	8 2	9 15	11 18	1 18	3 45	4 28	4 48 6
R. Garros ...	8 5	8 27	9 50	12 10	2 35	5 12	5 55	6 33 47
J. Carbery ...	8 10	—	10 19	12 4	2 4†	—	—	—
E. Renaux ...	7 35*	9 15	11 9	2 49	4 49‡	Sunday aft., 12.25.		

* Actually started at 8.23 a.m. † Descended in mid-Channel.
‡ Landed at Boulogne, 7.45 p.m.

	Handicap Time.	Flying Time.	Average Speed.
	h. m. s.	h. m. s.	m.p.h.
1. W. L. Brock ...	5 27 6	7 3 6	71·5
2. R. Garros ...	7 56 47	8 28 47	58·8
3. E. Renaux ...	24 34 0	26 55 0	—

Flying Times Between London and Paris.

	London–Paris.	Paris–London.	Total.
	h. m. s.	h. m. s.	h. m. s.
W. L. Brock ...	3 33 24	3 29 42	7 3 6
R. Garros ...	4 5 42	4 23 15	8 28 57
J. Carbery ...	3 54 0	—	—
E. Renaux ...	7 14 50	19 40 10	—

* * *

An Aeroplane for Australia.

FOLLOWING on the efforts which resulted in the presenting of a Blériot monoplane to the New Zealand Government, Lord Desborough, as President of the Imperial Air Fleet Committee, has issued an appeal to all former or present members of Oxford University to contribute towards the cost of an aeroplane which it is proposed to name "Oxford," in honour of the oldest university of the Empire, and to present it to Australia. Sir George Reid—the High Commissioner—has stated that such a gift will be enthusiastically welcomed by the Australian Commonwealth. The amount required is £2,000, and subscriptions should be sent to the Imperial Air Fleet Committee, 12, Norfolk Street, Strand, W.C.

The Art of Reconnaissance.

THIS book, which is now in its third edition, is deserving of notice in FLIGHT, for the reason that its author (General Henderson, Director of Military Aeronautics) has recently included a chapter dealing with aerial reconnaissance.

The author gives a comparison between airships and aeroplanes, pointing out their relative and potential military qualifications and methods of employment; indicating the manner in which cavalry and aircraft may be mutually supporting and most effective. As showing how important has been the advent of the aeroplane, it is stated that a fairly detailed observation of an enemy's force at a distance of three days' march can be completed within three hours from the time at which the order is issued until the information is delivered at headquarters. The qualities that render the aeroplane so valuable in reconnaissance are then examined, their probable actual duties are specified, and the methods of attack both from the ground and in the air are referred to.

The book is published by John Murray at the price of 5*s.* net, and although the chapter relating to aircraft will be read with interest and profit by all who are interested in aerial warfare, in order that the position of aircraft in war may be viewed in its true perspective, a study of the remaining portion of the book will prove attractive to many of our readers.

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The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Diary of Events.

July 18 ...	Flying Meeting. Hendon Aerodrome.
Aug. 10–22	*Daily Mail* £5,000 Circuit of Britain Race. Starting from Southampton Water.
Aug. 22–29	Gordon-Bennett Eliminating Trials. Upavon, Salisbury Plain.
Sept. 27–28	Gordon-Bennett Aviation Race. Buc, France.

HENDON AERODROME.

Members of the Royal Aero Club are admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards. The Membership Card admits the Member only—motor cars must be paid for.

DAILY MAIL £5,000 CIRCUIT OF BRITAIN RACE.

This Race will be open from 6 a.m. on Monday, August 10th, 1914, the starting place being Southampton Water.

The following are the entries, with the official numbers to be displayed on each aircraft :—

(1) Sopwith Aviation Co., Ltd. (Pilot : V. Mahl.)
(2) Wm. Beardmore and Co., Ltd. (Pilot : To be nominated.)
(3) Sopwith Aviation Co., Ltd. (Pilot : C. Howard Pixton.)
(4) Grahame-White Aviation Co., Ltd. (Pilot : To be nominated.)
(5) Eastbourne Aviation Co., Ltd. (Pilot : F. B. Fowler.)
(6) White and Thompson, Ltd. (Pilot : Capt. Ernest C. Bass.)
(7) A. V. Roe and Co., Ltd. (Pilot : F. P. Raynham.)
(8) Blackburn Aeroplane Co., Ltd. (Pilot : Sydney Pickles).
(9) White and Thompson, Ltd. (Pilot : A. Loftus Bryan.)

The Official Controls have been fixed as follows :—

Southampton (starting place), Ramsgate, Yarmouth, Scarborough, Aberdeen, Fort George, Oban, Kingstown (Dublin), and Falmouth.

Arrangements at Southampton.

The Royal Motor Yacht Club has kindly postponed the moving of the "Enchantress" until Monday evening, August 10th. Members wishing to witness the start of the Race on Monday morning may do so from the "Enchantress." A number of cabins are available for the week-end commencing August 8th, and members wishing to stay on board are requested to apply to the Secretary of the Royal Aero Club at the earliest possible moment.

COMMITTEE MEETING.

A Meeting of the Committee was held on Tuesday, July 14th, 1914, when there were present :—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. John Dunville, Major F. Lindsay Lloyd, Mr. Mervyn O'Gorman, C.B., Mr. C. F. Pollock, Mr. A. Mortimer Singer, and the Secretary.

New Members.—The following new members were elected :—William Campbell Adamson, Capt. G. C. Buckland, I.A., Hugh Burroughes, Earl of Carnwath, Capt. Alister James Henryson-Caird, Denis George Murray, and Evelyn Ronald Whitehouse.

Aviators' Certificates.—The following Aviators' Certificates were granted :—

827 Capt. Gerard Percy Wallace (S.A. Defence Force) (B.E.3 Biplane, Central Flying School, Upavon). June 29th, 1914.
828 Lieut. Gilbert Lindsay Farie, H.L.I. (Maurice Farman Biplane, Central Flying School, Upavon). June 30th, 1914.
829 Dennis Gwynne (E.A.C. Biplane, Eastbourne School, Eastbourne). June 30, 1914.
830 William Henry Charlesworth (Bristol Biplane, Bristol School, Brooklands). July 1st, 1914.
831 John Edmund Burnet Thornely (E.A.C. Biplane, Eastbourne School, Eastbourne). July 5th, 1914.
832 Lieut. Edwin Cheere Emmett (S.A. Defence Force) (Maurice Farman Biplane, Central Flying School, Upavon). June 9th, 1914.
833 Sub-Lieut. Frederick Barr, R.N.R. (Maurice Farman Biplane, Central Flying School, Upavon). July 9th, 1914.
834 Capt. John Francis Aloysius Kane (2nd Devonshire Regt.), (Vickers Biplane, Vickers School, Brooklands). July 9th, 1914.
835 William Harold Treloar (Bristol Biplane, Bristol School, Brooklands). July 9th, 1914.
836 Charles Cayley Godwin (Bristol Biplane, Bristol School, Brooklands). July 9th, 1914.
837 William Donovan South (Blériot Monoplane, Blériot School, Brooklands). July 9th, 1914.

London–Paris–London Race.—Major F. Lindsay Lloyd, who was one of the Stewards in Saturday's Race, submitted a report of the results. The Observers' and Timekeepers' reports were also considered, and the official placings were confirmed as follows :—

1st ...	W. L. Brock.
2nd ...	R. Garros.
3rd ...	E. Renaux.

The prizes were awarded as follows :—

£500, presented by the International Correspondence Schools, to the Grahame-White Aviation Co., Ltd., as the entrants of W. L. Brock, who completed the course in the fastest time.

£300, presented by the Royal Aero Club, to the Grahame-White Aviation Co., Ltd., as entrants of W. L. Brock, who completed the course in the fastest handicap time.

£150, presented by the International Correspondence Schools, to Messrs. Morane-Saulnier, as the entrants of R. Garros, who completed the course in the second fastest handicap time.

£50, presented by the International Correspondence Schools, to E. Renaux, who completed the course in the third fastest handicap time.

	Left Hendon.	Arrived Paris.	Left Paris.	Arrived Hendon.
W. L. Brock	7.45 a.m.	11.18.24 a.m.	1.18.24 p.m.	4.48.6 p.m.
R. Garros ...	8.5 a.m.	12.10.32 p.m.	2.10.32 p.m.	6.33.47 p.m.
E. Renaux ...	7.35 a.m.	2.49.50 p.m.	4.49.50 p.m.	12.25 p.m. (Sunday).

A Vote of Thanks was unanimously passed to the following Officials who assisted in the Race :—

Stewards :—Major F. Lindsay Lloyd, Mr. D. W. Thorburn, Mr. A. W. Ruthven-Stuart.

Observers at Turning Points :—

Mr. C. Parry Williams and Mr. E. T. Willows (Harrow).
Mr. A. J. A. W. Barr and Mr. L. Brotherstone (Epsom).
Mr. H. DelaCombe (Folkestone).
Mr. C. G. Grunhold (Boulogne).
Capt. W. Oswald Watt (Buc.).

Memorial to the late Mr. Gustav Hamel.—Correspondence from Members and others, suggesting a memorial to the late Mr. Gustav Hamel was considered, and it was decided to obtain some particulars relating to the endowment of an aviator's bed at a hospital.

Suspension by the F.A.I.—Letter was read from the F.A.I., notifying the suspension by the Aero-Club de France of M. Maurice Letellier, an aeronaut, for one year from May 21st, 1914.

Hedges Butler Challenge Cup.

The Long-Distance Balloon Race for the Hedges Butler Challenge Cup took place at Hurlingham on Saturday last, and resulted in a win for Mrs. John Dunville, who was accompanied by Mr. C. F. Pollock and Capt. B. Corbet.

Mrs. Dunville descended at Nesscliffe, near Shrewsbury, in the early hours of Sunday morning. This being Mrs. Dunville's third consecutive victory in this race, the Cup now becomes her absolute property.

Paris Aeronautical Exhibition.

The Sixth International Aeronautical Exhibition will be held at the Grand Palais, Paris, opening on November 21st and closing on December 6th, 1914. Particulars can be obtained from the Royal Aero Club.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

The Next German Aero Show.

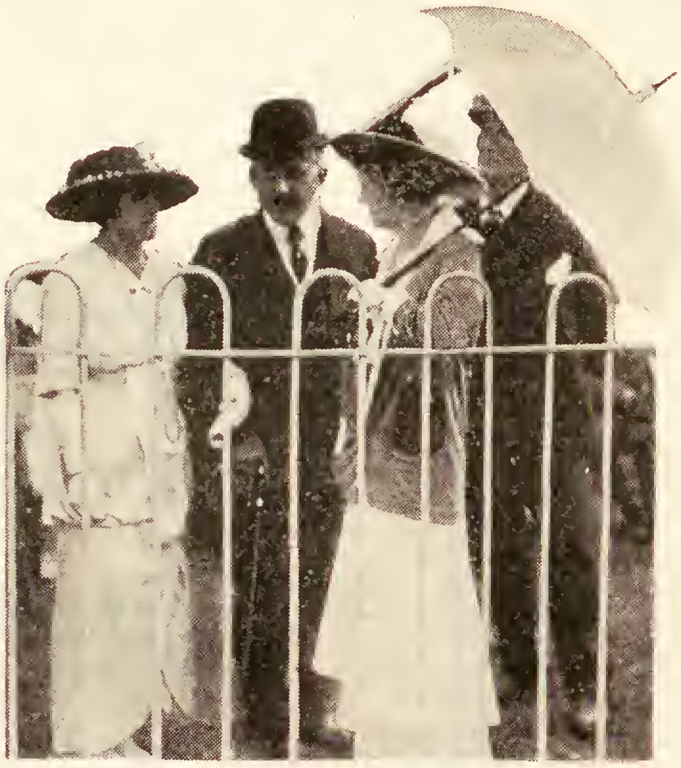
Arrangements are now well in hand for the Second International Aero Show which is to be held, in the Kaiserdamm, Berlin, from October 31st to November 10th next, under the auspices of the Kaiserlicher Aero and Automobile Clubs and the German Motor Manufacturers Association. Ample space is available in the new building, and it is proposed to make the show a most comprehensive one. A uniform scheme of stand decoration will be adopted. Application forms for space and other particulars can be obtained from "Ala," Allgemeine Luftfahrzeug-Ausstellung, 12, Unter den Linden, Berlin W 8.

FLYING AT HENDON.

OVER thirty flights were made at Hendon on Thursday afternoon of last week, and a number of passengers were taken up. Louis Noel on the 70 h.p. G.-W.-Maurice Farman made the greatest number, his total being about ten. N. Howarth and A. E. Barrs also put up several flights, the former on the 50 h.p. G.-W. bi-rudder 'bus and the Maurice Farman, and the latter on the 80 h.p. Blériot and the bi-rudder 'bus. R. J. Lillywhite flew both the 80 h.p. Blériot and the bi-rudder 'bus, and the latter machine was also flown by F. G. Dunn and M. Osipenko. R. H. Carr gave a looping demonstration on the 50 h.p. G.-W. tractor biplane "Lizzie," making two loops and a tail-slide, and concluding his exhibition with a number of stunts such as switchbacks, slow flying, and spirals. P. Bjorklund flew over to Brooklands on his 50 h.p. Blériot, completing the journey in about 30 mins. E. Baumann also made several flights on the Wright biplane.

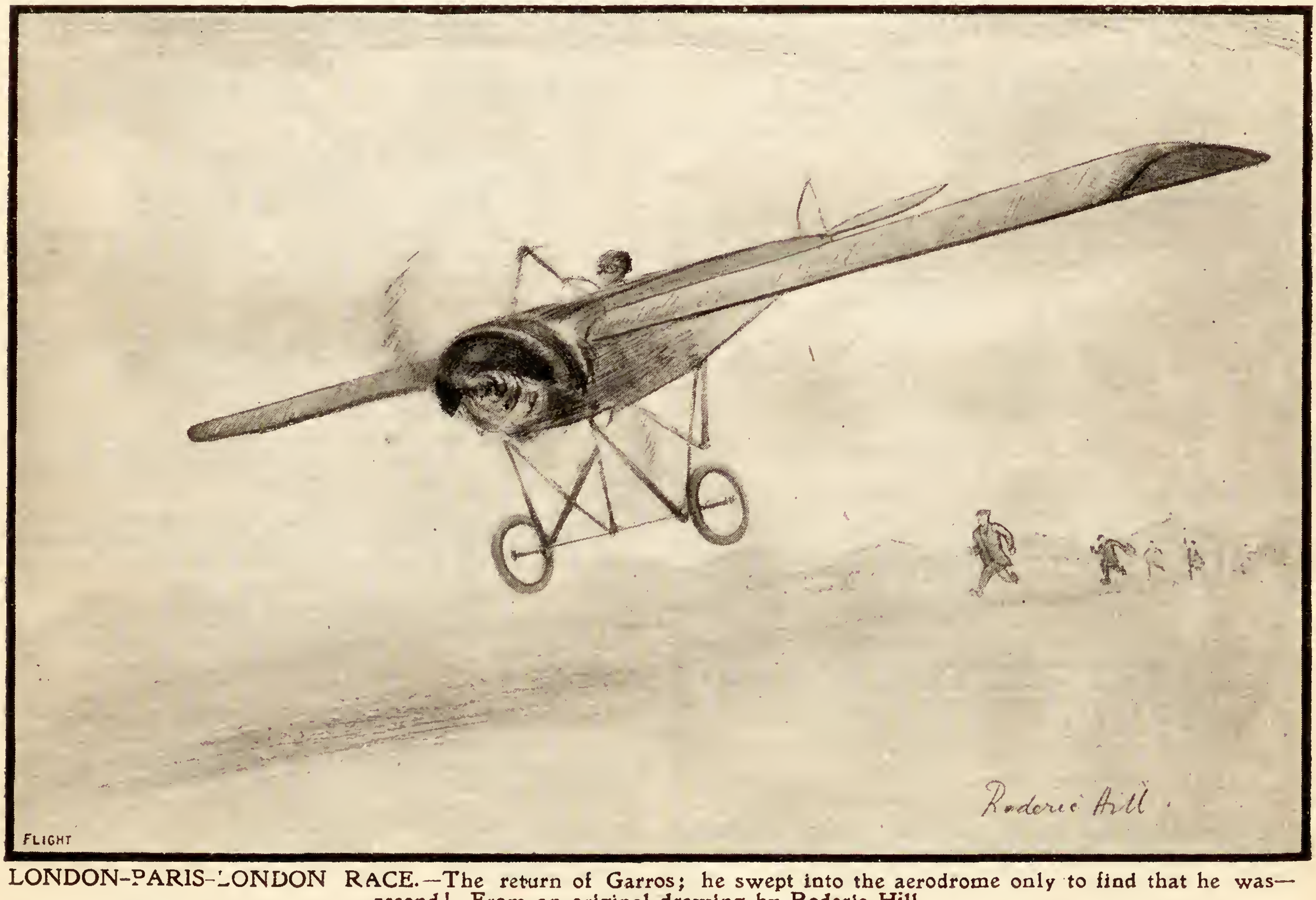
On Saturday afternoon whilst the London–Paris race was in progress, several exhibition and passenger flights were made by the Hendon pilots. The first up was R. J. Lillywhite on the bi-rudder 'bus, on which he performed quite a number of fancy evolutions. He was followed by A. E. Barrs with a passenger on the 80 h.p. Blériot. After this Lillywhite, Claude Grahame-White and P. Verrier gave exhibitions on the bi-rudder 'bus, and the two Maurice Farmans respectively. A 6-mile speed handicap for the "Teofani" Trophy was then flown in a single heat of six laps. Four started as follows:—R. J. Lillywhite on the bi-rudder 'bus (3 mins. 31 secs.); Claude Grahame-White on the G.-W. Maurice Farman (1 min. 38 secs.); P. Verrier on the Aircraft-Maurice Farman (1 min. 8 secs.); and A. E. Barrs on the 80 h.p. Blériot (scratch). Grahame-White overhauled Lillywhite on the last lap and crossed the line first, 14 secs. in front, and Barrs came in third 15 secs. behind Lillywhite. Verrier retired after completing five laps. Flying was then suspended for a time as Brock was announced to be nearing home. Brock arrived at 4.48 p.m., as reported elsewhere, and shortly after his arrival two balloons sailed past just outside the aerodrome. Just before Garros arrived F. G. Dunn ascended on the bi-rudder 'bus to about 500 ft. and from this height he saw Garros trying to locate the aerodrome. After this a few more passengers were taken up before the proceedings were brought to a close.

Heavy rain fell during Sunday morning, but in the afternoon it cleared up and a good afternoon's flying was witnessed by a fairly large attendance, Brock, the winner of the previous day's race, made a fine altitude flight on his Morane-Saulnier, reaching an altitude of 9,500 ft., being out of sight behind the clouds above 3,000 ft. R. H. Carr gave a very pretty looping demonstration amongst the low lying clouds on the G.-W. tractor biplane "Lizzie."



Miss Ethel Levey watching the London–Paris Race.

Other Hendon pilots out were R. J. Lillywhite on the bi-rudder 'bus and the Maurice Farman, Louis Noel with passengers on the Maurice Farman, A. E. Barrs on the 80 h.p. Blériot and the bi-rudder 'bus, N. Howarth, F. G. Dunn, E. F. Norris, and R. T. Gates also on the latter machine, P. Verrier on the Aircraft-Maurice Farman, and E. Baumann on the Wright.



LONDON-PARIS-LONDON RACE.—The return of Garros; he swept into the aerodrome only to find that he was—second! From an original drawing by Roderic Hill.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—Monday, last week, fine. There were only two machines up, 188 Maurice Farman and 152 Short Sociable, both being up a number of times.

Tuesday fine, rather windy. Nos. 152 Short Sociable, 64 Short, 188 Maurice Farman.

Wednesday, fine afternoon. Wet morning; Nos. 150 Avro and 188 Maurice Farman only machines out.

Thursday fine; Nos. 64 Short, 150 Avro 50 h.p., 1 Short.

Friday fine. Lieut. Spencer Grey on 152 Short Sociable to Isle of Grain and back. Com. Samson to Isle of Grain on 65 Short "converted"; this machine has had floats fixed on as well as wheels, so that it can be used for both land and water. 43 and 153 Bristol tractor, and 31 Henry Farman were also out.

Saturday fine, rather windy. No. 65 Short converted, Com. Samson pilot, to Isle of Grain.

Civilian Flying.—Saturday. Mr. Leo Jezzi was up about half an hour on his 35 h.p. Jap; also up three times on Sunday evening.

Brooklands Aerodrome.

On Monday morning last week the Martinsyde engine was being tested; in the afternoon further test of Martinsyde engine, and a test of engine of new Vickers gun 'bus.

Bristol, Blériot and Vickers pupils out Tuesday morning, also Mr. Merriam on Bristol biplane, Mr. Dukinfield Jones solo and with passengers on D.F.W. biplane, and Mr. Barnwell, with Mr. Knight as passenger, across country on new Vickers gun 'bus; in the afternoon Mr. Hawker to Farnborough on Sopwith "Scout," Mr. Dukinfield Jones testing new propeller on D.F.W., and Mr. Skene on Martinsyde.

Wednesday morning, Vickers pupils out; Mr. Merriam on Bristol. In the afternoon a fine display of "looping" and "upside-down" flying by Mr. Hucks on his Blériot monoplane; Mr. Jullerot on Bristol found it too "bumpy" for pupils.

Blériot, Bristol, and Vickers pupils out Thursday morning. Mr. Merriam on Bristol, Mr. Barnwell to Croydon and back on Vickers gun 'bus, Mr. Skene on Martinsyde, Mr. Gower over surrounding country on 50 Blériot, and Mr. Dukinfield Jones on the D.F.W. In the afternoon, Lieut. Lawrence (with Lieut. Roche as passenger) in from Farnborough on B.E. 348, returning to Farnborough after a short stay; Mr. Barnwell across country in Vickers gun 'bus, Mr. P. Bjorklund in from Hendon on Blériot and then to Staines, Mr. Skene on Martinsyde, and Mr. Dukinfield Jones on D.F.W. Bristol, Vickers, and Blériot school work. *Brevet* tests in excellent style on Bristol biplanes by Messrs. W. H. Treloar (altitude, 950 ft.) and C. C. Godwin (altitude, 2,500 ft.); on Vickers biplane by J. F. A. Fane (altitude, 800 ft.); and on Blériot monoplane by Mr. W. D. South (altitude, 450 ft.).

Mr. Ronald S. McGregor, who has just passed his *brevet* tests at the British Caudron School, Hendon.

Friday morning, Blériot, Vickers, and Bristol school work, Mr. Merriam on Bristol, Mr. Skene left for Hendon on Martinsyde, Mr. Laurence Hall on 50 Avro called on his way to Shoreham, Mr. Gower across country on 50 Blériot, Mr. Barnwell to Dartford on Vickers gun 'bus; in the afternoon, Mr. Barnwell from Dartford with passenger on Vickers gun 'bus, Messrs. Jullerot and Stutt on Bristol biplanes, and Jack Alcock on 100 Sunbeam. Too "bumpy" for school work.

Mr. Jack Alcock with Mr. Harold Lane as passenger flew on Saturday morning to Shoreham in 39 mins. on 100 Sunbeam, Mr. Skene from Potter's Bar on Martinsyde, Mr. Sippe testing Mr. Creagh's 80 h.p. Bristol tractor biplane. Mr. Hawker's machine arrived back from Australia. Mr. Barnwell with passenger on Vickers gun 'bus. In the afternoon, Mr. Hawker "looping" on his machine, Mr. Mahl on 80 Sopwith, Mr. Sippe with Mr. Creagh on latter's Bristol biplane, Mr. Stutt on Bristol biplane. Mr. Alcock back from Shoreham [where he started scratch and finished third in race] in 30 mins.

Mr. L. Gresley, who has just taken his *brevet* at the Bristol Flying School, Brooklands.

On Sunday afternoon, two fine "looping" exhibitions by Mr. Hawker on his Sopwith biplane, Mr. Mahl solo and with passengers on the 80 h.p. Sopwith, Mr. MacGordon also going up on same machine and flying well, Mr. Dukinfield Jones solo and with passengers on D.F.W. biplane, Mr. Sippe with Mr. Creagh on latter's Bristol tractor biplane went up to 6,000 ft., and came down with engine off in a fine spiral glide. The winner of the ballot for the free passenger flight—Miss Gwen East, of the "Hand and Spear" Hotel, Weybridge—was taken up by Mr. Sippe on Mr. Creagh's Bristol biplane.

Blériot School.—Rolling and straights on Penguin and 28 h.p. Anzani-Blériot: A. Crick, 6 mins.; G. Pitt, 18 mins.; Lieut.-Col. Fraser, 12 mins.; Compte FitzJames, 10 mins. Circuits on 45 h.p. Anzani: H. O'Hagan, 10 mins.; W. South, 10 mins. W. South took his certificate at 450 ft. E. C. Gower cross-country flights on 50 h.p. Gnome.

Bristol School.—Monday, last week, tuition impossible owing to high wind.

Tuesday, Mr. Collins taken as passenger twice, and solos by Mr. Godwin, Mr. Treloar and Mr. Adamson. The wind and rain prevented any further tuition.

Wednesday, school work impossible. Thursday, passenger tuition to Mr. Hay, Mr. Lucas (2 flights), Lieut. Sanders, Mr. Adamson and Mr. Collins (3). Solos by Mr. Godwin, Mr. Adamson, Lieut. Coles, Mr. Treloar and Mr. Lucas. Certificates taken by Mr. Treloar and Mr. Godwin at 1,000, ft. and 2,500 ft. respectively.

Friday, passenger tuition to Mr. Collins (2), Lieut. Sanders (2) and Mr. Lucas. Solos by Mr. Adamson, Mr. Rutledge and Mr. Hay. Wind stopped further tuition. Saturday, too windy and misty for school work.

Vickers School.—Tuesday, last week, with instructor: Capt. Kane, Lieuts. Clemson, Gillman, Wells and Warrand.

Thursday, with instructor: Lieuts. Clemson, Gillman, Warrand and Wells. Capt. Kane, Lieuts. Warrand, Gillman and Clemson solos. Barnwell on new gun-carrying biplane, and testing new box-kite.

Friday, with instructor: Lieuts. Haskins, Wells and Clemson. Lieut. Warrand solo. Barnwell on new gun-carrying biplane with passenger.

Liverpool Aviation School, Waterloo.

THURSDAY last week, Melly on two-seater and Birch on "Y" Anzani flew round Altcar at a height of 1,500 ft. Birch terminated his flight with a fine spiral. Groves took school machine out, but in attempting a hop in a side wind came down badly on one wing and overturned the machine.

Monday last, Birch again out on "Y" Anzani, doing figures of eight and banked turns for a quarter of an hour.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Tuesday, last week, Messrs. Murphy, Stalker and Haines (new pupils) rolling with Instructor Barrs. Messrs. Upton, Liu, Gruning, Courtney, Toolis straights with Instructor Barrs. Mr. Shepherd solo straights.

Wednesday, Messrs. Gruning, Liu, Stalker and Toolis straights with Instructors Barrs and Howarth. Mr. Shepherd solo straights.

Thursday, Messrs. Gruning, Courtney, Haines, Liu, Murphy, Stalker, Upton, Toolis and Wyles, straights with Instructors Barrs, Howarth and Lillywhite. Mr. Palmer solo straights, Mr. Shepherd solo circuits. Mr. Howett solo straights and circuits, and Mr. Lowe solo circuits and figures of eight.

Friday, Messrs. Courtney, Wyles, Liu, Haines, Gruning and Toolis straights with Instructor Barrs. Mr. Shepherd solo circuits.

Beatty School.—Monday last week, although weather was bad, Mr. Ruffy was out doing straights on monoplane.

Messrs. Bentley (10) and Allen (4) up with Baumann Tuesday morning, and Mr. Ruffy out by himself on monoplane. Tuesday evening Mr. Kelly (new pupil, 10) and Lieut. Paterson out with M. Baumann.

Wednesday, Messrs. Cheung (10), Elverson (10) and Kelly (3) up with Baumann. Watts out testing 40 h.p. Wright, afterwards taking MacLachlan up for 4 mins.

Thursday morning, Messrs. Kelly (15), Allen (8) and Cheung (5) and Lieut. Maguire (15) up with Baumann. Thursday evening, Capt. Bass (20), Lieut. Maguire (13), Messrs. Allen (5), Cheung (5) and Lieut. Paterson (5) up with Baumann and Messrs. Cheung (5) and Bentley (3) and Lieut. Paterson (5) and MacLachlan (10) up with Watts.

Friday, Lieut. Maguire (10), Messrs. Bentley practising landings (14), Kelly (10), and Cheung (10) up with Baumann.

Saturday. No school owing to Paris race. One passenger taken up.

Sunday. Two passengers taken up.

British Caudron School.—Monday last week, too windy for school to go out.

Tuesday evening, R. Desoutter on 60 h.p. Caudron biplane for 10 mins. with passenger.

Wednesday, school was out at mid-day under the instruction of W. T. Warren and Rene Desoutter. Mr. Valazzi doing rolling practice. In the evening R. Desoutter on 60 h.p. for quarter hour.

Thursday, school out at 5 under instructors. Messrs. Abbott and Valazzi doing straight flights. W. T. Warren and R. Desoutter flights, afterwards giving passenger flights to Messrs. Valazzi and Abbott.

Friday, school out at 5. After trial flights by Instructors W. T. Warren and R. Desoutter, Mrs. Buller on 35 h.p. for 20 minutes. Messrs. Abbott and Valazzi doing straight flights.

Saturday, too windy for school work.

Hall School.—Tuesday, last week, D. W. Clappen testing No. 2 Caudron, Miss Clifford doing straights later.

Thursday and Friday, school out under Messrs. Clappen and Virgilio. Clappen out testing Caudrons 1 and 2. Miss Clifford doing straights, improving greatly. Messrs. Arcier, Brooks, Gearing, Haines, Gibson and Rose doing straights on No. 2 Caudron. Arcier couple of circuits at 100 ft. 50 h.p. Avro overhauled during week. Thursday evening J. L. Hall out on Avro, finishing with complete loop at 2,000 ft. Friday morning J. L. Hall started for Brighton for exhibition flights.

Shoreham Aerodrome.

Pashley School.—New pupil, E. P. Roberts, up with instructor, controlling very well. W. Mortimer circuits and 8's ready for the *brevet* tests.

The tests of the new pusher biplane were quite satisfactory. The Brighton Cup was won on Saturday and the speed race on Sunday. Mr. Pashley piloted the machine above the clouds, and was completely lost to view.

FLYING AT SHOREHAM.

ALREADY the new management of the Brighton-Shoreham aerodrome have found time to effect quite a number of improvements in the arrangements at the ground, and the weekly flying meetings which are to be held during the present season should make this aerodrome very popular indeed. The ground itself is particularly adapted for the purpose, as it is absolutely level and as smooth as a lawn. The course itself, which is marked off by pylons, is a little over 1¾ miles long, and the last pylon before the home straight is so situated that in speed races round the pylons the competitors bank very steeply in fairly close proximity to the enclosures, so that an excellent view of the various ways in which the different pilots handle their machines can be obtained. Several new sheds have been erected to accommodate visitors' machines. In addition to the excellent flying, other attractions provided include well-appointed tennis courts and tea gardens, and on race days a military band provides a very good programme of music. The headquarters of the Sussex County Aero Club are situated on the flying ground adjoining the hangars. For the opening meeting of the season which took place on Saturday last the management were fortunate in having favourable weather conditions. That the efforts to improve the aerodrome are appreciated was shown by the large crowd which arrived from various parts of the

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SHOREHAM AERODROME.—On the left: View showing one end of motor car enclosure; and on the right: The enclosures, showing refreshment tents and judges' stand.

"Flight" Copyright.

Cecil Pashley banking one of the Farmans round a pylon in last Saturday's speed race at the Shoreham Aerodrome.

country by road or rail, and it must be recorded that the meeting was exceedingly well organised. The officials were: Directors, Messrs. G. Arthur Wingfield (chairman), H. V. Fabrin, H. Wingfield, W. Pettett; General Manager, Mr. John Bellham; Secretary, Mr. W. C. Littlewood; Aerodrome Manager, Capt. C. A. Tyrer, L.F.; Judges, Mr. W. B. Gentle and Mr. R. Brodrick; Clerk of the Course, Mr. H. Gonne; Stewards, Col. Hudson, Col. A. Woolley, J.P., and Messrs. J. T. Musgrave, T. Blair, G. T. Richards and O. Mellersh.

Among the pilots who were flying on Saturday may be mentioned J. L. Hall, Eric and Cecil Pashley, J. Alcock, W. H. Elliott and G. J. Lusted. Jack Alcock flew across from Brooklands on Saturday morning accompanied by a passenger, in his 100 h.p. Sunbeam-engined Maurice Farman biplane, completing the journey in 38 mins. J. L. Hall had arrived from Brooklands the previous evening on his Avro biplane. The proceedings of the day commenced with test flights by Hall on his Avro, Alcock on the M. Farman, and E. Pashley on a new small biplane of the pusher type, built by the Pashley brothers. This machine, although following standard lines in its general arrangement, is an extremely neat job, and the Pashley brothers are to be congratulated on their skill as constructors as well as pilots. The machine has been built quite recently, in fact it was only erected on the previous Sunday, and it was Thursday before the engine was fitted, and it may be mentioned that the Pashleys did most of the constructional work themselves.

At four o'clock Mr. Hall got into his machine, and starting off with a very steep climb soon climbed to about 2,200 ft. Having reached this height, Mr. Hall put the nose of his Avro biplane downwards and made a vertical dive of several hundred feet, to gain speed, and then pulling back his elevator, he made one of the cleanest loops we have seen, afterwards landing with a beautiful spiral *vol plané*. Shortly after the speed race was started, this race including two heats of four laps each and a final of six laps, the prizes being the Brighton Cup, and cash prizes aggregating £100, presented by the proprietors of "Shell" motor spirit.

In the first heat Cecil Pashley on an old-type Henry Farman biplane, received a start of 3 mins. from Jack Alcock who was flying his M. Farman. Competing unofficially was W. H. Elliott, also on an old-type Henry Farman biplane. Although banking his machine round the pylons at alarming angles, Alcock did not succeed in beating Cecil Pashley, who won by 31⅖ secs. In the second heat, J. L. Hall was scratch on his Avro biplane, whilst Eric Pashley on the new Pashley biplane received 1 min. start. Competing unofficially was G. J. Lusted on a Henry Farman biplane (2 mins. 45 secs. start). This heat was won easily by Eric Pashley by 1 min. 3⅖ secs.

Four machines were entered in the final: (1) Eric Pashley on Pashley biplane (2 mins. 25 secs. start); (2) J. L. Hall, Avro biplane (30 secs. start); (3) J. Alcock, M. Farman biplane (scratch). Cecil Pashley on one of the Farmans competed unofficially and received 3 mins. 45 secs. start. All the pilots handled their machines in excellent style, but although Hall's and Alcock's experience at Brooklands and Hendon stood them in good stead, they did not succeed in beating Eric Pashley, who won by 39⅖ secs. There appeared to be very little difference between the speed of the Avro and that of the M. Farman, as Alcock finished 27 secs. behind

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The machines lined up for the start of the second heat of the speed race at the Shoreham Aerodrome.

Hall, whose handicap allowance was 30 secs. Eric Pashley's fine win was greeted with enthusiasm by the spectators, amongst whom the Pashley brothers are evidently very popular, and he thus secured the Brighton Cup and £70, whilst Hall, who was second man home, received £20 and Alcock £10.

On Sunday the heavy rain in the morning was followed by a very fine afternoon, during which numerous exhibition and passenger flights were given. J. L. Hall and Eric Pashley had another try round the pylons under the same handicap conditions as those in the race on Saturday, but whereas in the Saturday's race Pashley won by 39$\frac{3}{5}$ secs., he only managed on Sunday to get home 8 secs. ahead of Hall.

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A fine bank by J. Alcock on his M. Farman biplane, 100 h.p. Sunbeam engine, at the Shoreham Aerodrome.

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An old aeroplane wing makes an excellent awning in the Sussex County Club's enclosure at Shoreham Aerodrome.

In the evening, in the presence of a good number of spectators, Mr. Hall went up again and repeated his performance of looping the loop.

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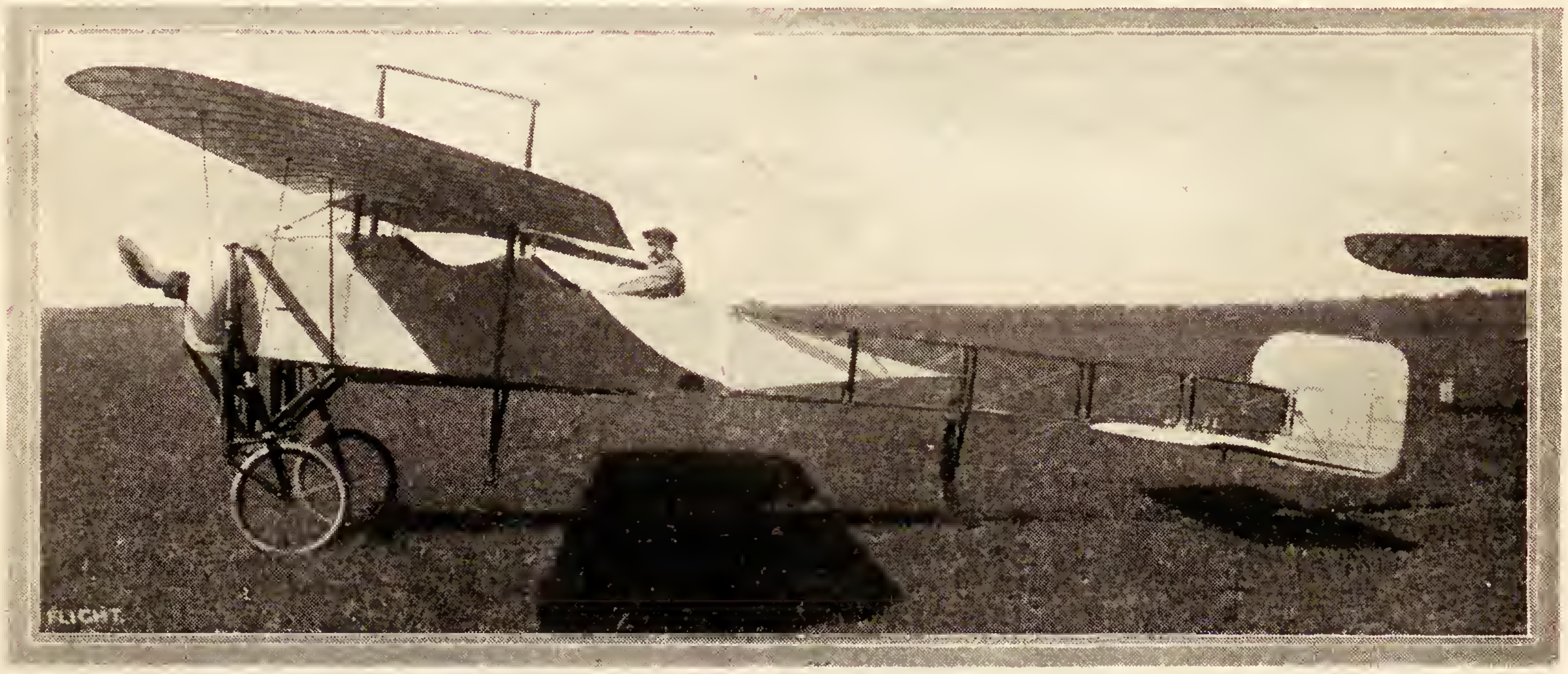
A NEW TWO-SEATER TYPE BLÉRIOT.

AMONG the machines exhibited by the Blériot firm at the last Olympia Aero Show was, it will be remembered, a single-seater with the wings mounted a slight distance above the *fuselage*, so that the rear spar came practically on a level with the eyes of the pilot. The object of this arrangement, as explained at the time of the Show, is to give the pilot an unobstructed view in all directions. This type of machine has proved so successful after thorough tests that M. Blériot decided to bring out a two-seater of the same type, and the accompanying photograph gives a good idea of its general arrangement. As in the ordinary Blériot two-seater, pilot's and passenger's seats are arranged tandem fashion, the pilot occupying the rear seat. The observer's seat is placed immediately above the centre of gravity thus making it possible to fly the machine minus a passenger without any adjustments of the tail plane. Should it not be desired to carry a passenger, an auxiliary tank can be fitted in its place thereby increasing the range of flight of the machine. The centre portion of the wings has been cut away in order to provide an unrestricted view in an upward direction for the observer. This machine can be fitted with a 9-cylinder 90 h.p. Rhone engine or with a 100 h.p. *monosoupape* Gnome.



As it has been chiefly designed for military purposes, the question of dismantling has been carefully studied. The landing chassis can be lowered in ten seconds, thus letting the machine as a whole down close to the ground to facilitate removing or fitting the wings without the use of any trestles. The top pylon is hinged, and by undoing a single wing-nut the pylon can be brought down close to the *fuselage* without interfering with any of the wires or cables supporting the wings, so that no readjustment has to be made in erecting the wings again. As it is fitted with spring hinge-clips the rudder can be removed instantaneously, a safety lock preventing the clip from coming undone.

The width of the chassis of the new two-seater, is slightly greater than that of the standard type, being, in fact, exactly the same as the diameter of the propeller, so that there is no necessity for removing the latter for packing—a valuable feature in a military machine, which may have to be frequently transported on a lorry.

EDDIES.

I hear very good accounts of the work done with the fleet of Caudron biplanes which were sent out to China some time ago. They are daily putting in a great amount of useful flying, and have fully justified the Chinese Government in selecting this type of machine on account of the ease with which they are mastered by pupils and their suitability for landing on the roughest ground, in addition to the other excellent qualities possessed by the products of the Caudron brothers. The accompanying photographs showing Pekin and Tientsin from above were taken by Mr. René Caudron, who, thanks to the stability of his mount, was able to let go of the control lever for considerable periods, in order to secure the snap-shots.

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A welcome addition to the ranks of private aeroplane owners is Mr. Richard P. Creagh, one of Mr. Barnwell's old pupils at the Vickers school, who passed his *brevet* tests in good style in February last. Having purchased a particularly fine Bristol tractor biplane fitted with an 80 h.p. Clerget engine, he intends to keep it at Brooklands and compete in the principal competitions of the season. He has already entered it for the August aeroplane handicaps. Mr. Creagh is to be congratulated on having secured the services of the well-known Bristol pilot, S. V. Sippe, to instruct him in the handling of the machine. With Sippe as pilot, Mr. Creagh went up to 6,000 feet recently, finishing in a fine spiral with the engine cut off.

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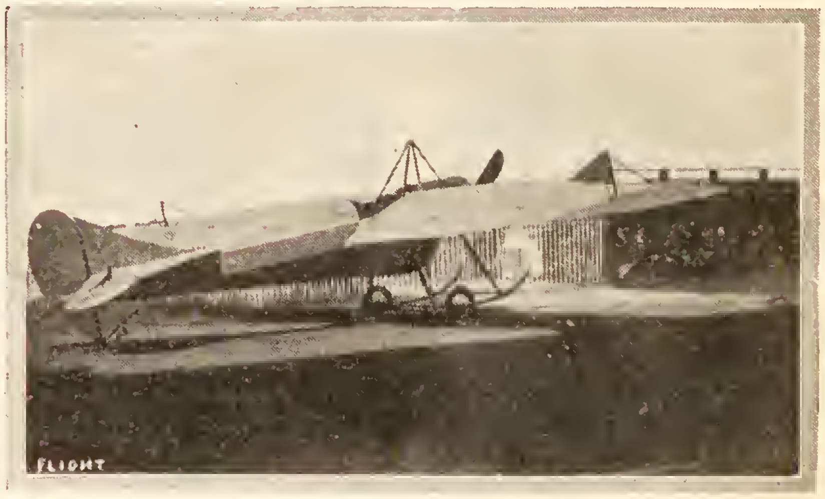
A rather exciting experience befell Mr. J. L. Hall at Shoreham on Sunday last, when flying with Capt. Tyrer as a passenger, at an altitude of about 3,000 ft. After circling about for some time, they got lost in a sea mist and could not locate the aerodrome. Coming down cautiously with the engine switched off, the aerodrome was not discernible until it was too late to land there, and so Hall was forced to alight on the flats alongside the river which runs by the ground. Fortunately very little damage was done to the machine, and both pilot and passenger were none the worse for their adventure.



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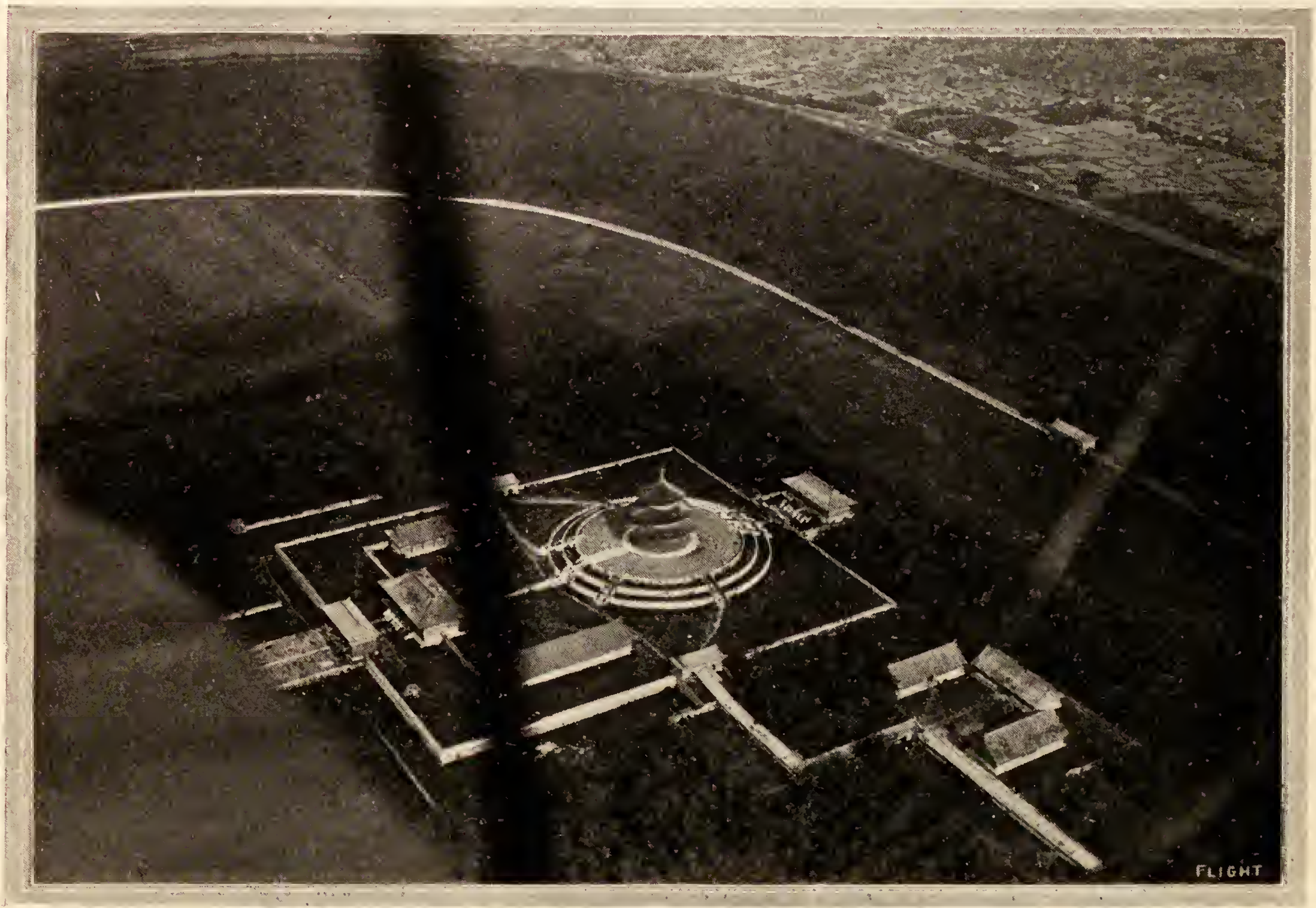
The Handley Page monoplane which has been partly reconstructed for the use of pupils at the Beatty Flying School, Hendon. Note the new type chassis which has taken the place of the original central skid type with which the machine was previously fitted. Another alteration has been effected by shortening the *fuselage*.



The "Temple of Heaven," Pekin, China. A photograph by René Caudron from a Military 80 h.p. Caudron biplane.

A mechanic having started his engine, he managed to get back into the flying ground again, but minus his passenger. As Hall's mechanic was rushing to the rescue, the car he was driving nose-dived into a ditch at the end of the aerodrome, fortunately without injury to the occupants, and but little to the car. The rest of the evening was spent in getting the car out of the ditch, and after several unsuccessful attempts this was at last accomplished, with the assistance and advice (mostly the latter), of a crowd of natives.

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It seems that our cousins from "down under" possess a wonderful faculty for acquiring the "knack" of piloting an aeroplane. Mr. Harold Treloar of Ballarat obtained his ticket—and a very good one it was too—at the Bristol school, Brooklands, on July 9th, after only three weeks' tuition, under very unsettled weather conditions. He has now arranged to take an extended course at the Blériot school at Brooklands in order to familiarise himself with the handling of monoplanes. Mr. Treloar, who intends to go back to Australia in the middle of August, will probably take a British-built machine with him. Good luck to him!

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To have won three such races as the Aerial Derby, the London–Manchester–London and the London–Paris–London is what might be termed the "hat trick" of aviation, and I shall expect to see Brock's helmet adorned with a tassel in future—he deserves it. To have beaten such a famous aviator as M. Garros is a feat of which Brock has every reason to be proud, especially as both were mounted on practically identical machines. The objection may be raised that perhaps Garros had bad luck in losing his way, but then it must be remembered that it is just in this ability to find his way that an aviator shows his capabilities as a cross-country pilot Brock had never been over the course, whereas Garros had, although it was in the European Circuit of three years ago. As I have already said, Brock may be justly proud of his victory, and it is fortunate that he is so level-headed a man, otherwise he might have to change the size of his head-gear. In congratulating him on his success, the best wish for the future that I can think of is: "May you always be free from engine troubles."

Brock
"still chewing."

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Running up against Mr. Cecil Kny, managing director of the British D.F.W. firm, the other morning, I found him highly elated at the news that the German pilot, Oelerich, has established a new world's altitude record by taking his all-steel military D.F.W. biplane, fitted with a 120 h.p. Beardmore Austro-Daimler engine, up to an altitude of 7,560 metres at Leipzig. We may hope to see the record-breaking machine before long, as arrangements have been made for it to leave Leipzig for Brooklands shortly.

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Apart from the collection of mascots, which goes on automatically, Manton's private hobby is the collection of socks and ties of strange hues and designs. A sock of a particularly riotous color-scheme was spotted by a spectator at Taunton, who approached Manton and claimed him as an old Winchester boy. On three other occasions his hobby has led to similar misapprehension, but each time a different school has been mentioned.

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It is nothing new to receive letters emphasising the fact that FLIGHT is jolly good value at 3*d*., but a North-country reader, who happens to be over in New York on business, puts the matter in a novel and convincing way. He says: "Papers over here are so dear, an aeronautical paper with just about 10 pages of reading matter costing 25 cents, while one with four pages costs from 10 to 15 cents; so according to size FLIGHT should sell at about $1.50."

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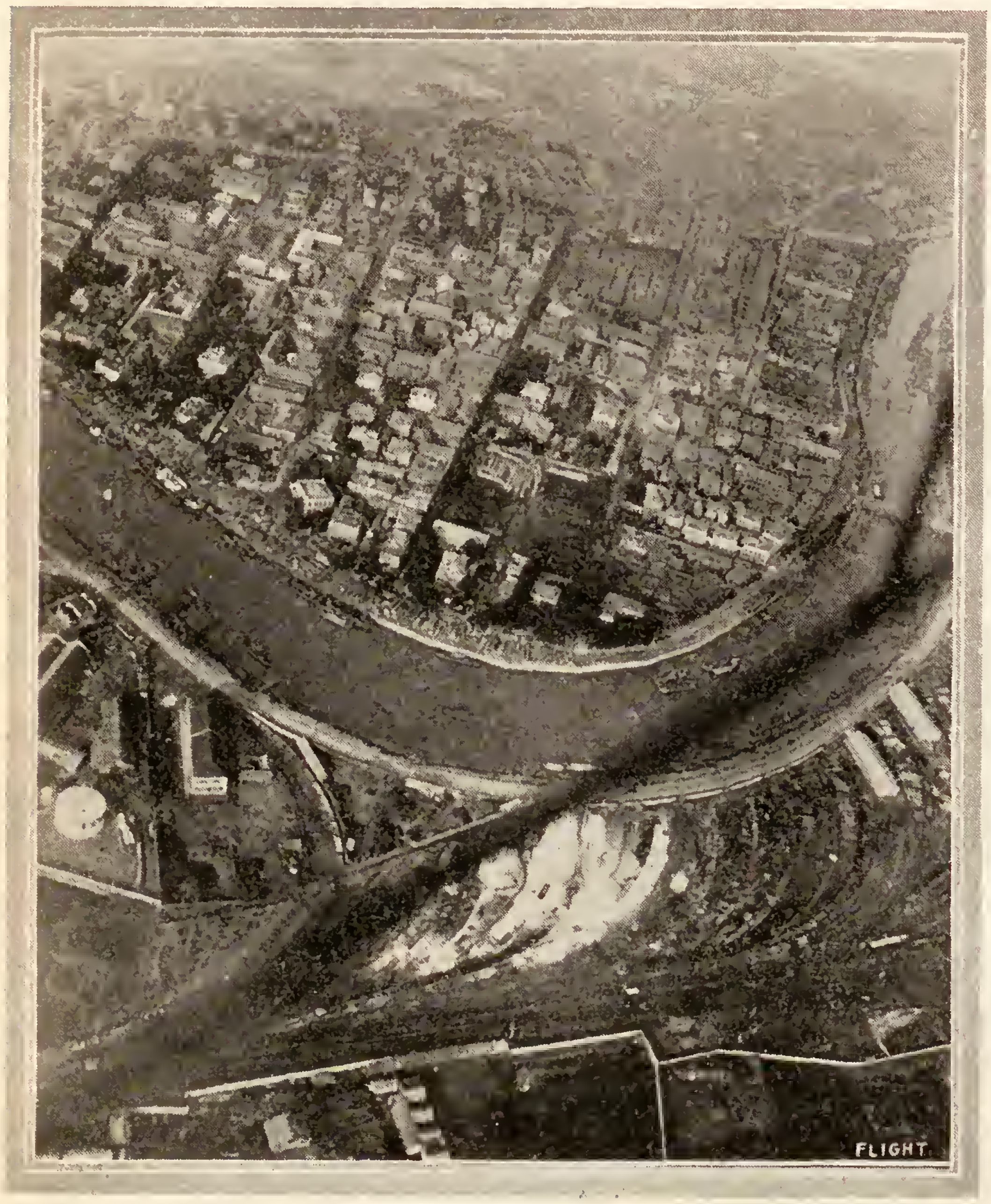
Some details will be found on another page regarding the fine flights made by Mr. Sydney Pickles last week-end. Although it was his first acquaintance with the Blackburn, Mr. Pickles found no difficulty with it, and reported that it was flying excellently. Incidentally it is interesting to note that this is the sixteenth type of machine that this versatile pilot has flown. "ÆOLUS."



The French quarter of Tien-Tsin, China. A photograph taken by René Caudron from a Military 80 h.p. Caudron biplane.

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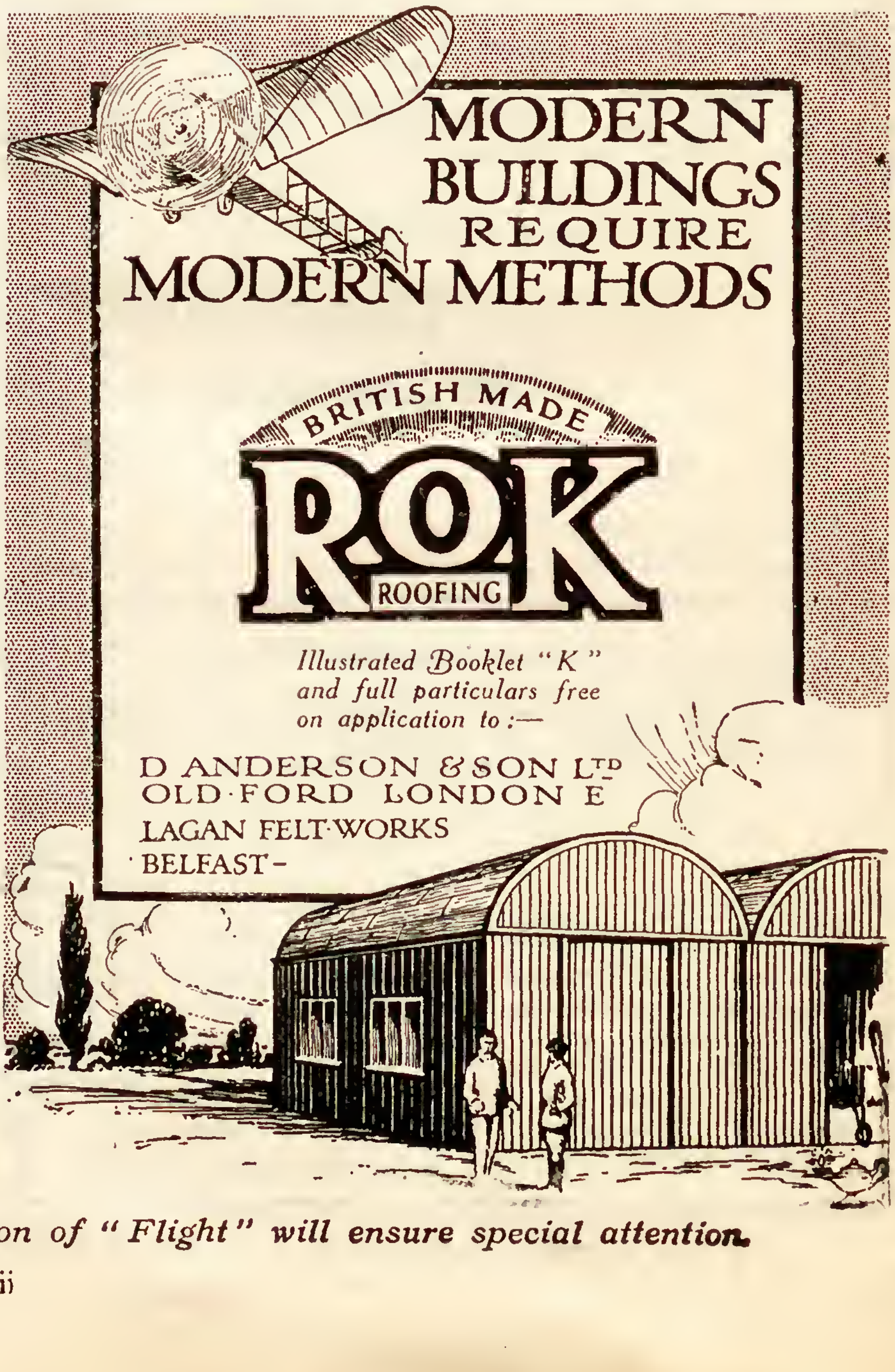

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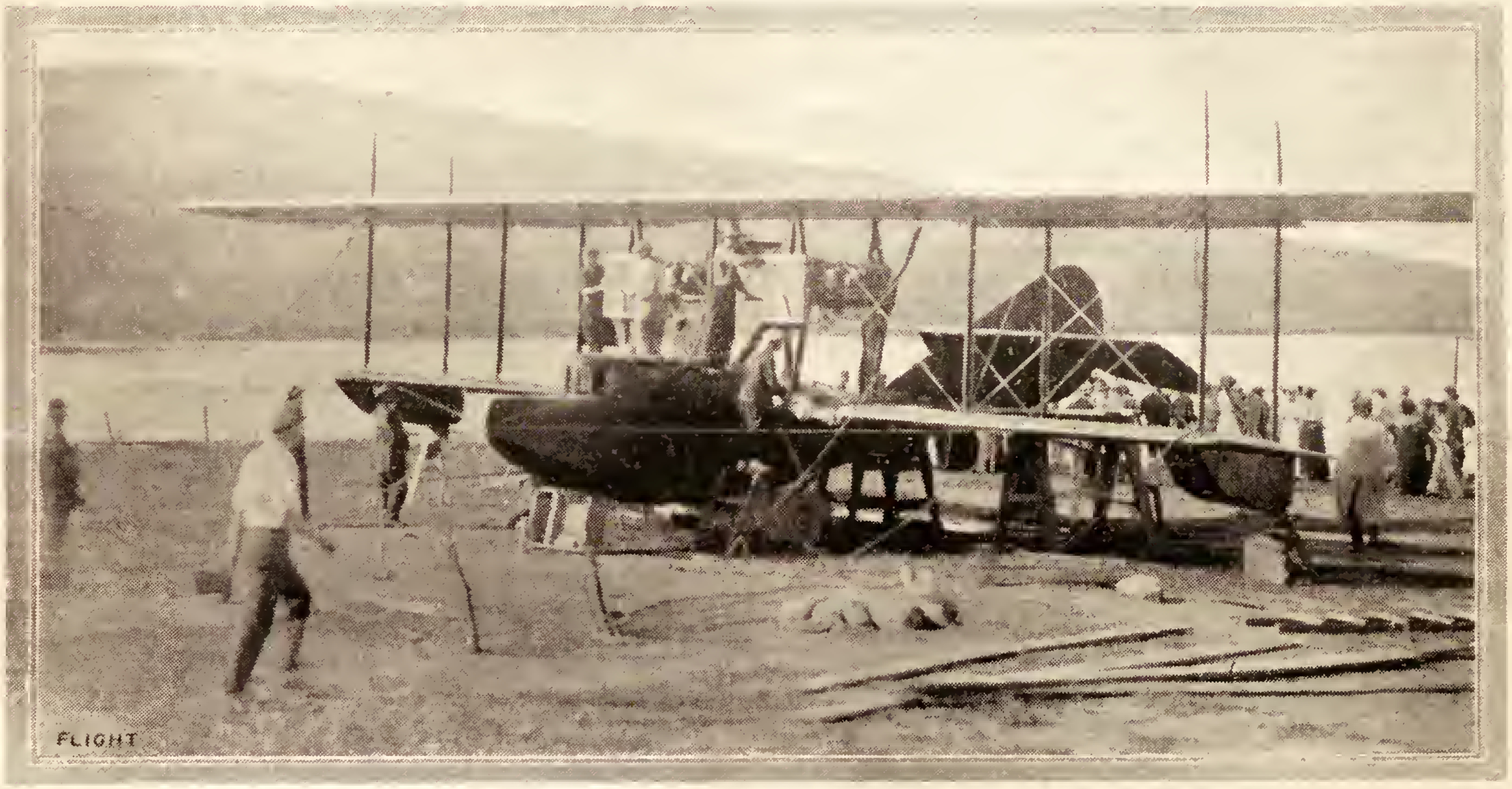
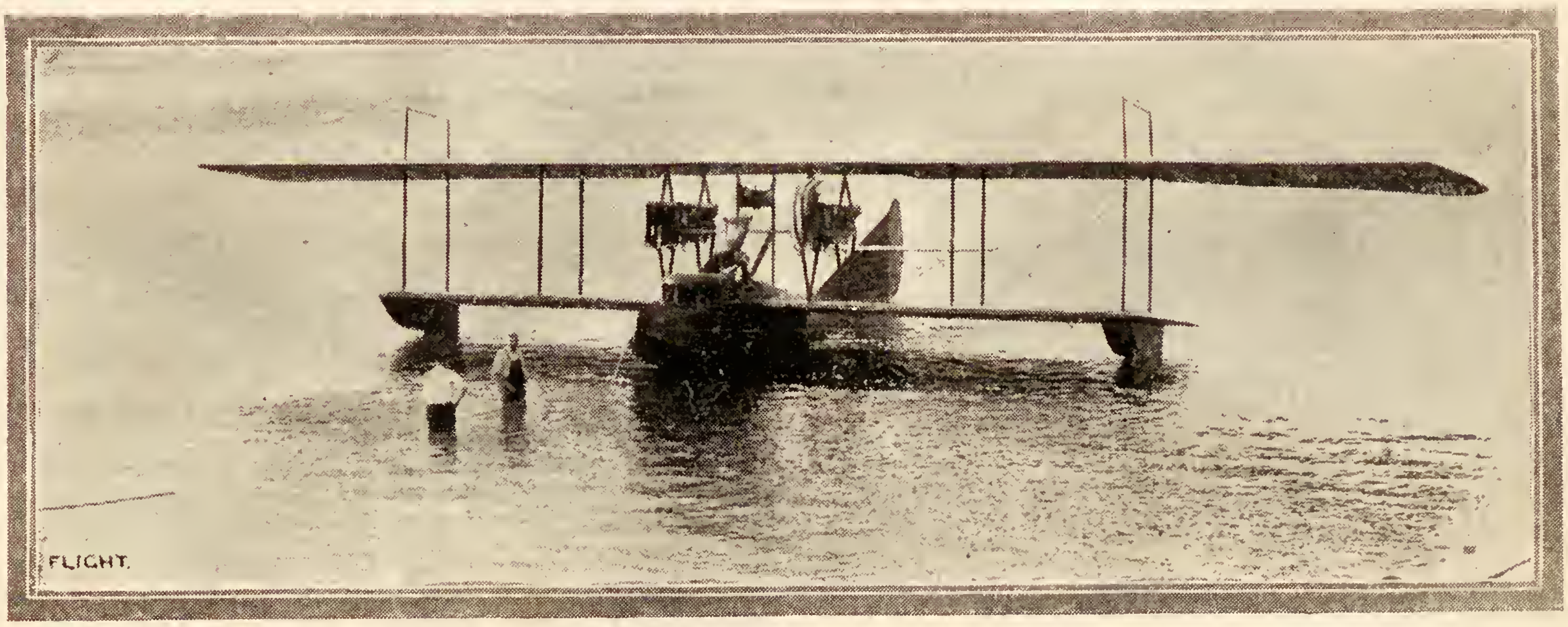


THE "AMERICA," THE CURTISS TRANS-ATLANTIC FLYING BOAT.—The following are the chief dimensions: Length over all, 34 ft.; length of hull, 30 ft.; width of hull, 4 ft.; depth of hull, 6 ft.; length of cabin, 7 ft.; height of cabin, 5 ft.; width of cabin, 4 ft; span of upper plane, 74 ft.; span of lower plane, 46 ft.; chord, 7 ft.; gap, 7 ft. 6 ins.; weight, empty, 3,000 lbs.; weight, fully loaded, 5,000 lbs.; speed, 62-65 m.p.h.



The Curtiss flying boat "America," at rest on the water.

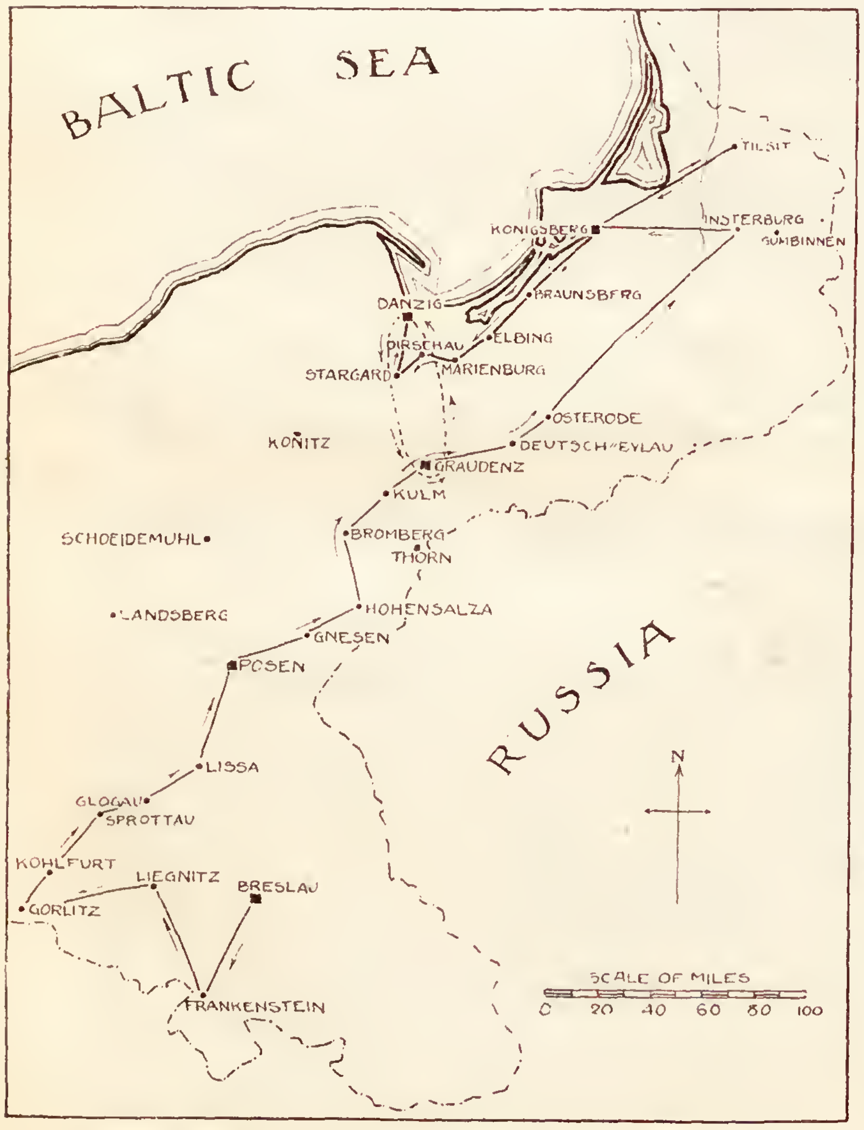
THE EAST GERMAN RACE.

THIRTY-SEVEN competitors were entered for the East German race, the three stages of which were completed on June 20th, 22nd, and 24th. Sixteen of the entrants were military pilots, and the remainder civilians. The start for the race took place on June 20th from Breslau, and the first stage included a flight to Posen, *via* Frankenstein, Liegnitz, Gorlitz, Glogau, and Lissa. The names of the starters and their machines will be found in our table at the end, the times in brackets being the aggregate times taken by those competitors finishing. At 3.30 a.m., 28 of the machines entered were ready to start, and at 4 o'clock the first man got off, being followed within 25 mins. by 26 of the machines. Half an hour later Scherff, who had omitted to be weighed-in in time, made a good getaway. Of the 28 machines which started from Breslau, 25 reached Posen between 8.4 and 10.38. Markgraf damaged his chassis at Liegnitz, and so was temporarily out of the race. Scherff had to come down at Oberlangenbielau. Eckardt also had to give up owing to engine trouble. The first three to arrive at Posen were: Langer, whose flying time was 3 hrs. 43 mins.; Lieut. von Freyberg, 3 hrs. 54 mins.; Sedlmayr, 3 hrs. 59 mins. After the arrival of the competitors at the Lawica flying ground, near Posen, the military pilots went up for test flights.

The second stage from Posen to Konigsberg was flown on June 22nd. A compulsory stop of at least 30 mins. had to be made at Graudenz. The start for the second stage was set at 4 a.m., and within a few minutes after that time 23 of the competitors were on their way to Graudenz. Lieut. von Karstedt returned again very shortly, having damaged a wing, and made a second start at 5.45. Stiefvater was unable to start in time, as his Prince Siegismund monoplane was not ready. All the competitors who left Posen succeeded in reaching Graudenz, and were on their way again after having spent the compulsory stop of half an hour at Graudenz. Luther had to make a forced landing at Lessen owing to engine trouble, and in doing so damaged his machine so badly that he had to retire from the race. The first to arrive at Konigsberg was G. Hans, who landed at 9.50 and was followed six minutes later by Schüler. Lieut. von Hiddessen, who, like Schüler, was competing unofficially, also arrived at 9.56, whilst of the official competitors, Lieut. Engwer was second, landing at Konigsberg at 10.6, followed three minutes later by Lieut. Freyberg. Markgraf who had dismantled his machine at Liegnitz, received the order to continue the race, and so had his machine erected again. However, on starting from Posen for the second time, he again damaged his machine, this time breaking the *fuselage* and so having perforce to give up the race. Suren had to make a forced landing at Insterburg owing to a leaky petrol tank.

On June 24th the third stage from Konigsberg to Dantzig was flown. The first part of this stage, from Konigsberg to Tilsit and back to Konigsberg again, was devoted to reconnoitring trials. The start on the morning of June 24th had to be postponed for an hour owing to fog. Between 5.14 and 6.13 a.m., twenty-one official competitors and four pilots competing unofficially, got away. The first to pass the reconnoitring trials was Steffen, who was back in Konigsberg again at 8.30. In Dantzig the arrival of the competitors was anxiously awaited, the Crown Prince and Crown Princess being among the large crowd of prominent personages present. Steffen was again the first to arrive, landing at 9.46, followed later by the other competitors at short intervals.

The Kaiser's prize for the military pilots was won by Lieut. Freyberg, whilst the prize of the Crown Prince for civilian pilots was secured by Georg Hans. Among the official competitors the three shortest aggregate times for the race were: G. Hans, 10 hrs. 25 mins.; F. Laitsch, 10 hrs. 44 mins.; Lieut. Freyberg, 10 hrs. 46 mins.; whilst the two pilots competing unofficially made the following aggregate times: Lieut. von Hiddessen, 11 hrs. 49 mins.; Max Schüler, 12 hrs. 24 mins.



Map showing course of East German Race.

Military Pilots.

1. Lieut. von Freyberg (L.V.G. biplane). Observer, Lieut. Kempe. (10 h. 46 m.)
2. Lieut. Engwer (L.V.G. biplane). Observer, Capt. v. Dewald. (10 h. 46 m.)
3. Lieut. Parschau (L.V.G. biplane). Observer, Lieut. Müller. (11 h. 15 m.)
4. Lieut. von Karstedt (Albatros biplane). Observer, Lieut. Beckers. (12 h. 3 m.)
5. Lieut. Behrens (Albatros Taube). Observer, Lieut. Zimmer-Vorhaus. (12 h. 11 m.)
6. Corpl. Steindorf (Gotha Taube). Observer, Lieut. Aumann. (12 h. 18 m.)
7. Corpl. Tornack (Gotha Taube). Observer, Lieut. von Lyncker. (12 h. 53 m.)
8. Lieut. Linke (Albatros biplane). Observer, Lieut. Menzel. (13 h. 22 m.)
9. Sergt. Kromm (Albatros biplane). Observer, Lieut. Rosenstein. (13 h. 26 m.)
10. Sergt. Grunewald (Aviatik biplane). Observer, Capt. Herber. (13 h. 46 m.)
11. Lieut. Schafer (Rumpler Taube). Observer, Lieut. Hasecke. (16 h. 3 m.)
12. Lieut. Serno (Albatros Taube). Observer, Lieut. Körner. (18 h. 32 m.)

Sergt. Reichart (Aviatik biplane). Observer, Lieut. Hahn.
Sergt. Markgraf (Albatros biplane). Observer, Lieut. Voelkers.

Civilian Pilots.

1. Georg Hans (L.V.G. biplane). Observer, Lieut. Kolbe. (10 h. 25 m.)
2. Felix Laitsch (L.V.G. biplane). Observer, Lieut. Turner. (10 h. 44 m.)
3. Bruno Langer (Albatros biplane). Observer, Lieut. von Dewitz. (10 h. 51 m.)
4. Gerh. Sedlmayr (L.V.G. biplane; System Schneider). Observer, Lieut. Aumann. (10 h. 53 m.)
5. Lieut. A. D. Steffen (Etrich Taube). Observer, Lieut. von Weihe. (11 h. 30 m.)
6. Benno Schlüter (Hansa Taube). Observer, Lieut. Eyser. (12 h. 16 m.)
7. Wilhelm Krumsiek (Hansa Taube). Observer, Lieut. Plagemann. (12 h. 18 m.)
8. Lieut. a. D. Surén (Gotha Taube). Observer, Lieut. Ulrich. (19 h. 5 m.)

Otto Stiefvatter (Prince Fr. Siegismund of Prussia monoplane). Observer, Lieut. Zimmermann.
Georg Luther (Gotha Taube). Observer, Lieut. von Renesse.
Willy Eckardt (Gotha biplane). Observer, Lieut. Felnoy.
Scherff (Kriegor monoplane).

Competing Unofficially.

Lieut. von Hiddesen (L.V.G. biplane). (11 h. 49 m.)
Max Schüler (D.F.W. biplane). Passenger, Lieut. z. S. Edler. (12 h. 24 m.)

THE LANGLEY MACHINE TESTS.

BEING in the United States on a visit to the Wright Bros., Mr. Griffith Brewer made a special trip to Hammondsport to get at first hand details regarding the trials which were recently made by Mr. Glenn Curtiss with the Langley machine. According to Mr. Brewer's enquiries opinion seems to be very divided as to whether the machine did actually rise so that all the floats were completely clear of the water. Mr. Brewer, in sending the photo. of the machine in flight, which he says is the best secured from a boat by the local photographer, writes :—

"—— the tail float is in the water, and it is doubtful if the front floats are really off. I also enclose two photos. taken by myself, one showing the old restored machine standing out in the open, where it is daily exposed to thunderstorms except for a cloth over its middle, and the other showing one of the Curtiss mechanics sewing extra pieces of wood stick on to the tail ends of the ribs, in order to improve the curvature ready for the next trials to be made when the weather is again absolutely calm."

Apropos of his visit to Hammondsport Mr. Griffith Brewer addressed, under date June 21, to the *New York Times* the following letter upon the subject of the Langley machine, which will doubtless be of interest to many of our readers :—

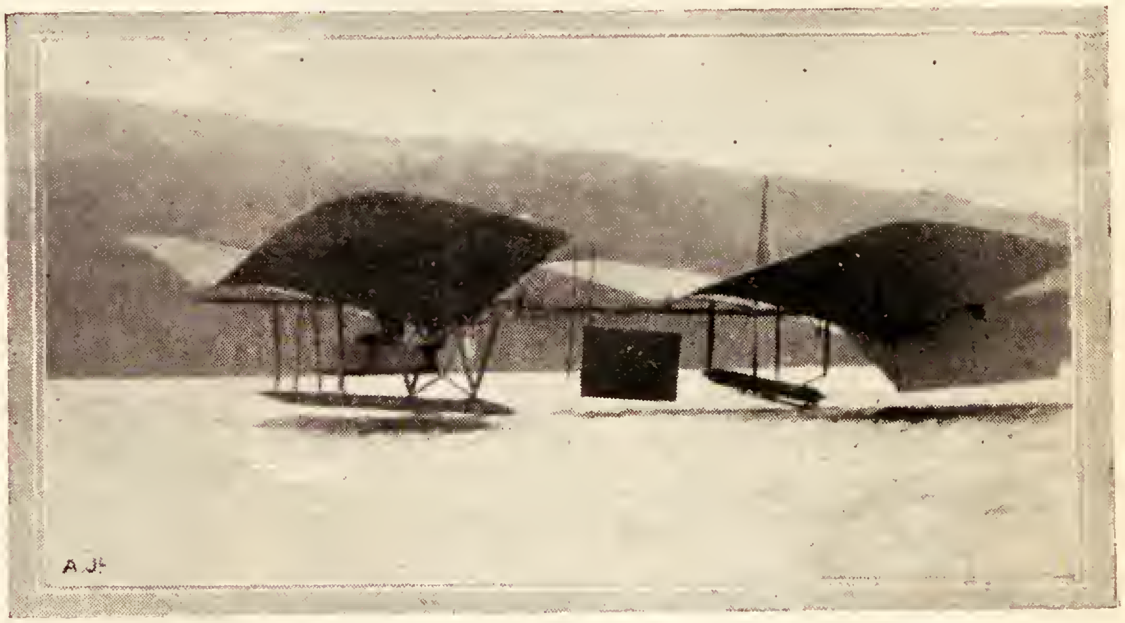
"In view of the statements that have been appearing in the American newspapers since I arrived over here ten days or so ago, I should like to give a few facts for the benefit of aviation in America :

"1. The Langley machine did not fail to fly in 1903 for want of power. It had 52 horse-power to drive it, and weighed about 750 pounds, whereas the Wrights had only 12 horse-power, and their machine weighed 741 pounds. Langley, therefore, had four times the power that the Wrights had, yet he failed where they succeeded. The reasons Langley did not succeed were as follows :

"2. The machine was inefficient. Langley was under the mistaken impression that it was necessary to have extreme lightness and large surface in order to fly. The result was that he designed wings of very small strength, which were extremely inefficient in lift, and also which possessed unnecessary resistance.

"3. The propellers designed by Langley were very inefficient. The propellers made by Langley gave an efficiency considerably less than 40 per cent., compared with the 66 per cent. efficiency given by the propellers constructed by the Wrights, and used on their first machine in 1903. The original Wright propellers have since been copied on the best machines to-day, and form the standard from which modern propellers are designed. More than 80 per cent. of the propellers in use on modern machines to-day are less efficient than the propellers designed and used by Wilbur and Orville Wright on their first machine.

"4. Langley had no practical means of balancing an aeroplane in the air during flight. Langley employed wings fixed at a dihedral angle to each other in order to maintain balance, and this method had been suggested by others many years before. Many experimenters have tried this system of balance and failed because the first side gust of wind will upset the machine and cause it to dive to the ground. The Wrights did not use the dihedral angle for maintaining balance, but they invented and used means for altering the angle of the ends of the wings, and this method or an equivalent is employed to-day on all machines which fly in the air.



The Langley machine over the surface of Lake Keuka.

"5. Langley had no practical means of launching his machine. The first attempt to launch it resulted in a portion of the machine catching in the launching apparatus, and the second attempt resulted in another portion catching, with the same result of plunging the machine into the water below. The Wrights succeeded in producing a practical launching apparatus which launched their machine successfully the very first attempt, and which repeated this successful launching thousands of times afterward.

"6. Even if Langley's machine had been successfully launched, and had been able to sustain itself in the air with its inefficient surfaces, and had been able to maintain the necessary flying speed by means of its inefficient propellers, it could only have been flown in the calmest of air, because the first gust would have upset it. The Wright machine, on its very first flight, was flown in a 27-mile-an-hour wind, which would have upset any machine ever thought of

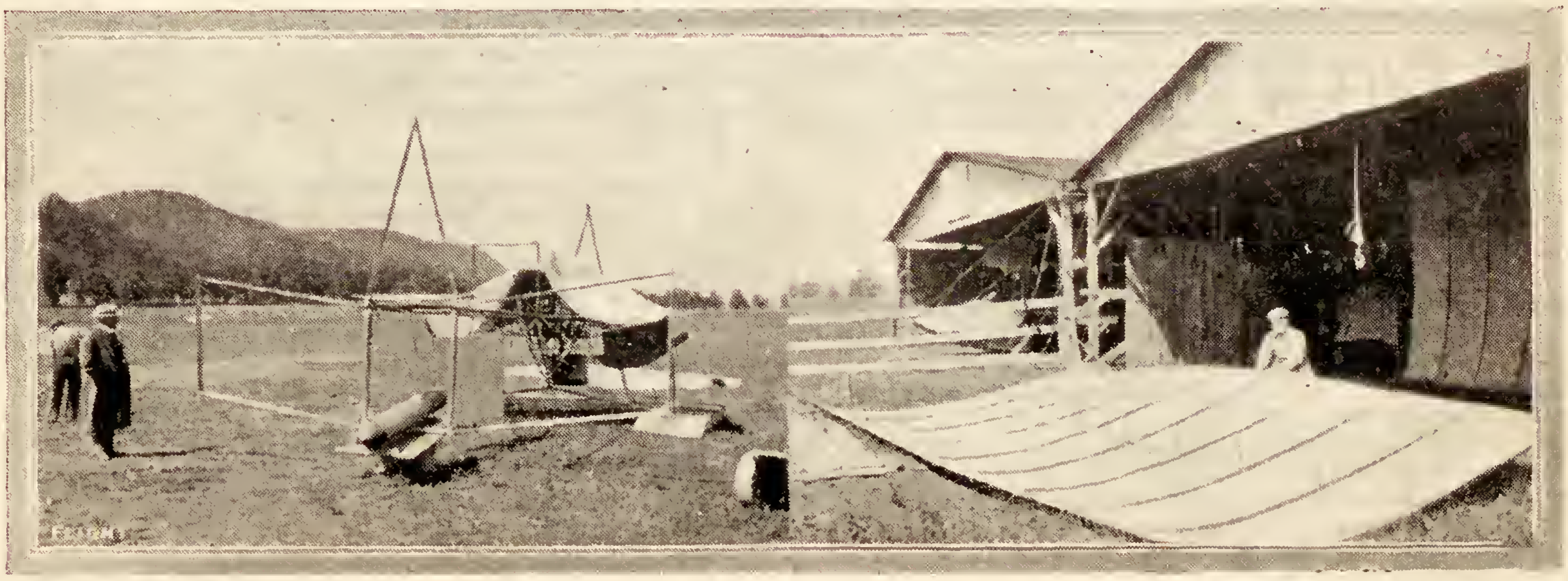


Photo by Mr. Griffith Brewer.

The machine, minus its wings, in its open-air "garage," and on the right, one of the wings of the old Langley machine being strengthened at the Curtiss works at Hammondsport.

then or since which was not fitted with the adjustable wing control invented by the Wrights.

"Langley is very rightly credited with having made a number of scientific experiments with miniature wings and surfaces, in order to ascertain data of 'lift and drift.' This is greatly to his credit, but it should not be forgotten that the Wrights also made independent experiments and obtained a number of readings from which they compiled scientific tables and drew diagrams of pressure curves far more complete and accurate than any previously made, either by Langley or by any other scientist. Unfortunately, the Wrights have been unable to publish these data hitherto, owing to the tardy protection afforded by the patent laws, which necessitate the guarding of exclusive knowledge, to supplement the incomplete patent protection of new inventions.

"Why, in view of all these facts, are the American newspapers making such a fuss of what Langley might have done had his machine been built differently and had he known more facts on the subject of flying?

"Why has Langley's most interesting machine been taken out of the Smithsonian Institution and altered from its original historic state to try to make it fly?

"Why, if such a demonstration were considered desirable, was not the old historic relic left untouched and a copy made to satisfy an insane curiosity?

"Why, if such a demonstration were decided on, was not some impartial, unprejudiced person chosen to make the tests instead of the person who has been found guilty of infringement of the Wright patent?

"Why, if the Langley flying machine was a practical flying machine, did not those in charge of the machine try to make it fly without alteration? With the knowledge gained during the past ten years this should have been easy if the machine as invented by Prof. Langley was really capable of flight.

"Why were Langley's old propellers taken off and propellers of more modern shape substituted?

"Why, if the tests have been successful, are there no photos available of the old machine in flight?

"All these things are incomprehensible to me, especially as I have just arrived from England, where the Aeronautical Society of Great Britain has only last month been paying its annual tribute to the memory of its honored member, the late Wilbur Wright, whom it regards as the joint inventor with his brother Orville of the first actual flying machine.

"GRIFFITH BREWER."

BRITISH NOTES OF THE WEEK.

Mr. Pickles Flies the New Blackburn.

ON Thursday, last week, Mr. Sydney Pickles had the new 80 h.p. Blackburn, military type, out for the first time. A brief test flight across the Knavesmire ground at York showed that the machine was in excellent flying trim, and Mr. Pickles then took it for a ten minutes' spin over the outskirts of the city. Later another flight was made, and the machine reached an altitude of 3,500 ft. On Friday morning four trips were made with passengers, and in the afternoon, with a passenger, a spare two-gallon tin of castor oil, and two suit cases aboard, Mr. Pickles started off for a 60-mile trip to West Auckland. After going splendidly for three-quarters of an hour, a dense fog was run into just after passing Darlington, and it was necessary to land in a very small field. On Saturday morning the journey to West Auckland was completed, and exhibition flights were given there during the afternoon, and four passengers, including a lady, were taken up. On Sunday morning Mr. Pickles started off to fly back to Harrogate, but after 10 miles he encountered fog, and as the machine was not fitted with a compass he decided to return. As the conditions did not improve, the start had to be postponed to Monday morning, when, after a short trial flight, Mr. Pickles flew with a passenger to York, taking an hour for the trip. A 20-min. flight with a passenger was made on Monday afternoon.

Mr. Manton in Devon and Somerset.

ON Wednesday week Mr. Marcus Manton flew at South Molton in a 40-mile wind, and looped many loops. According to the arrangements each flight was to last at least 10 mins., but after one fine flight in a bumpy wind, a committee-man gravely informed Mr. Manton that he had only been up 8½ mins. If it was scarcely tactful it showed a supreme faith in the aeroplane's reliability. Next day Mr. Manton appeared at Taunton. He experienced some trouble with his engine and new plugs were fitted. No improvement was noticeable, however, so the old plugs were put back, and then the Gnome ran splendidly. At exactly nine o'clock, with a gorgeous sunset background, Mr. Manton looped his 100th loop, creating immense enthusiasm. On Friday and Saturday he gave further looping demonstrations, totalling 20 for the visit. On the Saturday afternoon the air was simply full of *remous*, and the looping was frequently accompanied by startling sideslips.

Mr. B. C. Hucks at Scarborough.

ON Saturday last Mr. B. C. Hucks commenced a week's engagement at Scarborough, where he is flying twice a day over the North and South Bays. In the morning Mr. Hucks gave a very thrilling display indeed, and the many thousands of people who have been attracted to spend their holidays at Scarborough by Mr. Hucks' promised demonstrations were well repaid for their choice. In the afternoon, however, the engine on the new 60 h.p. looper developed slight trouble, so that Mr. Hucks decided to get his 50 h.p. reserve machine from Brooklands.

After amusing the crowds of visitors on his 80 h.p. passenger-carrying Blériot on Monday, the looper was brought out, and it was while flying on this machine that both Mr. Hucks and the onlookers had the thrill of the day.

While recovering from a splendid loop it was noticeable that the engine was running badly, and a sharp descent was unavoidable. Thanks to Mr. Hucks' skilful piloting and presence of mind, however, the machine was brought to a standstill within a few feet of a large stone groyne, and both the pilot and the looper escaped without injury.

Blackburn Developments.

THOSE who take an interest in the progress of the aeroplane industry in this country will have noted with pleasure that a new company—the Blackburn Aeroplane and Motor Co., Ltd.—has now been formed to take over the manufacture of Blackburn aeroplanes, propellers and accessories. The capital is £20,000, and the directors are Messrs. R. Blackburn and J. E. Jackson. The registered offices are at Olympia, Leeds, while the Company have lately acquired new and extensive premises, which, we understand, are to be developed into one of the largest works of the kind in Great Britain.

Emaillite in the London–Paris–London Race.

IN connection with the completion of Brock's "Triple Event" by his winning of the London–Paris–London race, it may be recalled that the planes of his Morane-Saulnier are doped with a combination of Emaillite of Grades 2, 3 and 4. In the Aerial Derby, the London–Manchester–London and the London–Paris–London, ignoring for the moment the flying which it has done at Hendon, the machine has completed over 1,000 miles, but when it landed at Hendon on Saturday, the condition of the doping was almost perfect, in spite of the varying climatic conditions through which it had passed. Every portion of the planes was "as tight as a drum," and the surface was quite unaffected. The average speed attained on the last flight speaks eloquently for the air friction reduction obtained by this dope combination.

Mr. Prosser at Nuneaton.

SOME fine flying was done by Mr. Edwin Prosser at Nuneaton on his Caudron biplane on Saturday evening. His first flight was made at half-past-eight. A second flight was made after dark, the machine being lit up by electric light, while a powerful searchlight was operated over the ground, and there was a firework display.

More Records for Integrals.

IT may be noted that the magnificent records which have recently been achieved in Germany have been carried out with the aid of Integral propellers. They were fitted to the Albatros machine on which Landmann and Böhm made their duration records and the Rumpler and D.F.W. machines on which Linnekogel and Oelerich accomplished their height records.

Fuel and Oil in the London–Paris Race.

AS in the other two great races recently won by him, Mr. W. L. Brock relied upon Pratts Motor Spirit in the London-Paris-London race, while the only lubricant used on the machine was Wakefield Castrol.

The London-Paris Map.

IN connection with the little sketch map in our last issue, which clearly showed the route of the London-Paris-London Race, it should have been mentioned that it was the work of Messrs. Geographia, Ltd., 33, Strand, W.C.

FOREIGN AIRCRAFT NEWS.

A Belgian Record.

ON the 9th inst., Capt. Dechamp, with Lieut. Peterman as passenger, flew from Brasschaet to Arlon in two hours, thus making a new Belgian distance record for pilot and one passenger.

Paris to the Sea and Back.

ON his 80 h.p. Rhone-Blériot, Baron Pasquier on the 10th inst. flew from Buc to Deauville for lunch. With a following wind, the machine, which also carried the mechanic, made the trip in 1 hr. 20 mins., but the return journey in the afternoon, with an adverse breeze, occupied an hour longer—2 hrs. 20 mins.

Good Flight by Champel.

ON his big Anzani-engined biplane, Champel on the 10th inst., with M. Dussot as passenger, flew the 260 kiloms. from Juvisy to Angers in 3 hrs. 45 mins., keeping at an altitude of 1,800 metres for the greater part of the way. Subsequently he went on to Nantes, and gave some exhibition flights in connection with the local fête. During one of the flights Mme. Cayat de Castella descended from the biplane by means of a parachute.

On Tuesday, Champel flew back to Juvisy, covering the 410 kiloms. in 3 hrs. 15 mins., not counting a 20-min. call at Chartres on the way. It is stated that, up to date, Champel has taken up over 2,065 passengers.

M. Farman's Aerial Tours.

USING one of the latest model M. Farmans, fitted with an 80 h.p. De Dion engine with a silencer, Maurice Farman on Friday last made his usual trip to Etampes with a passenger, but instead of flying direct when returning to Buc he made a detour to Dourdan, Rochefort, and along the Vaux-de-Cernay and Chevreuse valleys.

Experiments with Pigeons.

AN interesting experiment was carried out at Buc on the 9th inst. at the request of the Federation Colombophile. A hamper containing a number of carrier pigeons was taken up on a Blériot monoplane, when at an altitude of 1,500 metres it was opened, the birds flew off without any hesitation. The first two birds arrived back at their loft at Agen at 6 p.m., having taken eight hours for the journey of 530 kiloms.

A Monument to Frey.

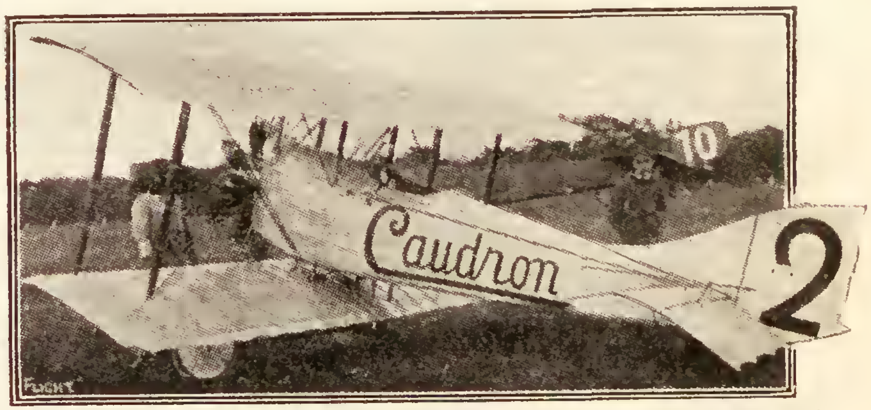
ON Saturday last a memorial to Andre Frey was unveiled at Viroflay by Senator Reymond, who gave a most stirring patriotic address on the subject of aviation.

Voisins for Russia.

AT Issy, on Sunday last, a batch of five Voisin military biplanes, fitted with 130 h.p. Salmson-Canton-Unne motors were put through their official tests before being despatched to Russia.

Pegoud a Chevalier.

IT is announced that the French Minister of War has nominated Pegoud as a Chevalier of the Legion d' Honneur, in recognition of his work in demonstrating the great controllability of the modern aeroplane.



A NEW CAUDRON BIPLANE.—This machine, it will be noticed, is fitted with a *fuselage* similar to that of the small Caudron monoplane on which Mr. Ewen crossed the Channel in 1912. The span is comparatively short, and the usual overhang of the upper plane has been greatly reduced. Instead of the flexing tail a hinged divided elevator is fitted. The engine is a 100 h.p. Anzani.

Pau to Paris on a Blériot.

STARTING from the military ground at Pau, Lieut. Brule, on his Blériot tandem monoplane on the 9th inst., flew to Villacoublay, only making a short stop near Poitiers to change a faulty plug.

French Aviation Centre in Mediterranean.

LAST week a French naval commission, composed of Capt. Roques, Engineer Herck and Lieut. Destrem, spent some time in Corsica inspecting various sites with a view to finding one suitable for the establishment of an aviation centre. It is probable that the centre will be near Ajaccio.

A Belgian Fatality.

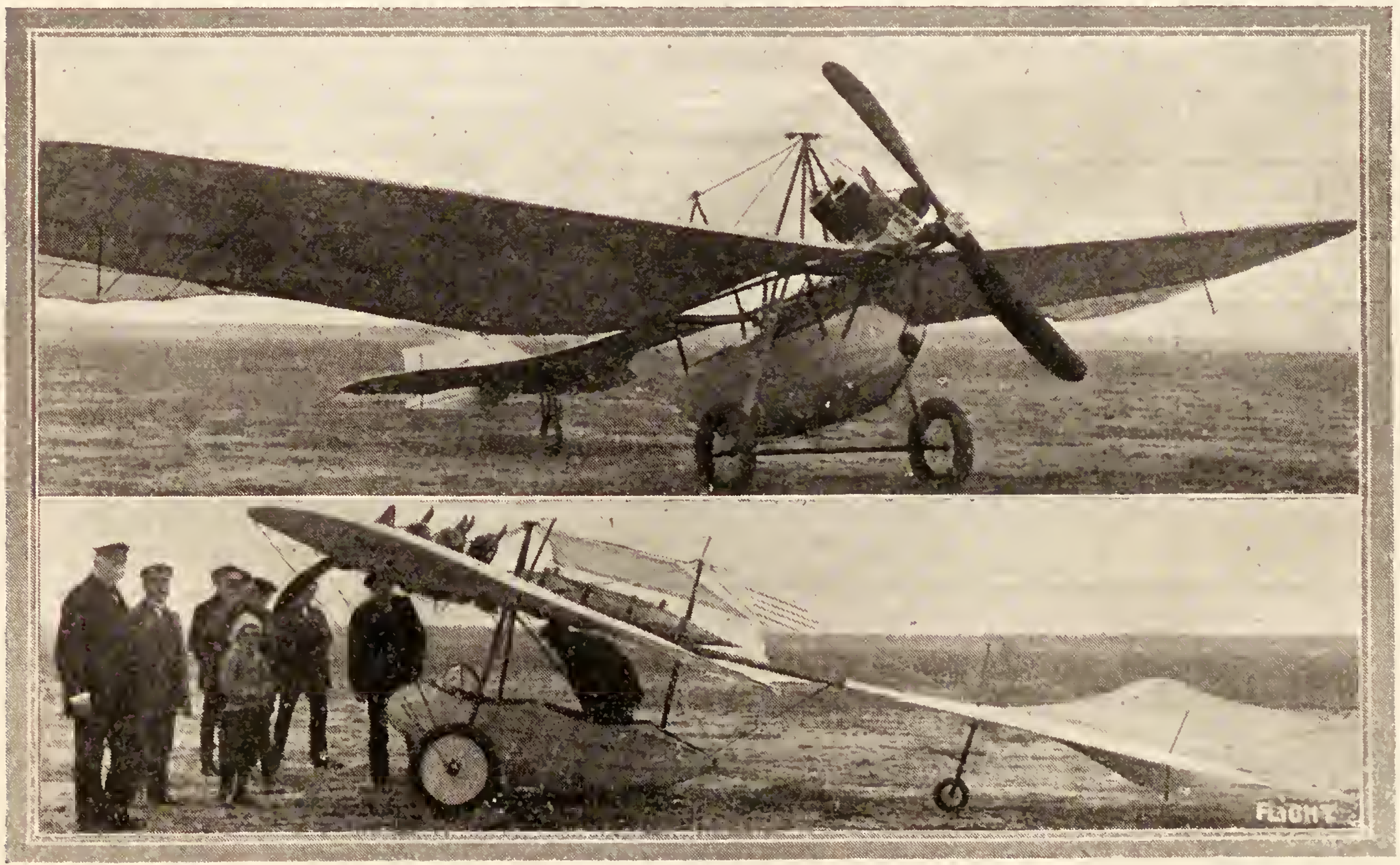
AFTER landing at the conclusion of a flight at the aerodrome near Kiewit, an aeroplane piloted by Lieut. Hubert could not be pulled up in time and dashed into one of the hangars. The pilot was so severely injured that he died in the hospital at Hasselt the next day, but the observer—Lieut. Pool—escaped practically unhurt.

A Chavez Memorial.

UNDER the patronage of the Aero Clubs of France, Italy and Switzerland, a fund has been started for the purpose of erecting a memorial to Chavez at Brigue, Switzerland, from whence he started on his ill-fated flight across the Alps, on September 23rd, 1910.

Fatal Collision in Russia.

TWO military aeroplanes collided in mid-air at the St. Petersburg aerodrome on the 10th inst. The pilot of one—Lieut. Chenchin—was killed, while the other pilot—Lieut. Nagorny—was seriously injured.



TWO OF THE LATEST GRADE MONOPLANES.—Top: The new 100 h.p. Grade monoplane, which is fitted with a 4-cyl. air-cooled Grade engine. In spite of the small number of cylinders this engine is said to be remarkably free from vibration. The oil consumption is ⅘ gal. per hour, and petrol consumption 7·7 gals. per hour. The speed of the machine is 75 m.p.h. Below: The 16-24 h.p. Grade monoplane, which weighs 265 lbs. only, and for which a speed variation of 50 per cent. is claimed.

THE FLYING MACHINE FROM AN ENGINEERING STANDPOINT.

By FREDERICK WILLIAM LANCHESTER, M.Inst.C.E.

(*Concluded from page 739.*)

The work that has been done on the Continent on the subject of stability does not in sum amount to much, moreover it frequently appears to suggest complete ignorance of what has been done in this country; in this particular matter it would seem that the Continent has become insular and our island cosmopolitan. For example, we find the work of Georges de Bathezat, "*Etude de la Stabilité de l'Aeroplane*" (Dunod, Paris, 1911), described by Mr. Painleve as "the first to give an exact and complete discussion of the stability of the aeroplane," and when we examine the work so described we find the subject not more than half dealt with, and at that in so ineffective a manner that scarcely one of the conclusions can be regarded seriously. R. Knoller ("*Über Langstabilität der Drachenflugzeuge*," 1911) and Reiszner ("*Einige Bemerkungen zur Seitenstabilität der Drachenflieger*," 1912), though interesting, do not materially advance the subject. R. Soreau deals with the subject of longitudinal stability under two distinct headings, *equilibrium*, and *stability*; so far as the former is concerned his conclusions as formulated will be found in their entirety published by me in 1897, with the rationale clearly set forth. (Patent Specification 3608, 1897, or compare also *Aerial Flight*, vol. ii, p. 353.) Soreau, however, scarcely carries the matter as far as in my previous publication. Incidently Soreau gives two propositions, *i.e.*, minimum tractive force, and minimum horse-power, which, except for differences of notation, appear to be identical with two propositions previously given by me in *Aerodynamics*, 1907, § 164. When we come to the question of stability it will suffice to state here that his conclusions on the subject of longitudinal stability are gravely at fault; briefly, Soreau states that the moment of inertia must not be too small for fear of oscillations becoming to rapid, whereas the only oscillation of importance—my "phugoid oscillation"—is virtually independent for its period on the value of the moment of inertia. On the questions of lateral stability and directional stability, Soreau's views (as pointed out by Bryan) are entirely at fault; the whole question of asymmetric or rotative stability is lost sight of, and the fact that in directional stability the centre of gravity cannot be treated as a static pivot (compare *Aerial Flight*, vol. ii, §§ 95 to 100; also Bryan, *Stability in Aviation*, chap. vii) is ignored.

The work of Captain G. A. Crocco ("*Sulla stabilita laterali degli aeroplani*," also "*Perfezionamenti nella stabilita longitudinale degli aeroplani*," "*Rendiconti delle Esperienze e degli Studi eseguiti nella Stabilimento di Costruzioni Aeronautiche del Genio Anno II*") is of interest. In the main he follows established mathematical lines of treatment; I have made no attempt to follow his work in detail. Captain Crocco's conclusions on the whole appear to be far sounder than those of most Continental writers; his work is evidently worth careful study.

The above may be taken as a brief summary of the existing literature of the subject. Excellent abstracts of the work of the foreign authors cited will be found in the appendices to the various reports of the Advisory Committee; excepting in the case of the French writers, which have been consulted in the original, I have relied on the abstracts in question for the summary here given.

In general the work has, in the past, been treated on too closely mathematical lines to be of immediate service to the engineer; in many cases the writers have clearly suffered from their want of appreciation of the real conditions. It is my deliberate opinion that there is very little room for useful work to-day on the subject of stability unless it be rigidly and directly supported by experimental work, and from our standpoint as engineers I think we may in the future confidently look to the exellent work being accomplished at the National Physical Laboratory, and at the Royal Aircraft Factory, to keep us in touch with that which is essential in this important branch of the subject.

APPENDIX I.

The subject of skin friction where air is concerned has been one of considerable controversy. The quantities to be measured are so small and the apparatus employed until recent years has been so insensitive that until the work of Zahm in 1904 very little was known on the subject. Langley in his *Experiments in Aerodynamics*, 1891, asserted skin friction to be a negligible factor in its relation to flight. Dines about the same date expressed the same view; in my *Aerial Flight*, vol. i, which appeared in 1907 (not at that time aware of the work that had been done by Zahm), I published some determinations of skin friction and attacked Langley's views, pointing out that skin friction is one of the controlling factors in the economics of flight. I also introduced the practice of expressing skin friction as a coefficient representing the resistance of a thin lamina in tangential motion in terms of its resistance at 90 degrees; the coefficient so expressed is the *double surface* coefficient, and in my work is represented by the symbol ξ. In the greater part of my experimental work planes or laminæ of mica were employed of but a few square inches area; the largest area used by him in any of his determinations was approximately ½ square foot. Now it is well established that the coefficient of skin friction in a plane of small area is sensibly greater than in one of large area, consequently my values were on the whole considerably higher than those of experimenters working to a larger scale; however, the following passage may be cited as the summary of experiments made with planes of about ½ square foot area and of smooth surface: "It is therefore to be concluded that for a well-varnished surface or for polished metal, under the conditions of experiment, the effective value of ξ is approximately 0·009 with a probable error of less than 10 per cent., plus or minus." (*Aerial Flight*, vol. i, p. 389.) According to the best estimate that can be made to-day the actual value of the double-surface coefficient under the conditions of the experiment in question should be 0·0081, showing an error of precisely the 10 per cent. which I allowed myself.

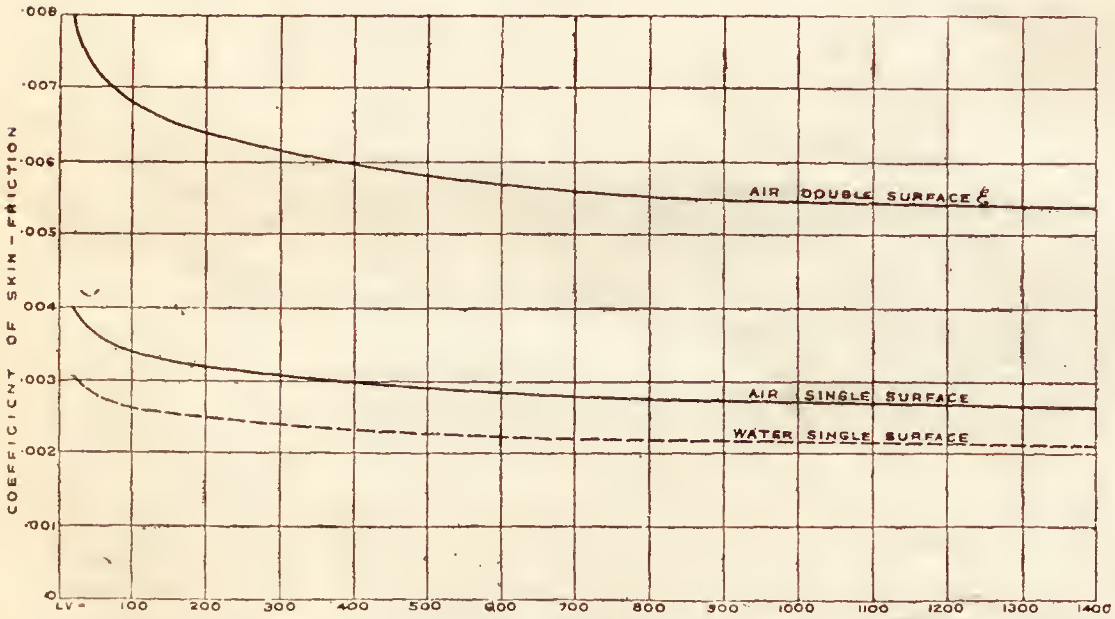


Fig. 38a.

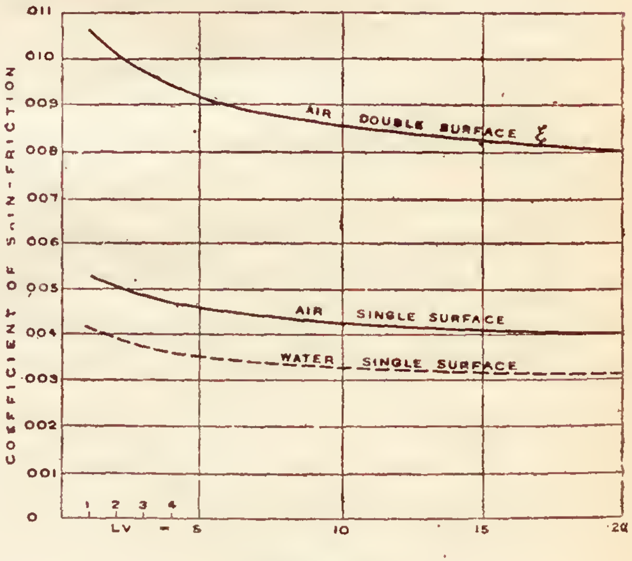


Fig. 38b.

It has been frequently stated that my results were in entire disagreement with those of Zahm; sometimes those making this statement ignored my lower values and took his highest, which admittedly were too high; in other cases they read his double-surface coefficient as a single-surface coefficient, and so made his values twice as great as they really are.

In a communication to the Advisory Committee (Memo. No. 15, June, 1909), I pointed out that my own results and those of Zahm for air, and the results obtained many years ago by W. Froude for water, are in substantial agreement—in fact, in very close agreement—provided that they are put in their proper perspective, with due consideration to the laws of dynamic similarity. (Compare memorandum cited, also addendum to same by Lord Rayleigh.) The final conclusion given in the memorandum under discussion is expressed in graphic form in Figs. 38*a* and 38*b*, in which abscissæ represent the quantity LV (the product of the linear dimension * in feet by the velocity in feet per second), and in which ordinates represent the coefficient of skin friction. Three curves are shown; the upper curve is the double-surface coefficient for air, for which I employ the symbol ξ, the lower curve (solid line) is the single-surface coefficient (half the value of the former), the dotted curve is the coefficient for water. In Fig. 38a, LV values may be read from 20 to 1,400. In Fig. 38b is given a graph for lower values.

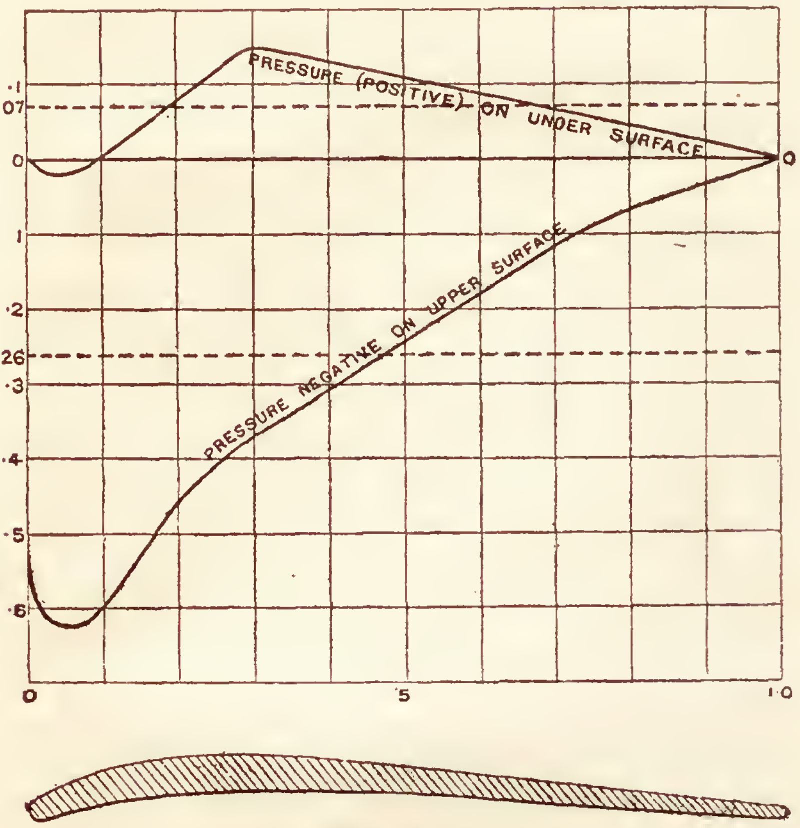


Fig. 39.

It is a point not without interest that, for geometrically similar aerofoils, the weight sustained varies as $(LV)^2$, consequently for any given value of LV the weight is constant. In other words, as already shown, for least resistance $P = C \rho V^2$, where C is a constant whose value is round about 0·32, or if $k L^2$ represents the area, and W = weight, $W = 0{\cdot}32\, k \rho\, (LV)^2$. Therefore assuming good design (max. lift/drift), and some definite value of aspect ratio (to fix the value of the constant k), the coefficient of skin friction is determined by the weight of the machine, and is the same whatever the designed velocity may be.

Skin-friction has a habit of playing an elusive part in actual resistance phenomena, and the subject in practice is full of pitfalls. In the case of a plane moving edgewise, it may frequently happen that skin frictional resistance will virtually disappear, the leading edge of a plane such as used by the late Professor Langley will by its bluffness set in motion a certain quantity of air, and this moving air subsequently washing the surfaces of the plane will reduce the skin-frictional resistance to something immeasurably small; as pointed out by me in discussing Langley's work, this was one of the causes that led him into error.

Another case where the coefficient of skin friction may be abnormally low is that of the inclined plane at a small angle of incidence; in *Aerial Flight*, vol. i, the matter is dealt with on page 264, article 182; it is pointed out that as a deduction from gliding experiments made with the ballasted plane, and calculations based on same, the coefficient of skin-friction is in effect less than is ordinarily the case, and the explanation is offered that the upper surface of the plane being to a certain degree a "dead-water region" the coefficient may in this case be only that of the single surface. This conclusion has received striking confirmation in connection with some experimental work recently carried out at the National Physical Laboratory.

I consider it probable that in the case of the pterygoid aerofoil, that is to say, the aerofoil of arched section, such as shown at the foot of Fig. 39, the skin friction may in effect be abnormally high owing to the augmented velocity with which the air flows over the upper surface. This, speaking generally, is not altogether compensated by the lower velocity on the under side. The velocity of the air in the vicinity of the aerofoil can be deduced approximately from the ordinary laws of fluid motion from the local pressure. Now pressure curves have been made of several different sections of aerofoil by the N.P.L.; the curve shown in Fig. 39 may be taken as roughly typical of the pressure graph for mid section of any well-shaped aerofoil at or about its angle of least resistance. The ordinates downwards from the zero datum line being the negative pressures on the upper surface of the foil, and the ordinates measured upwards from the said datum line being the positive pressures on the under surface, in both cases measured above and below atmosphere. Plotting the same curve in Fig. 40 and taking a datum line corresponding to zero motion, ordinates will represent fluid tension (negative pressure) and the velocity at every point is represented by the square root of its ordinate; hence the skin friction will vary as the ordinate itself, and, referring to Fig, 40, the effective coefficient of skin-friction will be greater than normal in the relation of the mean of the ordinates *a b a c* to the ordinate *a d*. Referring again to Fig. 39, it may be observed that the mean pressure increase on the under face is approximately one-fourth of the mean pressure decrease on the upper face; taking this proportion as a basis, I give, in Fig. 41, graphs of the augmentation of the skin friction as a function of the aerofoil pressure constant; the normal coefficient proper to the LV value in question being read on the ordinate corresponding to pressure constant = zero, on the left hand of the Figure.

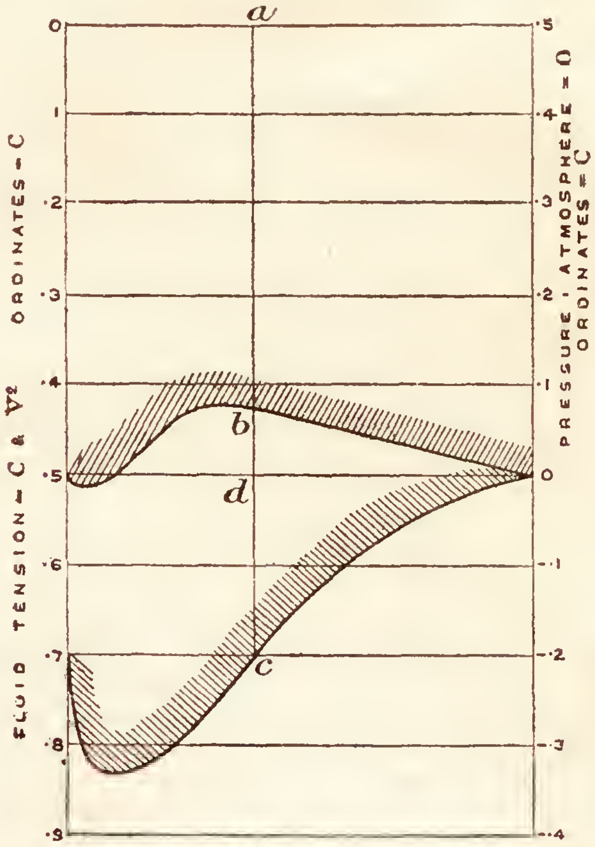


Fig. 40.

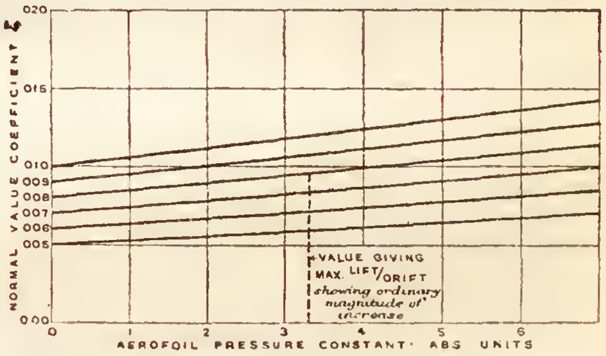


Fig. 41.

In the case, for example, of the normal value of the coefficient being 0·008, it will be seen that for a pressure constant = 0·32 the augmented coefficient will be nearly 0·01.

We thus begin to obtain values approaching those that I have found to apply in connection with the theory of least resistance. If, in addition to the above, we allow an addition to represent *form resistance*, as has been found by Prandtl in the case of the ichthyoid body, and which is due to the degeneration of the stream-line system consequent on the appearance of the frictional wake, we might expect the effective direct resistance of the aerofoil expressed in terms of skin friction equivalent to a coefficient of 0·0175, which is in full and complete agreement with experience. The assumption here is that the proportion of the added *form resistance* bears the same ratio to the true skin friction, approximately 3 : 4, as commonly found in the case of the ichthyoid body.

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* Ordinarily the *linear dimension*, represented in the laws of dynamic similarity by L, presupposes geometrical similarity, *i.e.*, geometrical form as an invariable. In the present usage, owing to the thinness of the layer of air affected, L may be taken as the linear dimension of the plane in the direction of motion.

Models

Edited by V. E. JOHNSON, M.A.

The Steering Competition for Models.

THIS competition, which was held on Wimbledon Common on July 11th, was an extremely disappointing one, so far as the number of competitors was concerned. The tests were: (A) Straight flight ahead. (B) Figure of eight. The last really amounted to two consecutive circles, one right-handed and the other left-handed, or *vice versa*.

Only one competitor, Mr. J. E. Louch, was successful in accomplishing both tests. Mr. Louch made a very fine straight flight of at least 150 yards before the model turned at all; only 50 yards was necessary to qualify; his first attempt at a figure of eight was unsuccessful, the model quickly coming to the ground, but his second attempt was quite successful.

The mechanical device adopted by Mr. Louch was very neat and simple but quite efficacious, and struck us as being the best we have yet seen.

The model was of the canard type, and the most reliable and efficacious way of steering such a model is, in our opinion, by means of canting the elevator; the machine is supposed to be like Mr. Louch's one with twin propellers. Presuming the propeller thrust equal and the wings free from warp, &c., then with the elevator (preferably of the dihedral angle type) set symmetrical, *i.e.*, without cant to either side, the machine will fly straight. Cant the elevator in either direction, and the machine makes a right or left handed circle according to the direction in which the cant is made. Let us assume the machine started with the elevator so canted as to cause the machine on rising to make, say, a right-handed turn, then if the elevator be suddenly pulled over so as to have an opposite cant the model will at once commence to describe a curve in the opposite direction, and will continue circling in this sense so long as the elevator suffers no further alteration, until the motive power runs down.

The final setting of the elevator at a given angle of cant presents no difficulty, if we imagine a certain restraint against which it is held fairly tight by means of some form of stretched spring. A further extension will place the elevator in a normal lateral position, and a still further extension pull the elevator over so as to have a cant in the opposite direction.

Let us suppose that it is held in this latter position by means of a wire bolt or pin, which when withdrawn permits the spring to pull the elevator over to the other side.

This again presents no difficulty so long as the pin is pulled out and the elevator spring released after the model has risen and completed a circle in one direction, either clockwise or anti-clockwise, as seen from below.

The manner in which Mr. Louch drew out the pin was as follows: A thread was attached to the pin, and this thread was wound round the thin axle of a cogwheel about an inch in diameter and containing therefore a good number of teeth, this cogwheel was turned by means of a worm or thread on a wire axle, one revolution of the latter causing the toothed wheel, the axle of which was transverse to the *fuselage*, to turn to the extent of one tooth. The axle carrying the worm ran fore and aft of the *fuselage*, and was rotated by a twisted band of rubber whose speed was checked or "braked" by a little fan or propeller. This propeller, if we remember correctly, was further reduced in speed by its turning the opposite way, to which its travel through the air would cause it naturally to turn, if free to rotate in either direction. When the machine was released to run along the ground and rise, the little fan brake and motor was also released, with the result that after a certain time the elevator sprung over as already stated.

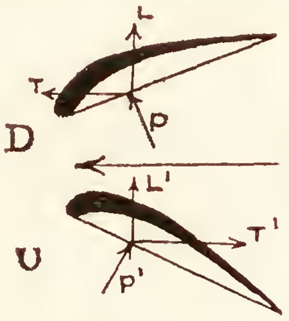
The time, no doubt determined by trial, can obviously be controlled by the motor, size of fan brake, size of cog-wheel axle, &c. Mr. H. Bedford also succeeded in making his machine describe the requisite figure of eight, but failed to obtain the requisite 50 yds. straight flight in the three trials permitted.

Mr. Bedford's method of control was by means of a movable fin in the rear, actuated by means of a small rubber motor and propeller brake. The movement of the fin or rudder in this case was gradual.

Mr. H. W. Sykes' Aero Show Ornithopter Model.

The principle upon which this machine is based is that in order to obtain flight in a horizontal straight line the pressure on the underside of the wings must remain constant during both up and down strokes.

This is brought about, in the case of a bird, as follows: During the down stroke the wings are set at a negative angle, as at D in the accompanying figure, in which the arrow shows the direction of flight. The wind pressure forms, at right-angles to the wings, a pressure, P, which may be resolved into vertical and horizontal components, L and T. The former produces the "lift" or sustentation against gravity and the latter the forward impulse. At the bottom of the down stroke the wings are turned to a positive angle as at U in the diagram. The bird is carried along by the kinetic energy acquired during the down stroke, and the (relative) wind striking the under side of the wings produces a reaction, P′, at right-angles. This reaction, P′, resolves into vertical and horizontal components, L′ and T′. T′ is the "drift" or resistance to forward motion, and must be overcome by the kinetic energy of the bird, and L′ is the "lift."

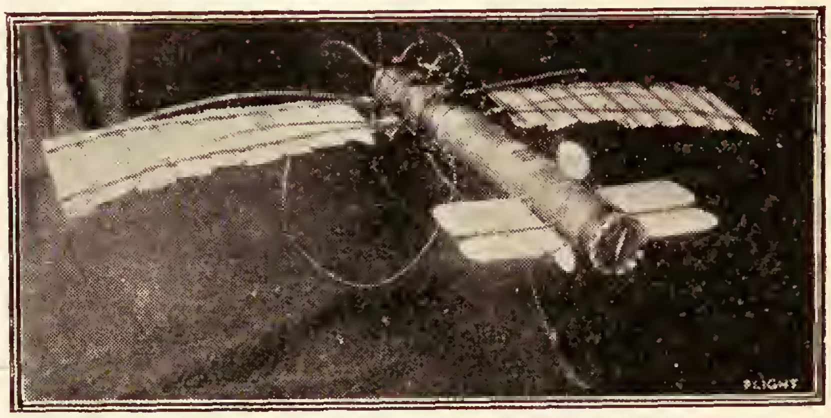


This force, L′, lifts the wings without any muscular effort being exerted, and if they were left limp they would be raised without doing any useful work in sustaining the bird, but if the upward movement is resisted, muscularly or otherwise, the result is a sustentation of the whole bird in proportion to this resistance. And if, instead of being a mere braking force, this resistance consists of the stretching of an elastic cord, or some other means of storing energy, the energy so stored can be given out during the down stroke, thus materially assisting the muscles. This appears to be the function of the "pectoral cords" of a bird—a most important organ of flight and one which does not seem to be possessed by non-flying creatures.

In the case of the model the turning of the wings is brought about by driving the two spars thereof by two cranks, the forward one of which has a certain angular advance on the rear one; consequently the front spars reach the top and bottom of their stroke and begin the reverse movements before the rear ones, with the result that the front edge of the wing is below the rear one during the down stroke and above it during the up stroke, or, in other words, the wing is inclined downwards towards the front during the down stroke and upwards towards the front during the up stroke. The wings assume a helical form, and are, in fact, two one-bladed screw propellers going in opposite directions, and their direction and pitch are constantly "alternating" periodically. During the down stroke the "propeller torques" furnish the lift, and during the up stroke the negative torques, or resistance to rotation, produce the lift.

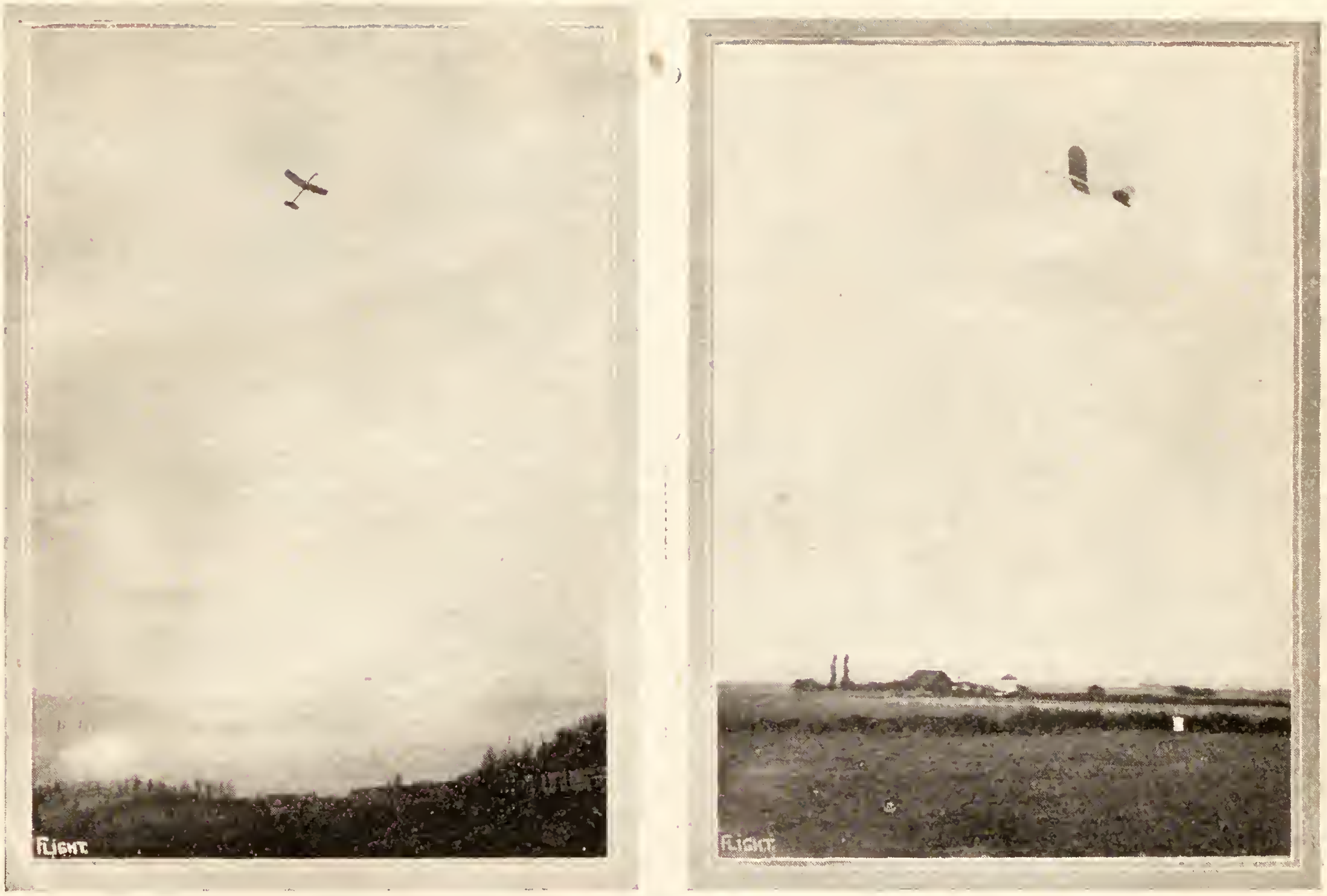
The duty of "pectoral cords" is performed by springs. The engine power should be shut off during the up stroke, a thing which is impossible with a rubber motor, but which would be quite easy with a petrol one.

In this model the front wing spars are pivoted at a point below the horizontal centre line and the rear spars above it, imparting a backward and forward component to the motion of the wings—a rowing action—to assist in the propulsion. The down stroke of the wings should be faster than the up stroke to generate the kinetic energy requisite to carry on with during the up stroke, but it is impossible with an ungoverned elastic motor, whose speed depends solely upon the resistance with which it meets.



Mr. M. W. Sykes' Olympian ornithopter model.

A simple balance gear, analagous to that in the back axle of a



Two excellent photographs of a model in flight by P. Rolfe.

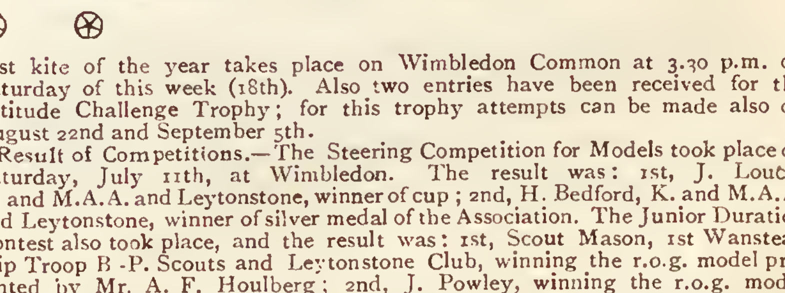
motor car, is provided, allowing the wing on the outside of a curve to flap harder than the inside one—equivalent to automatic warping. Also by this arrangement either wing would yield to a gust.

The tubular construction, though perhaps not the happiest arrangement, was adopted for experimental purposes to allow of alteration of the centre of gravity if necessary. The wings and all the machinery are attached to the outer sleeve, which can be slid along the inner tube to adjust the balance.

Model Aviation in Germany.

"I enclose you two photographs taken here of two models I have finished lately," writes Mr. P. Rolfe (Nürnberg, Germany). "The smaller view is of an 'Excelsior' tractor, which has not more than 18 ins. of rubber. The model with rounded wings is larger, 2 ft. 2 ins. span, but they both have 8-in. diameter propellers, and they fly equally well. Both rise without a push in less than 6 ft., and hand-launched fly about 150 to 200 yds. The climbing angle of the larger model is really extraordinary, and the glide, too, is extremely flat. As far as I know the Excelsior is the most efficient, practical model of its size, and I am really astonished at the height and distance attainable for so large a weight and so little rubber. [Our correspondent omits to state either the *weight* of the model, of the rubber, or of the *duration*, a much safer test than distance.]

"The people here, speaking generally, are not the least bit interested in models, and there are very few firms who make models in South Germany. All the models I have seen are Etrich 'pigeons, and very roughly made; but now there are several firms beginning to specialize in cheap, power-driven models which have great promise, and a better market (here) than the rubber-driven models. Of course, all model material is exorbitantly dear, and not very good at that. There are no model clubs here whatever, though I believe in North Germany the model is more popular than here in Bavaria. The photos are both genuine, and not 'faked' to appear flying."



Mr. H. Bedford's very neat device for raising and lowering the wheels on his hydro-aeroplane Olympia model.

* * *

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration ...	J. E. Louch ...	95 secs.
Twin screw, do.	Distance ...	R. Lucas	590 yards.
	Duration ...	G. Hayden ...	137 secs.
Single screw, rise off ground	Distance ...	W. E. Evans ...	290 yards.
	Duration ...	J. E. Louch ...	68 secs.
Twin screw, do.	Distance ...	L. H. Slatter ...	365 yards.
	Duration ...	J. E. Louch ...	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance ...	C. C. Dutton ...	266 yards
	Duration ...	J. E. Louch ...	91 secs.
Do., off-ground	Distance ...	C. C. Dutton ...	190 yards.
	Duration ...	J. E. Louch ...	94 secs.
Single screw hydro., off-water	Duration ...	L. H. Slatter ...	35 secs.
Single-tractor, do., do. ...	Duration ...	C. C. Dutton ...	29 secs.
Twin screw, do., do. ...	Duration ...	L. H. Slatter ...	60 secs.
Engine driven off grass ...	Duration ...	D. Stanger ...	51 secs.

Official Trials.—The monthly official trials take place to-morrow, Saturday, on the Leytonstone Ground.

Competition.—The sixth annual contest for the Baden-Powell Shield for the best kite of the year takes place on Wimbledon Common at 3.30 p.m. on Saturday of this week (18th). Also two entries have been received for the Altitude Challenge Trophy; for this trophy attempts can be made also on August 22nd and September 5th.

Result of Competitions.—The Steering Competition for Models took place on Saturday, July 11th, at Wimbledon. The result was: 1st, J. Louch, K. and M.A.A. and Leytonstone, winner of cup; 2nd, H. Bedford, K. and M.A.A. and Leytonstone, winner of silver medal of the Association. The Junior Duration Contest also took place, and the result was: 1st, Scout Mason, 1st Wanstead Slip Troop B.-P. Scouts and Leytonstone Club, winning the r.o.g. model presented by Mr. A. F. Houlberg; 2nd, J. Powley, winning the r.o.g. model presented by Mr. H. Bond; 3rd, Mr. Blake, winning the r.o.g. model presented by Murray, Son and Co. Messrs. Akehurst, Lyche, and Jannaway acted as judges.

Royal Aero Club Hydro Competition.—To be held at Welsh Harp, Hendon, August 8th, at 3 o'clock; entries close first post August 1st; for hydro-aeroplanes rising off water (open to the world). Prizes: 1st, £5 5*s.* (presented by the Royal Aero Club) and certificate of the Association; 2nd, £2 2*s.* (presented by Major Sir Bryan Leighton, Bart.); 3rd, £1 (presented by Mr. Reginald Balston). Tests: A, duration; B, stability; marks, duration actual seconds 25, stability 25. Additional rules governing this competition: 1. Competitors must be at the judges' flag at 2.45; any competitor not present at that time will be disqualified. 2. Models must not weigh less than 1 lb. 3. All competitors must launch their machines in the same direction, and one trial to be launched with the wind. 4. Extra marks will be awarded at the discretion of the judges for the best run down wind. Non-competitors admission to ground, 3*d.* Payable only at gate.

The Lady Shelley Hydro Competition.—To be held at Welsh Harp, Hendon, August 8th; entries close last post August 1st. For power-driven hydro-aeroplanes rising off the water (open to the world). Prizes: 1st, silver cup (presented by Lady Shelley); 2nd, silver medal of the Association; 3rd, bronze medal of the Association. Marks: Design 100; duration actual seconds; minimum duration 25 seconds. The design of models submitted must be applicable to full-size machines.

27, Victory Road, Wimbledon. W. H. AKEHURST, Gen. Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (30, Corringham Rd., Golders Green).

Flying Saturdays, 3.30, at Hampstead Garden Suburb Fields, Golders Green. For r.o.g. machines, Sunday morning, at 10 o clock.

Bristol and West of England Aero Club (Model Section) (42, Royal York Crescent, Clifton, Bristol).

Bristol International Exhibition.—It has been decided to postpone the Summer Model Aeroplane Competition until Saturday, August 1st, when it will be held in the Pageant Ground (a slightly smaller ground than the field originally proposed). The exhibits from Bristol and Bath will be on view in the International Pavilion for one week previously. Copies of the amended programme may be obtained on application to the above address. 38 models have been entered in the various events.

Leytonstone and District Aero Club (64, Leyspring Road).

July 18th, K. and M.A.A. official trials, Wanstead Flats, 3 p.m. Route for visitors, Liverpool Street to Forest Gate. On leaving station follow tramlines to left hand. Wanstead Flats will be reached in four or five minutes. The trials will be held on the right-hand side, about five minutes from the road. July 19th, flying on Wanstead Flats, 6.30 to 10.30 a.m.

Paddington and Districts (77, Swinderby Road, Wembley).

July 18th, competition for single-propeller models, minimum weight and loading, 4 ozs. Average of three flights, r.o.g. duration.

Wimbledon and District (165, Holland Road, W.).

July 18th, flying 2 p.m. July 19th, flying 11 and 2. July 25th, competition for tractors, r o.g., average of three flights. 1st prize, 15 shillingsworth Bonn's goods, presented by Mr. H. Lyche; 2nd, 10*s.*, and 3rd, 5*s.*, same presented by Messrs. J. Bonn and Co.

UNAFFILIATED CLUBS.

Finsbury Park and District (66, Elfort Road, Highbury, N.).

July 18th. r.o.g. duration tractors, 5 p.m. Exhibition flying from 3 p.m.

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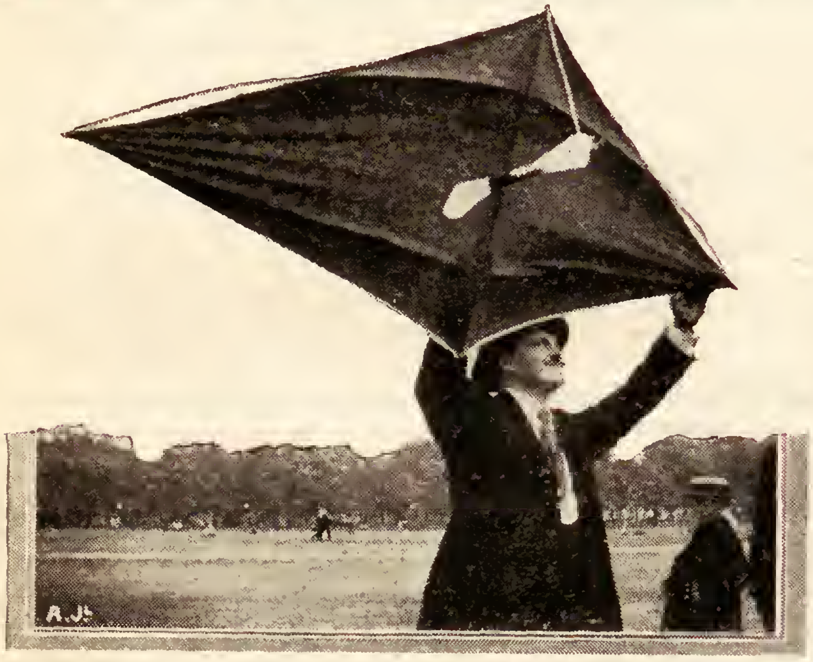
THE "HI-FLI" KITE.

An interesting demonstration was given in Hyde Park recently of a new type of kite, introduced by Messrs. Gamages, Ltd. This new kite, which has been given the name of "Hi-fli," is chiefly remarkable on account of the fact that it is fitted with a propeller, or, more correctly speaking, with a small windmill. The advantage claimed for this new kite is good stability, said to be due to the gyroscopic action of the propeller. In addition to this action, the propeller is claimed to increase the stability of the kite by breaking the force of gusts before they reach the kite, as the greater part of the gust is absorbed in turning the propeller. During the demonstration the kite reached a great height, and appeared remarkably stable, whilst the angle of the string was at times about 80°. Constructionally the kite consists of a longitudinal stick, to which are fastened, by means of a short piece of brass tube, the two short lengths of bamboo which provide the necessary stiffness transversely. The propeller revolves round a short length of string coming from the central part of the stick.



Messrs. Gamage's new kite, the "Hi-fli."

CORRESPONDENCE.

Brakes for Aeroplanes.

[1879] In answer to the suggestions contained in two letters which have just appeared in Flight, advocating the reversing of the engine of an aeroplane in order to exercise a braking effect, and of employing reversing gear, I should like to make a few remarks upon the subject.

I certainly cannot agree with "Mechanic's" method of comparing the cases of reversing the engines to stop a ship, and applying the same principle to an aeroplane with a similar object. The two cases are obviously widely apart; and your correspondent appears to forget that the elements through which the ship and the aeroplane are travelling are of a totally different character, and other equally important points.

The direct result of reversing the engine (and propeller) of an aeroplane would, in my opinion, upset the equilibrium of the machine, and certainly entail disaster in some form, probably causing the aeroplane to veer sharply from its course, and lurch over to one side, with resulting damage to the wing (I think that this would specially apply in the case of a monoplane).

No such device as reversing the engine, or having reversing gear fitted, would fulfil the requirements of an aeroplane brake, two of which might be enumerated as under:

1. It should be capable of enabling the pilot to start the engine and to get away without any outside assistance.
2. Keep the aeroplane from running back when landing on an incline (say in the case of a sudden descent upon unsuitable ground).

The brake I have designed (prov. patented) would fulfil these above-mentioned requirements, and I intend to arrange for the manufacture of same, and should be glad to hear from any constructors, &c., with a view to that end.

Other opinions of your readers as to the effect of reversing the engine, or the employment of reversing gear, on the stability of the aeroplane would be of interest.

Walthamstow, July 7th. Vincent H. Mair.

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PUBLICATIONS RECEIVED.

Nouvelles Recherches sur la Résistance de l'Air et l'Aviation. In 2 volumes. By G. Eiffel. Paris: H. Dunod et E. Pinat, 47–49, Quai des Grands-Augustins. Price 50 frs.

"*Time and Tide*": *Sunset and Tide Tables for* 1914. Markham and Prance, Dudley House, Southampton Street, Strand, W.C.

Guide to Patents, Trade Marks, and Designs. London: J. S. Withers and Spooner, 51–52, Chancery Lane, W.C.

Bibliothèque de "La Conquête de l'Air." No. 1. *La Traversée Aérienne de l'Atlantique.* By A. de la Hault and A. Bracke. Paris: H. Dunod and E. Pinat, 47–49, Quai des Grands-Augustins. Price 45 centimes.

"*To the Continent.*" London: The Continental Manager, Great Eastern Railway, Liverpool Street Station.

The Art of Reconnaissance. By Col. D. Henderson, K.C.B., D.S.O. London: John Murray. Price 5*s.* net.

Catalogue.

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CONTENTS.

Editorial Comment: PAGE
Aircraft at the Naval Review ... 773
Eiffel and his Work ... 773
Central Flying School at Upavon ... 776
Flying at Hendon ... 781
Shoreham to Hendon. By Miss M. L. Elliott ... 782
From the British Flying Grounds ... 785
Eddies. By "Æolus" ... 787
Navy Planes at the Spithead Review ... 791
Foreign Aircraft News ... 783
Models. Edited by V. E. Johnson, M.A. ... 797

EDITORIAL COMMENT.

Aircraft at the Naval Review.

The aspect of the recent inspection by His Majesty the King of the great fleet gathered at Spithead which has most appealed to those who have followed it with intelligent appreciation, does not seem to have been so much the terrific power for destruction of the mighty armada of ships as the importance of the new element introduced into naval war by the coming of the seaplane and the airship. The sight of the seaplanes flying over the King's yacht, dipping in salute as they flew and manœuvred in the air, seems to have impressed people with a feeling that in these craft we have the potentialities of a development in war as great, if not even greater, than those bound up in the submarine. That seems to be the dominant note of all the comment of the naval experts. In this connection we cannot do better than quote from a leader in the *Daily Telegraph*, which says: "They (the aircraft) represent an extension of our sea power; they are the scouts of the future. A fleet of battleships unattended by aerial craft will be blind. Cruisers, even if able to steam at thirty knots, like those now reaching completion, will be inadequate. Their range of vision is limited; their rate of steaming is insufficient. The seaplane, on the other hand, is the fastest and handiest ship ever contrived by the ingenuity of man—with a speed of seventy miles an hour in the air and a capacity for manœuvring which defies competition. In two years or so the rate of flight has been doubled; even to-day no one can say that the limit has been reached. A fleet without aerial squadrons will be robbed of the essential intelligence service which is the talisman of victory—the foundation of successful naval tactics . . . . As we are forced to press on with the development of our sea fleet, so no effort must be spared to build up its complement—a great air service, with the most efficient airships and seaplanes."

There is nothing much to be added to these words by ourselves—they sum up the whole question admirably and succinctly. This much may, however, be said, that to us who have argued from the beginning of practical flight that there had indeed arrived a new element, a new science, which would unquestionably revolutionise all the older ideas of war and the manner of its conduct, it is something more than pleasing to be able to feel that at last the self-evident truth is finding recognition. As we have remarked more than once in these pages, recognition in these matters is half-way to accomplishment, and now that the recognition of an outstanding fact has been reached, we feel that accomplishment is not far off. Not that we can feel comfortable yet, for much remains to be done before British aerial defence will have reached the state of efficiency and preparedness which is essential. But Rome was not built in a day, neither can aerial fleets be created from nothing, and, on the whole, we are quite satisfied with the progress of the Naval Branch of aeronautics.

* * *

Eiffel and his Work.

If there be one man above all others in the scientific world of aeronautics to whom honour would be generally acknowledged as due, that man is surely M. Eiffel. His first volume recounting his experiments on the resistance of the air at the Eiffel Tower was published in 1907, and a second volume examining the formulæ and his experiments in this direction saw the light in 1910. Later in the same year, the well-known aeronautical classic—*La Resistance de l'Air et l'Aviation*—was issued, a revised and augmented edition being published during the following year, 1911. Both of these works are regarded as standard text books upon the subject with which they deal by designers and students of aeronautics all over the world, to whom they have proved of incalculable benefit. The results of his researches have probably been quoted more frequently by lecturers and writers on aviation than those of any other experimenter, and have rendered signal service to almost every aeronautical engineer.

It was suggested by one speaker at a meeting of the Aeronautical Society, during the session which has just closed, that the field of research in aeronautics was so vast that the establishment of laboratories in connection with the works of aeroplane manufacturers was highly desirable, and would in no way militate against or limit the activities of the National Physical Laboratory at Teddington. If any proof were needed in support of this statement it is adequately afforded by the most recent publication of M. Eiffel—*Nouvelles Recherches sur la Resistance de l'Air et l'Aviation*—a work that deals with the experiments he has conducted since 1911 in his new laboratory at Auteuil. This book is now in two volumes, one of which gives the text, and the other the tabulated numerical data and diagrams relating to his researches.

Coming so soon after the issue of the Technical Report of the Advisory Committee, one is tempted to make comparisons between them, but they do not lend themselves to this process because of the differences in the subjects touched upon, and the variations in the nature of the objects of the experiments recorded. The staff of the N.P.L., while developing research into the various factors affecting the aerodynamic properties of a limited number of aeroplane wings and propellers have, in the main, been concerned with new ground, new lines and methods of research, always the more difficult work, notably in regard to stability, to which one-third of the recent Blue Book is entirely given up. The R.A.F. also contributed a report on full scale work. M. Eiffel, on the other hand, has been mainly concerned with the aerodynamic properties of a large number of aerofoils, and the study of scale models of complete aeroplanes, seaplanes and airships. Hence the subject-matter of the experiments at the two laboratories are dissimilar, although research of a like character to some of Eiffel's, but on a less pretentious scale, has already been conducted at the N.P.L. Some of the work recorded by Eiffel concerns old and superseded machines, as is only to be expected, and it is because the publication of the results of research of a number of experimenters in volume form necessarily means delay, that we have so repeatedly advocated the more frequent issue of reports. As M. Eiffel observes, however, much of the results of his work has been already communicated to interested persons, so that progress has not stagnated through the lack of sufficient data.

After a description of the plant and the methods of testing at the laboratory at Auteuil, M. Eiffel gives a series of diagrams relating to the resultant of the forces acting upon an aeroplane under varying conditions during flight, as well as the inter-relation between the weight supported, speed, and power, with typical applications that should prove of value to the designer. He also examines the effect of altitude upon performance of an aeroplane and upon the power of the engine. The results of tests for determining the air resistance of spheres, convex and concave surfaces, cylindrical bodies which vary in the ratio of length to diameter and in the formation of the ends, struts and models of aeroplane bodies at speeds varying between 4 and 30 metres per second are then recorded, and he proceeds to deal with his experiments on wings, which are of an extremely interesting nature.

In this chapter over thirty wing sections are treated, many of which are similar to current types, although some are of curious design, and we note amongst them those of the Wight seaplane and the Bristol scout. As regards the former, while the curves of lift and drag, the ratio of lift to drag and the pressure distribution are given, the movement of the centre of pressure with varying angles of incidence are not recorded, although it can be deduced from the data supplied. In the results of a wing, however, of similar design, but inferior aerodynamically, it is shown that the centre of pressure varies from about 0·34 to 0·42 of the chord from the leading edge for all angles of incidence, which accounts largely for the excellent flying qualities of the machine to which it is fitted. The high efficiency of the Coanda wing section on the Bristol scout, concerning which M. Eiffel speaks in terms of high praise, is also indicated, the ratio of lift to drag at from 0° to about 4° angle of incidence being approximately 0·06.

The next chapter deals with the interference of various wing surfaces when placed in tandem or when staggered. As regards the latter, some confirmation of the N.P.L. results is given, since a general increase in efficiency is shown when the upper plane is placed in advance of the lower to the extent of 0·4 to 0·45 of the chord; although, as Eiffel states, for some flight angles there is little difference between the results obtained, and those for the commoner arrangement—non-staggered. It is interesting to note that the lift curve is very slightly improved for the upper surface by staggering the planes, while that for the lower surface is much diminished, but as, however, the drag is also reduced by a greater or a proportionate amount at ordinary flying angles, the ratio of lift to drag of the two wings is either increased or but little affected.

The experiments on model aeroplanes are then fully considered. A novel type of machine with tandem planes, and a cigar-shaped body with the propeller in the middle of its length, being amongst those treated in the text. The next chapter gives much data respecting the air resistance of floats and of bodies. Chapter VIII is devoted to the consideration of airships of various makes, including the Clement Lebaudy, Fleurus, and the Astra-Torres. The last two chapters deal with wind pressure on airship sheds and the propeller—the latter being exceptionally well treated, especially as regards the effect of the number of blades on power and efficiency.

The work—a truly monumental one, well up to the standard of its predecessors—concludes with seven appendices, two of which relate to the method employed by Drzeweicki in the design of propellers.

* * *

ROYAL FLYING CORPS.

The following promotion was announced by the Admiralty on the 16th inst.:—

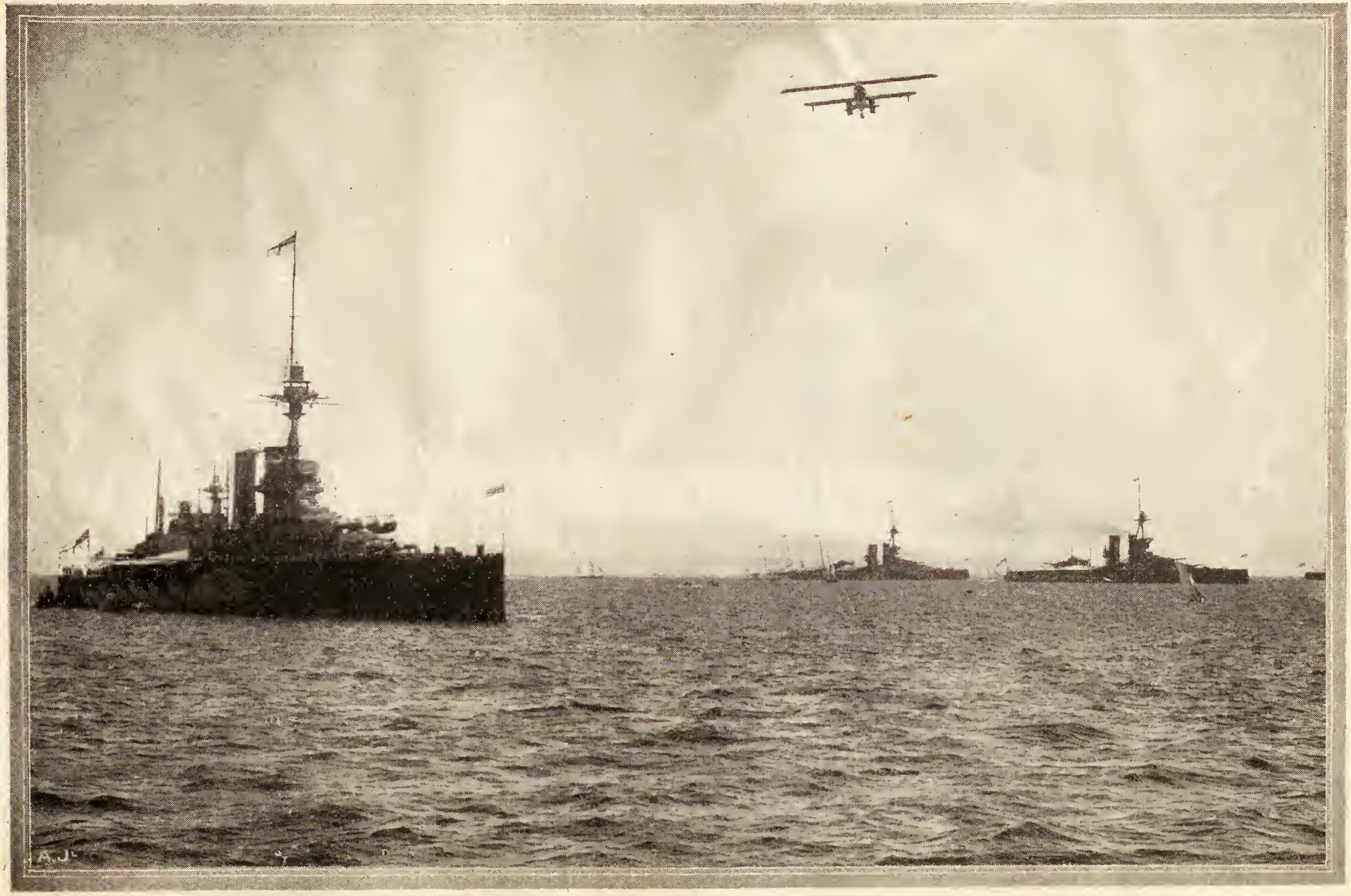
Commander F. R. Scarlett, granted acting rank of Captain, to date July 14th.

The following appeared in the *London Gazette* of the 17th inst.:—

R.F.C.—Military Wing.—The appointment of Lieut. Leslie Da C. Penn-Gaskell, 3rd Batt. Norfolk Regiment, as a Flying Officer, is ante-dated to Feb. 26th, 1914, but without pay or allowances prior to March 18th, 1914.

Military Aeroplane Competition in U.S.A.

A competition open only to American makers is to be held by the U.S. military authorities at San Diego, Cal., next autumn. There will be prizes of $12,000, $10,000 and $8,000 for the three machines which make the best performances, while orders will be given for at least twenty other machines. Competing aeroplanes will be required to carry a pilot and passenger, have a speed variation ranging from 40 to 70 m.p.h., and be capable of rising 4,000 ft. in 10 mins., while other points which will be taken into consideration will be handling of machine in restricted space, quickness of assembling and dismantling, ability to land on and start from rough ground. The total amount which will be available for this competition and the other aeronautical requirements of the U.S. Army is $250,000.



THE GREAT NAVAL REVIEW AT SPITHEAD.—Seaplane No. 77 flying over the super-Dreadnoughts "Iron Duke" and "Marlborough" (on right) and "Centurion" (on left).

THE CENTRAL FLYING SCHOOL AT UPAVON.

In FLIGHT for June 26th and the 3rd instant we published particulars of the organisation and the work carried out at the first Concentration Camp at Netheravon, by the Military Wing of the Royal Flying Corps. Now we are able, by permission of the Commandant (Capt. G. M. Paine, C.B., M.V.O., R.N.), to whom we are especially indebted for the facilities that were afforded us during our visit to the Central Flying School, to give our readers an account of the excellent scheme of training which our Naval and Military pilots and the air mechanics undergo, before joining the various air stations and squadrons.

CENTRAL FLYING SCHOOL, UPAVON.—N.C.Os. and men's quarters.

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Staff.—The School, which is under the control of the War Office, has a permanent staff of 14 officers, 3 warrant officers, and a number of flight serjeants, serjeants, corporals, 1st class air mechanics, 2nd class air mechanics and boys, all of whom with the exception of the last-mentioned, who enlist from the Gordon Boys' Home, are drawn from the Army and the Navy in, approximately, the proportions of two from the former to one from the latter branch of the service. We believe that this is the only military organisation in this country wherein representatives of all grades of the Naval and Military form a joint staff. The officers forming the staff of the Commandant are: The Assistant-Commandant (Major H. M. Trenchard, C.B., D.S.O.), Secretary (Assistant Paymaster J. H. Lidderdale, R.N.), the Medical Officer, Quartermaster, Meteorologist, five Instructors in flying, an Instructor in the Theory and Construction of Aeroplanes and an officer in charge of Transport; but several officers, other than those especially borne as Instructors in Flying, who also have other responsible duties in connection with the maintenance of their machines—the control of workshops, and the giving of lectures, for example—are engaged for a part of their time in this particular class of work.

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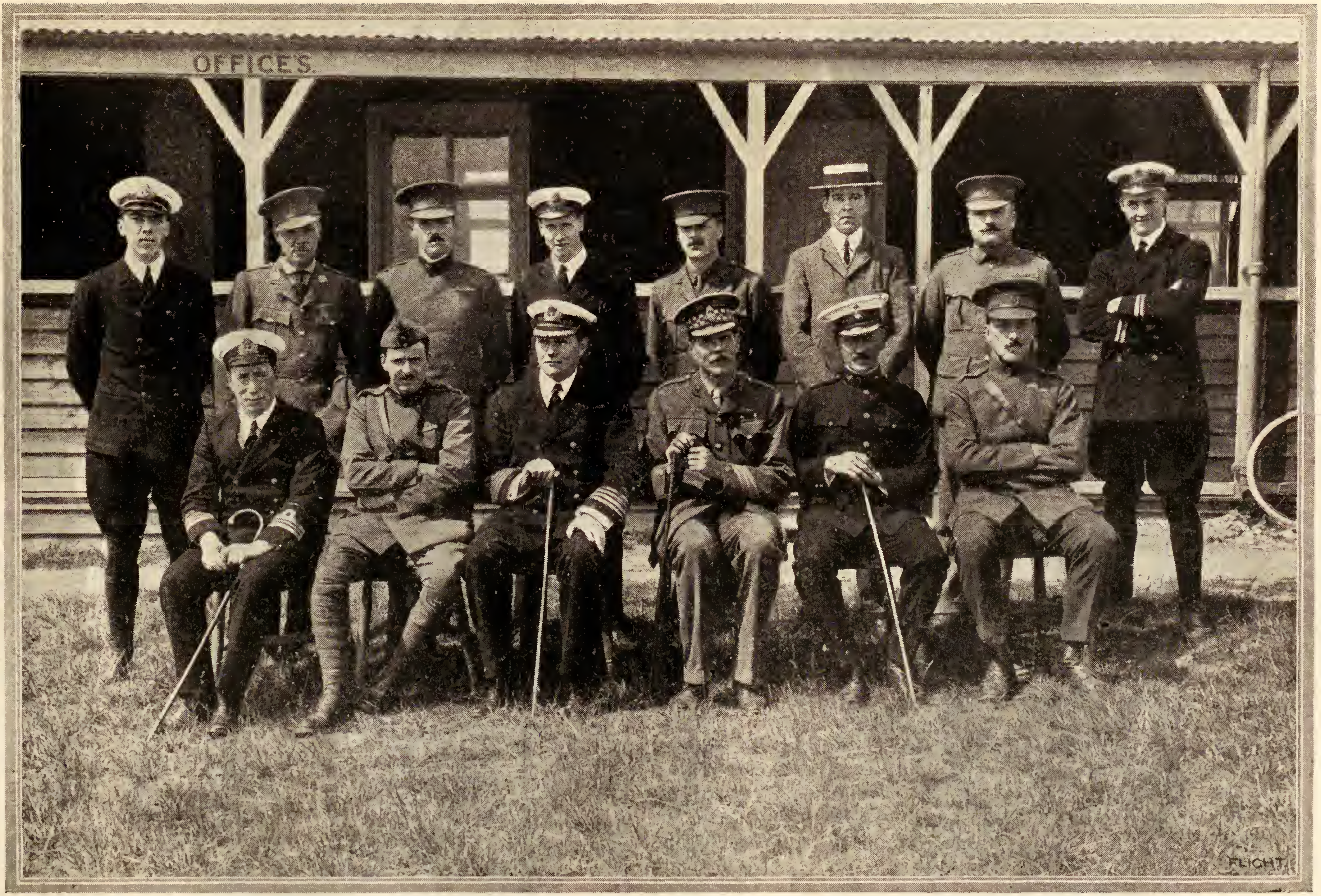
CENTRAL FLYING SCHOOL, UPAVON.—On the left officers' mess, and on the right permanent quarters of the staff.

Officers and Men under Training.—At the present moment there are some 40 officers drawn from the Army, the Navy, the Colonial Forces and Civilians, undergoing instruction, most of whom had already obtained their pilot's certificate before entering the School. But, in general, their experience in flying, which (by the way) constitutes only a fraction of the work forming the course, is more or less limited to one or two types of machine, and hence they require a much more extended experience apart from cross-country flights, before they can be regarded as expert pilots; whilst in addition there are a number of air mechanics who are taught to fly during the time they are at the School, and a still greater number who undergo mechanical training alone. It is really important, if a true conception of the magnitude of the work carried out during instruction at Upavon is to be gained, to appreciate the fact that the tuition in flying received by an officer prior to commencing the course is regarded as merely preparing him for instruction in the more serious duties of the career which he is about to enter upon.

For instructional purposes, officers and men are attached to the



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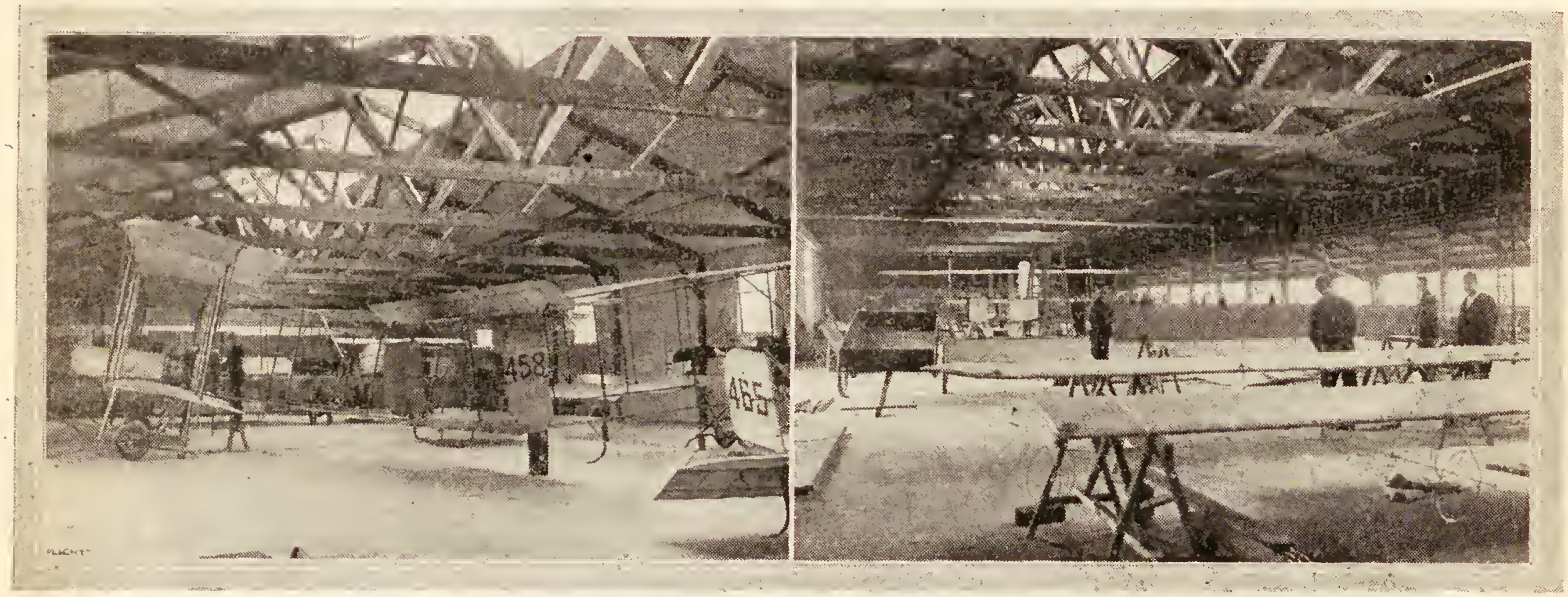
THE STAFF OF THE CENTRAL FLYING SCHOOL, UPAVON.—From left to right: (Standing) Sub-Lieut. Pierce, R.N.; Lieut. Conran; Capt. A. G. Board, Asst.-Paymaster J. H. Lidderdale, R.N.; Capt. E. G. R. Lithgow, R.A.M.C.; Mr. G. Dobson, M.A.; Lieut. Kirby, V.C.; Eng.-Lieut. C. D. Breeze, R.N.; (Sitting) Lieut.-Commdr. Shepherd, R.N.; Capt. A. C. H. MacLean; Capt. G. M. Paine, C.B., M.V.O., R.N. (Commandant); Major H. M. Trenchard, C.B., D.S.O. (Asst.-Commdt.); Major E. L. Gerrard; Capt. T. I. Webb-Bowen.

flights, of which there are four—A, B, C and D. D Flight has Henry and Maurice Farmans, and one Blériot; B and C Flights have Maurice Farmans and B.Es., while A Flight is composed of B.Es. and Avros, the number of machines totalling 42. Some of each type of these machines are fitted with dual control levers. Flying usually takes place during the early morning and in the evening; in the summer, from 4 a.m. to 6.30 a.m. and from 4.45 p.m. to 8.15 p.m., and the assembling of all the machines outside the sheds prior to the commencement of flying presents an extremely interesting spectacle, as may be seen on referring to some of the accompanying photographs; but, not infrequently, flights are made a little earlier in the morning, while when a pilot becomes more expert, he is required to make cross-country flights at some time during the day. Lectures on various subjects are delivered from 12 noon to 1 p.m., and the remainder of the day is spent either in the workshops (during the period of mechanical training), in the flights or in resting. The keenness of the officers may be appreciated from the fact that many are prepared to sacrifice a portion of their leisure in order to acquire a fuller practical knowledge of engine construction outside that which comes within the normal working course of instruction.



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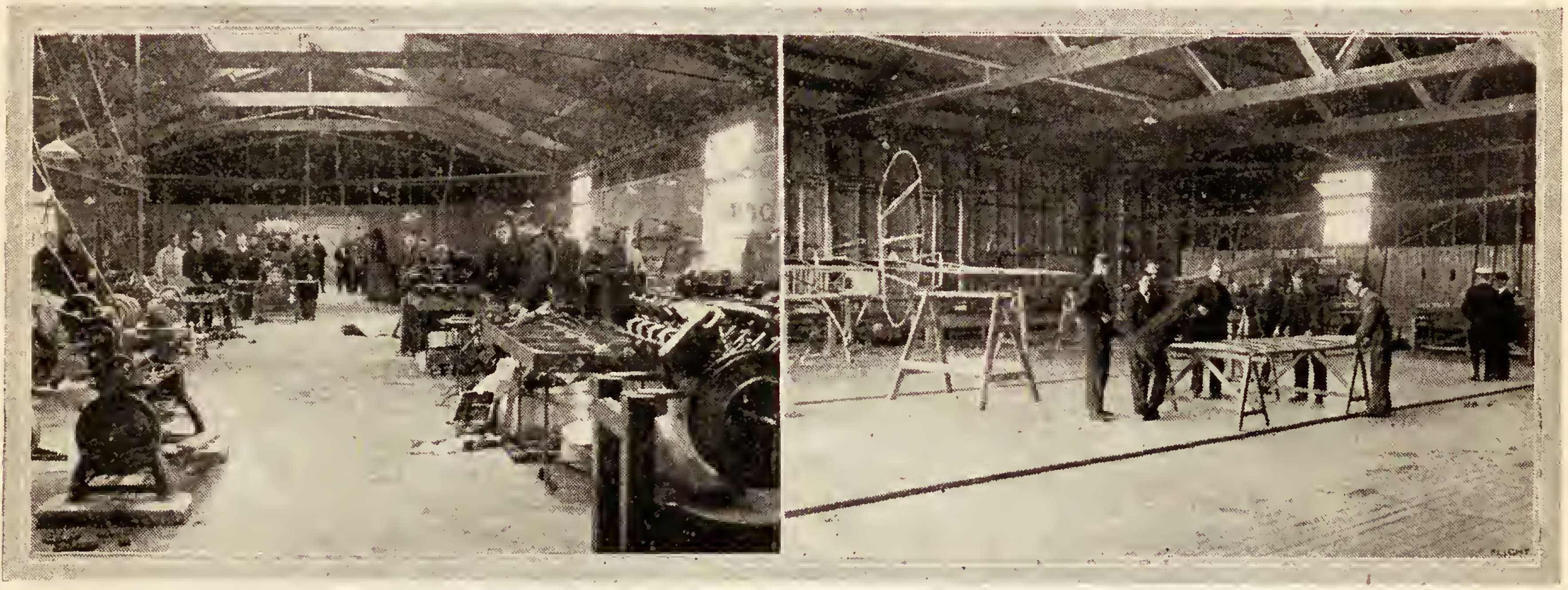
CENTRAL FLYING SCHOOL, UPAVON.—The left-hand photograph shows the interior of one of the aeroplane sheds of B Flight. On the right is a view of the interior of the aeroplane repair shop.



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CENTRAL FLYING SCHOOL, UPAVON.—On the left, the engine repair shop with the engine instruction room in the distance. On the right, the construction shop, wherein are skeleton B.Es. and a Farman machine for the instruction of officers.

Buildings.—The buildings at Upavon are at present of wood roofed with corrugated iron; but many are now having their sides covered with galvanised iron, and permanent quarters for the Staff are in course of erection, some having been already completed. All the aeroplane sheds and the workshops are fitted with hot-water heating systems for the purpose of maintaining an equable temperature all the year round, the boiler for supplying each building being located at the rear. The aeroplane sheds for the four flights form two sides of a rectangle, those for D Flight and the offices being along one side, with the officers' and men's quarters and the shops behind. In front of each group of sheds is a strip of asphalte, which enables the propellers to be swung, in starting up the engine, with safety in wet weather; and beyond these stretch two exceptionally fine aerodromes, which, however, appear none too large when flying is in progress and as many as thirty machines are in the air at one time; while still further on are the "gallops," in the vicinity of which preliminary instruction in flying is given.

We have already mentioned that the shops are located immediately behind the D Flight. The first shed forms the repair shop, where overhauls, repairs and renewals which are within the capacity of the School, but beyond those of the flights, are attended to. In other cases, where extensive damage has been done or a complete overhaul has become necessary, the machines are either returned to the makers or sent to the R.A.F. for attention. Here machines are dismantled, and after the necessary repairs have been effected, or the damaged part renewed, are re-erected and sent out for test. The interior of this shop, which is in charge of Capt.

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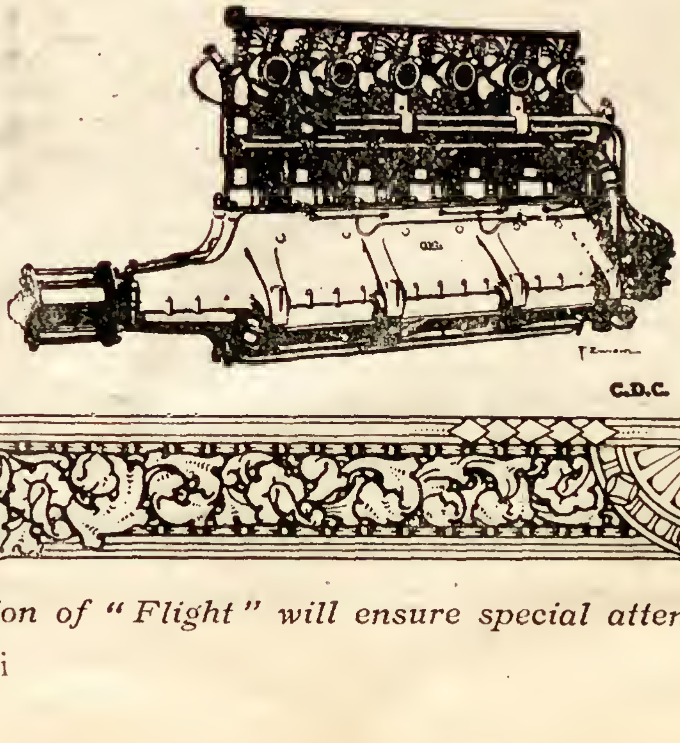

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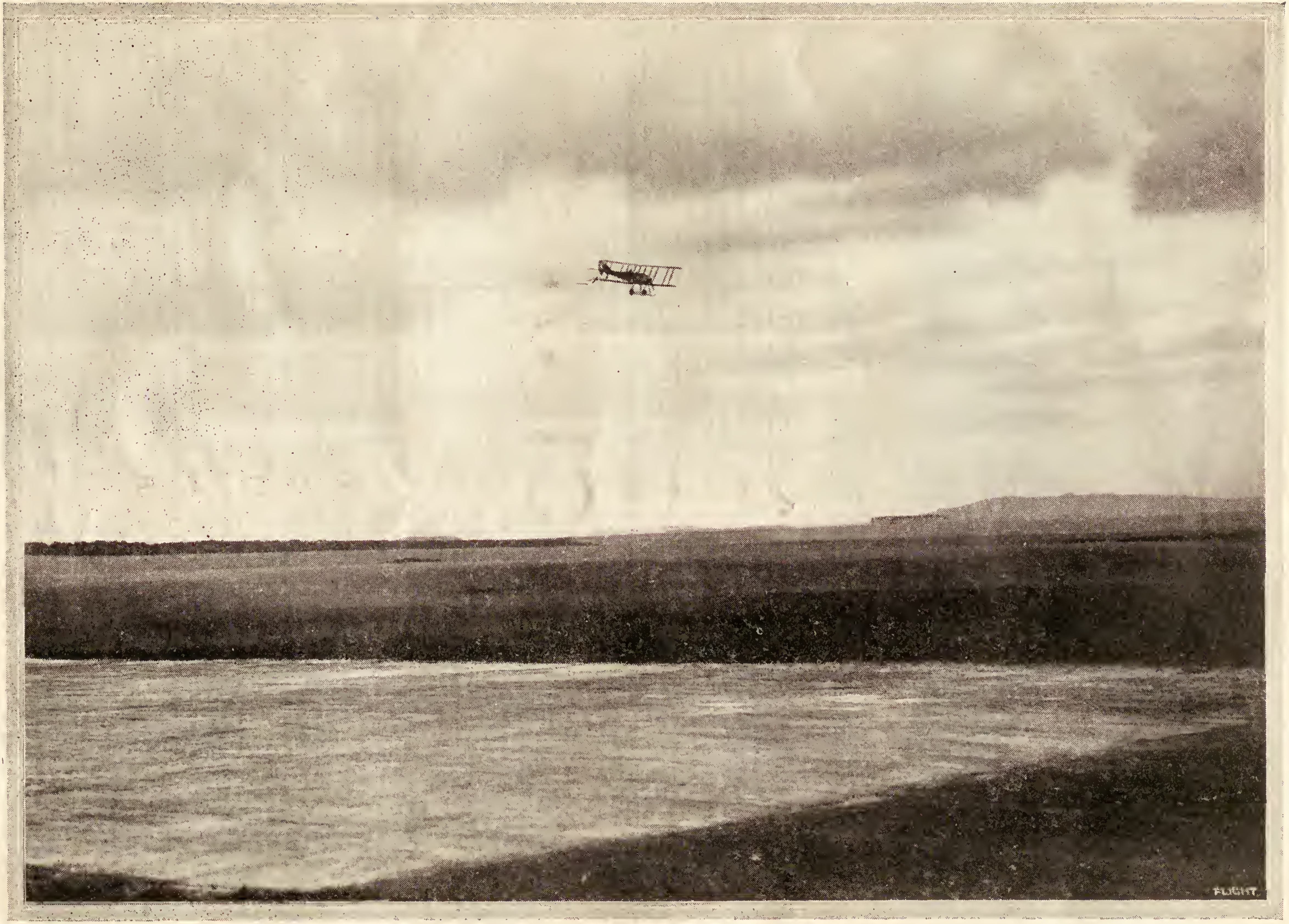

CENTRAL FLYING SCHOOL, UPAVON.—A B.E. 8 in flight during evening practice.

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CENTRAL FLYING SCHOOL, UPAVON.—A view of the machines of A, B, and C Flights on the asphalte in front of the sheds during preparation for the evening practice. The machines missing from the centre of the line are the four Avros, which were undergoing overhaul at the time of our visit.

Webb-Bowen and a master mechanic, who have a staff of three sergeants and sixteen men, is shown in one of the accompanying photographs.

Passing on, we come to the engine shop, which is divided into two portions. In the first and smaller part are various sectioned examples of actual engines, as well as the engines complete. These latter are used for instructing officers and men in engine construction, dismantlement and assembling, as well as for demonstrating the method of timing the ignition and the valves, &c. The second part is the engine repair shop proper, where the engines used in the flight machines are periodically overhauled and the necessary adjustments made by the staff mechanics. This shop contains a good equipment of electrically driven machine tools, as well as an acetylene welding plant and an apparatus required for white-metalling engine bearings.

The next shed is the fabric shop where aeroplane wings, rudder, elevators, &c., are re-covered and doped. Across the road, at the far end of D Flight aeroplane sheds is the rigging or "construction" shop, in which are three full-size skeleton aeroplanes. Two of these were assembled and the third was being prepared for erection by the officers forming the class. This work is an important part of the curriculum, as in addition to familiarising those under training with the constructional details of the machines, it also renders them thoroughly conversant with the manner in which aeroplanes are assembled, trued up and repaired. The instructor (Engineer-Lieut. Breeze) alters the adjustment of the bracing as he considers desirable, or breaks a certain part of a wing, &c., and the alterations necessary or the repair required are effected by the members of the class under instruction. In some cases the machines (which it is hardly necessary to say are used solely for this purpose) are dismantled, re-built and trued up several times by a single class.

(*To be concluded.*)

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ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending July 17th, 1914:—

No. 2 Squadron. Montrose.—No. 2 started on their return journey to Montrose on the 13th July; reached Lincoln that evening, and left Scarborough the following day. They have since been detained at Scarborough by heavy rain. Machines, transport and *personnel* are moving together, as on the journey down.

Nos. 3 and 4 Squadrons. Netheravon.—These two Squadrons have been engaged daily in carrying out the course of instruction for 10 Officers drawn from regular units and in observation of artillery fire. The course is progressing satisfactorily.

No. 4 Squadron has also done some night flying, and a convoy run by night by the whole Squadron Mechanical Transport.

No. 5 Squadron. Fort Grange.—No. 5 Squadron is busy getting settled in at their new Station, Fort Grange. Machines are being flown over from Netheravon and Farnborough as temporary tent sheds are erected for housing them. It is expected that work on the permanent sheds will be commenced shortly.

No. 6 Squadron. Farnborough.—Pilots were out daily engaged on observation work in connection with the training of the 1st and 2nd Divisions. This Squadron should be completed in *personnel* in another two weeks' time by drafts from the Recruits Depôt.

Nos. 1 and 7 Squadrons. Farnborough.—The organisation of these two new Squadrons is progressing. No. 1 Squadron will receive one complete flight in *personnel* (less officers) from No. 2 Squadron as soon as the latter arrive at Montrose. No. 2 Squadron has been training a flight with this object in view.

Aircraft Park. Farnborough.—Repair work on Aircraft and Mechanical Transport and technical training of recruits was carried out daily.

Headquarter Flight. Farnborough.—Experiments of various kinds were continued, in connection with which a considerable amount of flying took place.

Recruits Depôt. Farnborough.—There are now over 100 recruits "on the Square," divided up into 5 squads. The initial training of recruits is of a wide scope, and includes, in addition to courses of instruction in technical duties connected with the maintenance of aircraft and mechanical transport, drill, physical training, musketry, athletics, boxing, lectures and practical instruction in first aid, sanitation, field cooking and map reading, lectures on military discipline, and the organisation of the Army, particularly of the Royal Flying Corps (M.W.).

THE DISASTER AT GOSPORT.

IT is with the greatest regret that we have to record the accident which cost the life of Lieut. L. C. Hordern on Monday last. The deceased officer was attached to No. 5 Squadron of the Military Wing of the R.F.C., which has just been transferred to Fort Grange, Gosport, and he was flying a 80 h.p. H. Farman biplane, with Sergeant Campbell as passenger. The latter sustained a broken leg, but it is progressing as well as can be expected.

At the inquest on Wednesday, Lieut. H. M. Brock said that he watched the machine go away in a westerly direction two or three miles. On its approaching the fort again from the west he heard the engine stop and saw the biplane glide down from a height of 800 ft. in what developed into a very sensational spiral. He realised there was something wrong. The machine made three and a quarter complete left-handed circles before striking the ground. He came to the immediate conclusion that the rudder control had jammed, but later inspection of the machine on the ground revealed nothing to show that any of the controls had jammed. The machine was fitted with dual control which could be used by either the pilot or observer, but it was a recognised practice that the observer was never to touch the controls. He was of opinion that either the pilot or observer got one of his feet jammed in the rudder bars. Lieut. Brock added that he flew the machine on Friday, when there was some irregularity due to the rudder bar, but that had been put right. Similar evidence was given by Major Higgins and Capt. Grey, and the jury returned a verdict of "Accidental Death," adding an expression of opinion that better medical provision should be made at the Fort Grange flying centre.

FLYING AT HENDON.

The meeting on Thursday of last week opened with exhibition and passenger flights by R. J. Lillywhite and N. Howarth on the 50 h.p. G.-W. bi-rudder 'bus, A. E. Barrs on the Blériot, and Louis Noel on the G.-W.-Maurice Farman. Barrs had a passenger and flew high, and Noel had Capt. Upton (pupil) as passenger. W. L. Brock then made an altitude flight on his prize-winning 80 h.p. Morane-Saulnier, after which Barrs, Lillywhite and Noel made passenger flights, the latter on the Maurice Farman, and the others on the 80 h.p. Blériot. Pierre Verrier then came out on the 70 h.p. Aircraft-Maurice Farman, and made a cross-country flight with a lady passenger. He returned to the aerodrome at an altitude of about three or four thousand feet, from which height he descended with his engine stopped. R. H. Carr went up next on the 80 h.p. Blériot with a lady passenger from South Africa, who thoroughly enjoyed her flight, and afterwards made a tour of the hangars. Lillywhite then gave a fine exhibition on the bi-rudder 'bus performing "stunts" which, considering the type of machine he was flying, were quite remarkable. The work—school, exhibition, passenger and racing—this machine and the two other G.-W. 'buses have done seems to be something near a record, and it makes one wonder if they will ever be pensioned off. Fit as they are for still further work, we cannot help thinking that newer machines might well relieve them of some of the hard work to come. At about 4.30 p.m. J. L. Hall came out on his 50 h.p. Avro, and Lillywhite took up another passenger on the bi-rudder 'bus, after which Carr gave a looping demonstration on the G.-W. 50 h.p. tractor biplane "Lizzie," making two loops and a tail slide. The last flights of the evening were made by F. G. Dunn on the bi-rudder 'bus, Hall with a passenger on his Avro, Brock with a passenger on the Morane-Saulnier, and E. Baumann on the Wright biplane, after which school work started.

Saturday last was rather "bumpy" from the aviator's point of view, but fine and sunny for the spectators. The first half of the afternoon was devoted to exhibition and passenger flights, mostly the latter. The pilots and the number of passengers taken were as follows:—Louis Noel on the 80 h.p. Morane-Saulnier (3) and 70 h.p. Maurice Farman (1), A. E. Barrs on the 80 h.p. Blériot (3), R. H. Carr on an 80 h.p. Morane-Saulnier (3), P. Verrier on the 70 h.p. Aircraft-Maurice Farman (3), W. L. Brock on his 80 h.p. Morane-Saulnier (1), and R. J. Lillywhite on the 50 h.p. G.-W. bi-rudder 'bus (1). Solo flights were made by Brock on the Morane, Lillywhite on the bi-rudder 'bus, and René Desoutter on the 60 h.p. Caudron.

At 4.30 p.m. a start was made for the 16-mile cross-country handicap for the Hendon Cup and £20. As the wind was blowing from the south-west the machines were lined up in the middle of the aerodrome facing the enclosures, so that they could get off against the wind. There were eight starters as follows:—R. J. Lillywhite on the bi-rudder 'bus (9 mins. 17 secs.), Claude Grahame-White on the Maurice Farman (6 mins. 32 secs.), René Desoutter on the 60 h.p. Caudron (6 mins. 17 secs.), P. Verrier on the Aircraft-Maurice Farman (5 mins. 22 secs.), A. E. Barrs on the 80 h.p. Blériot with a passenger (2 mins. 47 secs.), Louis Noel on the 80 h.p. Morane-Saulnier (12 secs.), R. H. Carr (2 secs.) and W. L. Brock (scratch) on similar machines.

Throughout the race all interest was centred round the three Moranes, and their "get away" was extremely thrilling, as all three got off and rounded No. 1 pylon very close together. Carr got in front of Noel after completing two laps of the circuit, which was to Bittacy Hill and back four times, whilst Brock flew high with the intention of diving at the finish. He was unable to do this, however, as he was too close to the other machines. After having completed two laps, Barrs disappeared from view, and no one noticed where he had come down. Both Lillywhite and Verrier retired on the third lap. The first to cross the line was Carr, Noel following 29 secs. after, with Brock $\frac{1}{5}$th of a second behind. Grahame-White came next, 17$\frac{4}{5}$th secs. after Brock and 1 min. 33 secs. in front of Desoutter. As soon as the race was over Grahame-White and Lillywhite went up to look for Barrs. After circling about just outside the aerodrome, Grahame-White was seen to land, and shortly after both he and Lillywhite returned with the news that pilot and passenger were safe but that the machine was smashed. We were no sooner relieved of anxiety on this matter when another incident occurred which caused some alarm.

Desoutter had ascended with a passenger on the Caudron, and when over the railway his passenger, who was making his first flight, appeared to be taken with a desire to get out and walk. Desoutter was naturally somewhat alarmed, and wisely decided to descend at once, which he did, unfortunately in bad ground, with the result that the chassis gave way when an attempt was made to avoid some fencing. This caused a skid to dig into the ground, and so turn the machine over on its nose upside down. Neither pilot nor passenger were injured, and all the damage done to the machine was a broken skid, one or two struts and ribs. It was certainly an unpleasant experience for Desoutter, and we congratulate him on coming out of it as well as he did. After this little episode, Carr gave a looping display, making three loops and a tail slide on the 50 h.p. G.-W. tractor biplane "Lizzie." For the rest of the evening the various Hendon pilots made exhibition and passenger flights. Amongst the passengers taken up during the afternoon was one of the U.S.A. Navy officers visiting this country.

Sunday was fine and showery at intervals, and there was a good attendance of visitors. Louis Noel and R. J. Lillywhite were busy with passengers on the Maurice Farman and the bi-rudder 'bus respectively. R. H. Carr and W. L. Brock both made altitude flights on 80 h.p. Morane-Saulniers, the former reaching an altitude of 8,500 ft., and the latter 9,700 ft. Later in the evening Brock made another altitude flight, climbing to 4,000 ft. Carr also gave a looping display on the 50 h.p. G.-W. tractor biplane "Lizzie," on which he made three loops and a tail slide. Other flyers out were F. G. Dunn, R. T. Gates, and M. Osipenko on the bi-rudder 'bus, and E. Baumann on the Wright biplane.

Result of Cross-Country Handicap (16 Miles) for Hendon Cup and £20.

		Handicap.		Handicap Time.	
		m.	s.	m.	s.
1.	R. H. Carr (80 h.p. Morane-Saulnier mono.)	0	2	23	6
2.	Louis Noel (80 h.p. Morane-Saulnier mono.)	0	12	23	35
3.	W. L. Brock (80 h.p. Morane-Saulnier mono.)	scratch		23	35$\frac{1}{5}$
4.	C. Grahame-White (70 h.p. Maurice Farman biplane)	6	32	23	53
5.	René Desoutter (60 h.p. Caudron biplane)	6	17	25	26
	A. E. Barrs and passenger (80 h.p. Blériot monoplane)	2	47	—	
	P. Verrier (70 h.p. Maurice Farman biplane)	5	22	—	
	R. J. Lillywhite (50 h.p. G.-W. biplane) ...	9	17	—	

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A Picture for Sale.

It may be of interest to some of our readers to know that the painting, "A Caudron Amphibian being flown on the French Coast," by Mr. Roderic Hill, which has attracted a good deal of attention in the aviation section of the Anglo-American Exhibition, is for sale. The picture, which is painted in "Tempera" colours, measures 20 by 30 ins.

Mr. Landry, the first French Canadian to take his F.A.I. *brevet* at Buc.

SHOREHAM TO HENDON.

SOME IMPRESSIONS OF A NON-STOP FLIGHT.

By MISS M. LOUISE ELLIOTT.

Miss M. Louise Elliott.

VISITORS to Hendon are accustomed to seeing a little tractor biplane slip out from a group of sheds at the far end of the enclosures, lift and climb steadily in ever-widening circuits, until it becomes an infinitesimal speck which vanishes above the clouds. Suddenly a silver spark flashes out from a space of blue sky, like a new and brilliant evening star—the tractor screw, flashing in the sunlight as the machine turns and commences its descent. It comes back, circles the aerodrome again and again, floating slowly round and downwards with propeller stopped, and, after a perfect landing, finally comes to rest by its own shed.

Possibly the megaphone man has announced the name of the pilot and machine, but if he has not it is of no consequence. "Good wine needs no bush," and Mr. Laurence Hall's flying of the Avro announces itself.

I have done a good deal of passenger flying at Hendon, on different types of aeroplanes, and with some of the best pilots of the day. There is no need to make any odious comparisons, but it may safely be said that the steadiness, controllability, and general comfortableness, if one may put it in that informal way, of the little 50 h.p. Avro make it a delightful machine to fly in, and that anyone who has made even a single flight with Mr. Hall can have nothing but supreme confidence in his ability as a pilot.

Moreover, aerodrome flying is all very well, but the "out and home" variety is better, and a genuine cross-country flight over a fair distance is real aviation, or should be. So altogether, when I found myself, in company with several keenly interested friends, at the very successful inaugural week-end meeting at the Shoreham Aerodrome, and knew that I was to have the privilege of accompanying Mr. Hall on his return flight to Hendon, I felt pleased with myself and all the world.

Shoreham has many of the qualities of the ideal aerodrome—even service, open surroundings, boundaries guiltless of trees, and excellent atmospheric conditions. One of my most delightful recollections will always be a long flight I had with Mr. Hall on the Sunday afternoon. We went out round the country and over the sea, and the sea, beautiful as it always is, never looks so beautiful or so wonderful as from an aeroplane; and my friends told me afterwards that when the machine disappeared through and above the clouds for a time, the excitement among the crowd was intense.

We were to make the return flight on either Monday afternoon or Tuesday morning, according to circumstances, but on Monday the wind was so high that it would have been unwise to start, until too late to reach Hendon by daylight, so Mr. Hall, with sound north-country common sense, utilised the interval in having the machine thoroughly overhauled and tested. One reason for the successful record of the hard-worked little Avro is the fact that it is always kept in the most perfect flying condition, and in this respect it is an object-lesson to many bigger and more ambitious machines. As luck would have it, more things went wrong on that Monday evening than during the preceding six months, but they were all successfully negotiated, from a broken tail-skid to a missing petrol funnel.

Tuesday morning dawned bright and clear, and very soon after the appointed time we were off. We started with two or three typical wide circuits, the Avro climbing beautifully; but the wind was up early too, and just at first we were badly bumped about—upwards, downwards, first on one side and then the other. The bumps did not worry me in the least, for we steadied again instantly after each one of them, and they really only showed how perfectly the pilot had the machine in hand. I sat and watched the blue sea, veiled by a tender haze towards the horizon, and edged by a white thread of breakers against the stone-coloured beach; the red-and-white toy bungalows grew smaller every moment, and at something over 2,000 ft. the wind grew steady, and we turned and shot inland, still climbing at a terrific pace.

We were very soon well over 4,000 ft., and going across what, to me, was unknown country, with no resemblance to what one sees when travelling to or from Brighton in the ordinary way. Once or twice we saw in the distance a dark patch, which developed into the streets of a town, and fled away behind us. Here and there a dark line marked a railway, a white one a road; a patch of greenish-blue meant water. So we went on through the fresh clear air of the summer morning, high above the dusty, weary world, with everything except ourselves—and when I say "ourselves" I count the Avro as one—unsubstantial as the fabric of a vision. Filmy wreaths of cloud played hide-and-seek with us, or flung their shadows on the dim green fields lying infinitely far below, with the hedges seeming to run into one another as they raced past beneath us. On either side of me our wings stretched out, creamy-golden, the stay-wires flashed in the sunshine like silver; before, the engine sang rejoicingly, and behind, unseen but unfaltering, were the watchful eye and steady hand on which our fates depended.

It was with a positive crash of disappointment that I heard a voice behind me say "Brooklands!" and saw the great motor track, looking like a miniature model, far down beneath us, for, with our low-powered engine, we had expected to take perhaps an hour in getting to Brooklands, and had arranged, therefore, to land there on our way. And now we seemed to have only fairly started, we were going splendidly, and the idea of stopping was most distasteful. To my joy, we did not descend. We had

A silhouette against the clouds at Hendon of J. L. Hall on the Avro.

done the greater part of our journey, and had a good half of our resources still in hand. To have turned into the high wind for the sake of making an unnecessary landing would have been sheer waste of time and trouble, and so we left Brooklands behind us and raced ahead.

Just after this, the machine surprised me by wavering a little once or twice, for the first time since we left Shoreham—it had been as steady as a rock ever since. I put it down to the state of the air, which was quite different as we neared the Thames, but Mr. Hall explained afterwards that when we started he had the compass set for Brooklands, and after passing there had been busy resetting it for Hendon, with altered course and wind accordingly. Over the river and beyond it, the wind was very tricky, and there were patches of haze and cloud everywhere; London itself lay under a thick blanket of black smoke. Only a few minutes after crossing the Thames I recognised the Welsh Harp, and then, in no time at all, microscopically tiny and with colours dulled by the mist, the red-white-and-blue pylons of the London Aerodrome.

The song of the engine ceased, the propeller slackened, stopped; and slowly, gently, we floated round the whole extent of the aerodrome for perhaps a couple of circuits. I know of nothing so indescribably fascinating as this particular feat, and Mr. Hall executes it to perfection, but it cannot be done on every machine, nor should it be attempted by any but a thoroughly capable and resourceful aviator, as the sequel shows. Whether the spirits of the air at Hendon were annoyed at having been neglected, even for a week-end, I cannot say, but apparently they withdrew their support from us, for we suddenly and quite simply fell down. I had always wanted to know what this particular experience felt like, and now I do, but I had barely time to realise it properly at the moment. The voice behind me said "*Remou!*" the nose of the machine went down in a nearly vertical dive, the propeller spun round again, and in far less time than it takes to tell we were on our way in a normal attitude, and at full flying speed. It was a magnificent "save" at the end of an altogether fine piece of flying. I would not have missed it for the world, and my one regret was that there were not more people there to see it.

After that, anything else would have been an anti-climax, so we came down, landing so beautifully that it was impossible to tell when we touched the ground. We made our way to the telephone office, and I addressed the inevitable stack of picture postcards, while Mr. Hall rang up Shoreham to announce our safe arrival. I knew we had done well, but the real fun of the thing only struck me when he got through to his mechanics, who had just settled down to a well-deserved breakfast, and found it at first difficult to convince them that we had really reached Hendon. They did not give us credit for getting even so far as Brooklands, and thought we must have come down somewhere *en route!*

Well, it was not surprising, for we had done the whole journey, from one shed to the other, in forty-five minutes. It may not be a record, but for a little machine like the 50 h.p. Avro, handicapped by carrying a passenger, it was a first-class piece of work. At any rate, I know one person will never forget it—and that is the passenger,

M. Louise Elliott

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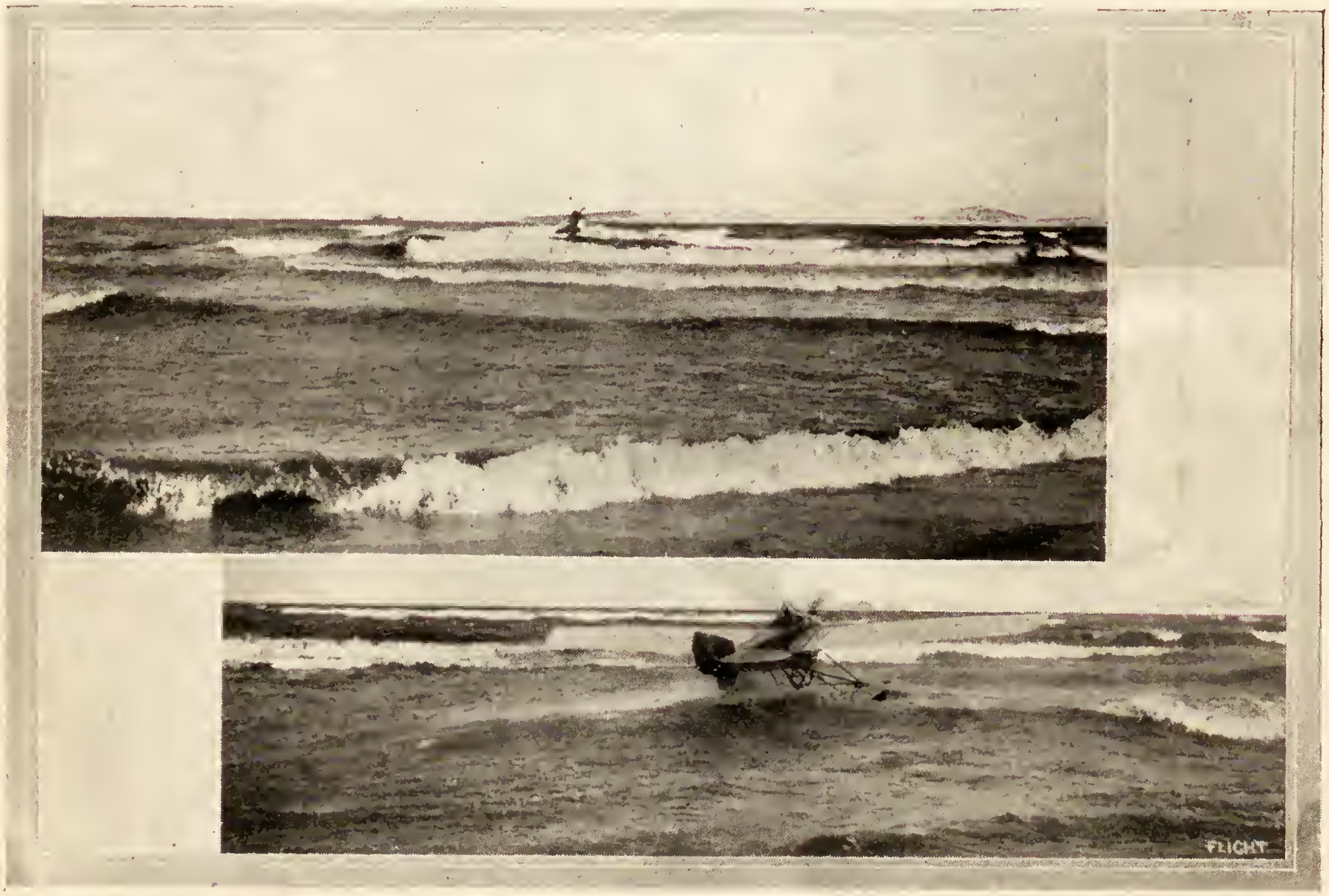

A REMINISCENCE OF THE MONACO AERIAL RALLY.—A couple of snaps during the competition of M. A. Mallard on his Nieuport waterplane at Marseilles.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—Monday last week, fine. The undermentioned left for Portsmouth :—Com. Samson, No. 50 B.E. ; Capt. Courtney, No. 153 Bristol tractor ; Lieut. Osmond, No. 49 B.E. ; Lieut. Davis, No. 150 Avro ; Lieut. Marix, No. 104 Sopwith ; Sub-Lieut. Clarke, No. 43 Bristol tractor ; Sub-Lieut. Young, No. 64 Short ; Sub-Lieut. Draper, No. 70 Maurice Farman. Lieut. Littleton, 103 Sopwith, landed near King's Ferry owing to leak in petrol tank, but returned to the aerodrome and left for Portsmouth on 41 Avro. Sub-Lieut. Newton Clare on 31 Henry Farman went to the assistance of Lieut. Littleton, but in landing on the rough ground buckled the planes and chassis, but was not hurt. Lieut. Spencer Grey also went to assist, with Dr. V. Wells as passenger, on 152 Short Sociable.

Tuesday, fine. No. 152 Short Sociable was the only machine up, making a number of flights.

Wednesday, wet morning and evening. No. 2 Short and 152 Short Sociable.

Thursday, fine. Nos. 45 Caudron, 3, 34 and 152 Shorts Sociable.

Friday, fine. No. 62 Short.

Saturday, No. 3 Short.

Civilian Flying.—On Monday, Mr. F. McClean made a fine flight on his Short hydro-biplane, 160 h.p., at Harty with passenger ; this was the first time the machine had been out since its return from Egypt.

On Saturday, Mr. Leo Jezzi made a couple of flights on his J.A.P. 35 h.p.

Brooklands Aerodrome.

MONDAY morning last week, the Bristol, Vickers, and Blériot pupils out, also Mr. Hawker, who flew to Farnborough on a Sopwith scout. In the afternoon, Mr. Gower to Sutton and back at 3,500 ft. on the 50 Blériot. Messrs. Jullerot and Stutt solo flights on Bristol biplanes. Mr. Barnwell on a Vickers biplane, Mr. MacGordon doing good circuits and landings on Sopwith biplane, Mr. Sippe out on Mr. Creagh's Bristol biplane. Blériot, Bristol, and Vickers pupils out.

On Tuesday morning, Vickers, Bristol, and Blériot pupils at work. *Brevet* tests in good style by Messrs. A. W. Clemson (altitude 2,200 ft.) and A. S. N. C. Warrand (altitude 1,200 ft.) on Vickers biplanes, and by Mr. T. F. Routledge on a Bristol biplane. Mr. MacGordon doing circuits and landings on Sopwith biplane' In the afternoon, Mr. Gower to 3,400 ft. on 50 Blériot, Messrs Jullerot and Stutt solo flights on Bristol biplanes, Mr. Sippe on Mr. Creagh's Bristol biplane, Mr. Serge de Bolotoff testing new propeller of his triplane.

Mr. L. J. Lankester Parker, who obtained his *brevet* at the Vickers Flying School, Brooklands, on June 18th.

Blériot pupils out Wednesday morning, Mr. Stutt on Bristol biplane, and Mr. Barnwell testing new Vickers biplane with R.E.P. engine ; in the afternoon, Mr. Barnwell further testing new Vickers biplane ; Bristol, Vickers and Blériot pupils out. *Brevet* test (A) by Mr. Adamson on Bristol biplane.

Vickers, Blériot and Bristol pupils out Thursday morning, Mr. Barnwell on new Vickers biplane, arrival of Sopwith "Round Britain" machine ; in the afternoon, Mr. Barnwell on Vickers gun 'bus with passengers, Mr. Raynham on Avro biplane, Mr. Gower on 50 Blériot, Messrs. Jullerot and Stutt solo flights on Bristol biplanes, Mr. Barnwell on new Vickers biplane (R E.P.), and for several flights on the Vickers gun 'bus, Bristol, Vickers, and Blériot school work, Mr. Serge de Bolotoff testing propeller of his triplane. *Brevet* tests in good style by Mr. Adamson on Bristol biplane (B. and C.), and Mr. MacGordon on Sopwith biplane, the latter landing on the mark and reaching 1,000 ft. in the altitude test. Mr. Hawker out on his looping machine. Mr. Mahl four circuits on the "Round Britain" Sopwith.

Mr. W. D. South, who has recently secured his *brevet* at the Blériot School, Brooklands.

Friday, Vickers, Blériot, and Bristol pupils out, Mr. Mahl testing "Round Britain" Sopwith, Mr. Barnwell with Mr. B. Huskisson as passenger on the Vickers gun 'bus to Dartford, Mr. Mahl with Mr. MacGordon as passenger to Farnborough on the "Round Britain" Sopwith, the machine doing a speed test of 85·8 m.p.h. ; in the afternoon Mr. Gower to 4,200 ft. on 50 Blériot, Mr. Barnwell with passenger back from Dartford, Mr. Stutt on Bristol, Mr. Knight on Vickers solo and then with pupil, Mr. Sippe on Mr. Creagh's Bristol, Mr. Mahl with Mr. MacGordon back from Farnborough.

On Saturday Blériot pupils at work, Mr. Knight on Vickers biplane, Mr. Alcock on 100 h.p. Sunbeam to Redhill and Reigate, Mr. Barnwell with Howard Flanders as passenger on the new Vickers gun 'bus for cross-country flight, Mr. Raynham on 80 h.p. Avro, Bristol school work. In the afternoon, Mr. Barnwell with passenger on new Vickers gun 'bus, Mr. Raynham to 7,000 ft. on 80 h.p. Avro, coming down in a fine spiral, Mr. Hawker testing new Sopwith scout.

Mr. Hawker gave two excellent looping demonstrations on Sunday, and Mr. Raynham was out on the 80 Avro, Mr. Barnwell on the new Vickers gun 'bus, Mr. Mahl on the 100 Sopwith (English *monosoupape* Gnome) *Daily Mail* machine, on which he took up a number of passengers, including the winner of the ballot for the free passenger flight, Mr. Edward Coulson, The Cottage, Amble, Northumberland. Mr. Dukinfield Jones solo and with passengers on the D.F.W. biplane.

Blériot School.—Rolling and straights on 25 and 28 h.p. : Messrs. R. P. Creagh, 23 mins. ; A. Crick, 30 mins. ; G. L. Pitt, 30 mins. ; W. H. Treloar, 92 mins. ; Comte FitzJames, 36 mins.

Circuits and eights on 35 and 45 h.p. : A. Crick, 46 mins. ; H. O'Hagan, 33 mins. ; Capt. de Villiers, 15 mins.

Mr. V. Wilberforce 15 mins. on 45 h.p. to 1,500 ft., finishing in spiral v.p.

E. L. Gower 2 hours on 50 h.p. Gnome. A new 35 h.p. Anzani-Blériot in use for school.

Bristol School.—Monday, last week, passenger tuition to Capt. Bernard (2 flights), Lieut. Sanders (2), Mr. Collins (3), Mr. Rutledge (2), Lieut. Lawrence (4), Mr. Hay (1), Mr. Lucas (1). Solos by Lieut. Coles (2), Mr. Rutledge (2), Lieut. Lawrence (1), Mr. Adamson (2), Mr. Hay (2).

Tuesday, passenger tuition to Lieut. Sanders (1), Mr. Collins (1), Mr. Rutledge (1), Lieut. Lawrence (2), Mr. Lucas (1). Solos by Lieut. Lawrence (6 straights). Mr. Rutledge completed tests for certificate.

Wednesday morning raining. Later passenger tuition to Lieut. Lawrence (1), Mr. Adamson (1). Mr. Hay solo and smash.

Thursday, passenger tuition to Lieut. Sanders (2), Capt. Bernard (1), Mr. Collins (1), solos by Lieut. Lawrence (2) and Mr. Adamson (1). Mr. Adamson obtained certificate in windy weather.

Friday, passenger tuition to Lieut Moule (1), Mr. Collins (2). Solo by Lieut. Coles.

Saturday, passenger tuition to Mr. Collins (9), Capt. Napier (4), Capt. Bernard (5), Lieut. Moule (1), Mr. Collins first solos (four straights).

Vickers School.—Monday, last week, with instructor: Lieuts. Wells and Clemson, and Capt. Lumsden. Lieuts. Wells, Warrand and Clemson solos.

Tuesday, with instructor: Lieuts. Clemson and Wells. Lieuts. Warrand and Clemson for *brevets* in excellent style.

Wednesday, with instructor: Capt. Lumsden, Lieuts. Wells and Gillman. Lieut. Wells solo.

Thursday, with instructor: Lieut. Gillman and Capt. Lumsden. Lieuts. Gillman and Wells solos.

Friday, with instructor: Lieut. Gillman and Capt. Lumsden. Lieuts. Wells and Gillman solos.

Saturday, with instructor: Capt. Lumsden. Lieut. Wells solo.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Messrs. Liu, Toolis, Gruning, Courtney, Murphy, straights, with Instructors Howarth and Barrs. Messrs. Robinson and Shepherd, solo, circuits, figures of eight, &c.

Tuesday, Messrs. Liu, Stalker, Gruning, straights with Instructor Howarth.

Wednesday, Sir A. Sinclair solo straights.

Thursday, Messrs. Upton, Toolis, straights with Instructor Barrs. Mr. Robinson circuits, &c., afterwards going in for *brevet* tests and gaining certificate.

Friday, Messrs. Winter and Lowe solo circuits, &c., Sir A. Sinclair solo straights. Mr. Lowe passing first and second part of *brevet* tests.

Saturday, Messrs. Duncan and Strickland (new pupils) rolling with Instructor Howarth. Mr. Winter solo circuits, eights, &c., afterwards going in for *brevet* tests and gaining certificate.

Beatty School.—Monday last week, Messrs. Allen (14) and Roche Kelly (24) out with Baumann and Y. Leong (13) up with Watts.

Tuesday morning, Messrs. Roche Kelly (10), Bentley (13), and Lieut. Maguire (10) out with Baumann.

Tuesday evening, Capt. Bass (12), and Messrs. Bentley (8), and Khan (5) out with Baumann, Mr. Gruning taking extra practice. Mr. Leong (12) up with Watts.

Wednesday morning, Lieut. Maguire (10) and Mr. Roche Kelly (6) up with Baumann. Wednesday evening, Princess Ludwig of Lowenstein-Wertheim (15) and Messrs. Bentley (8) and Ruffy (6) up with Baumann and Mr. Roche Kelly (8) up with Watts.

Thursday morning, Mr. Ruffy out on monoplane. Mr. Bentley (11) up with Baumann and Mr. Leong (9) up with Watts.

Thursday evening, Messrs. Roche Kelly (10) Ruffy (10), Bentley (10) and Leong (12) and Lieut. Browning Paterson (13), up with Baumann, also Mr. H. Keating taking extra practice (10), up with Baumann. During evening school Mr. Watts took up one lady and one gentleman passenger.

Friday, Messrs. Roche Kelly (12), Leong (10) up with Baumann and in the evening Ruffy (5) up with Baumann.

Saturday, Lieut. Browning Paterson (9) and Mr. Leong (5) up with Watts and Lieut. Maguire (12), and Messrs. Ruffy (7) and Bentley (12) up with Baumann.

British Caudron School.—Monday last week, school out at 4.30 a.m. under the instruction of R. Desoutter. Messrs. Valazzi and Abbott doing straights. Mr. Cornier rolling and straights. R. Desoutter flight of 15 mins. on 35 h.p., reaching to a height of 500 ft. R. Desoutter two flights on 60 h.p., reaching to a height of 600 ft.

Tuesday, school at 4.30 a.m. under instruction of R. Desoutter. R. Desoutter test flight. Messrs. Abbott and Valazzi very good straight flights at 15 ft. up. Mr. Cornier on 35 h.p. R. Desoutter 10 mins. flight on 35 h.p., reaching to a height of 600 ft.

Tuesday evening, R. Desoutter on 60 h.p. for 20 mins. reaching to a height of 1,000 ft. Mr. Cornier passenger flight.

Wednesday, school at 5 a.m., Messrs. Abbott, Valazzi and Cornier doing straight flights. R. Desoutter test flight, afterwards passenger flights to pupils on 60 h.p.

Thursday, out at 5 a.m., under instruction of R. Desoutter and R. M. Murray. Test flight by R. Desoutter. Mrs. Buller 15 mins. flight, reaching to a height of 700 ft. Messrs. Abbott, Cornier and Murray doing straights. R. Desoutter flight.

Friday, school at 5 a.m., under instruction of R. Desoutter and R. M. Murray. R. Desoutter test flight. Mr. Murray doing straights. Messrs. Abbott and Cornier half circuits.

Saturday, school out at 5.30 a.m., Instructors as before. R. Desoutter test flight. Mrs. Buller 15 mins. flight, reaching to a height of 600 ft.

Hall School.—Instructors during last week, Messrs. Clappen and Virgilio. On Monday the following pupils were out morning and evening: Miss Clifford five straights, Messrs. Rose, Gibson and Haines two each on No. 2 Caudron.

Tuesday, Mr. Arcier did three circuits at 200 ft. on No. 1 Caudron. In the evening Mr. Gibson was out doing straights on No. 2.

Thursday, pupils out morning and evening, Miss Clifford, Messrs. Rose, Gibson, Charig, Haines and Scott, six straights each on No. 2. Messrs. Gering and Brookes four circuits each on No. 1.

Friday, Miss Clifford, Messrs. Rose, Charig, Haines and Scott two straights each on No. 2. Messrs. Gering and Brookes four and two circuits respectively on No. 1.

Shoreham Aerodrome.

Pashley School.—Instructors last week: C. L. and E. C. Pashley. Up with instructors, E. P. Roberts and H. Pashley. Circuits and eights, W. Mortimer. B. F. Hale (late pupil) made several flights on Tuesday, these being his bonus flights for passing his certificate without a breakage.

FLYING AT SHOREHAM.

A WIND of from 40 to 45 m.p.h. velocity somewhat marred the Second Summer Meeting of the Brighton-Shoreham Aerodrome last Saturday, in that the 12-mile speed contest for the Shoreham Cup (presented by Mr. G. S. Howell) and cash prize (presented by the directors of the aerodrome) had to be abandoned. G. M. Dyott, who is well known to our readers, was also unable to give the special flying exhibition flights on his 50 h.p. Dyott monoplane as had been arranged. However, the large attendance of visitors were not disappointed, as they saw a very fine display of flying by Eric Pashley on the new 50 h.p. Pashley biplane, when he put up a magnificent fight against the wind. Flying head to wind, at times the machine hardly moved at all, whilst when he turned and flew with the wind he went at a terrific speed. He repeated this performance several times, and on each occasion his landings were quite exciting and well made. Amongst the visitors may be mentioned Lord and Lady Brassey, the Mayor of Hove (Alderman Leeney, J.P.), and Lieut. Littleton of the Royal Naval Air Service. The latter had flown over on the Wednesday previous from Eastbourne on a 50 h.p. Avro whilst proceeding to Spithead, and was compelled to land at Shoreham on account of the strong wind. When starting to continue his journey the next day he damaged his machine, and so had to prolong his stay at Shoreham.

Sunday turned out to be a much better day, and a splendid show of flying was put up. There was an exceedingly gratifying attendance, which included several notabilities from Stageland—Brighton and Shoreham being, of course, two of their favourite haunts. Both Eric and Cecil Pashley made several exhibition and passenger flights on their biplanes, Eric Pashley putting up a good show on the new Pashley biplane. A friendly speed contest was flown between Cecil Pashley and W. H. Elliott, the former on the Pashley-Farman and the latter on a similar machine. The course was over a distance of six miles, and Elliott received a start of 17½ secs. Both pilots flew a very good race, Pashley winning by 17 secs. G. M. Dyott gave a demonstration of speed-flying on his monoplane, which formed an interesting contrast to the comparatively slower biplanes. The winner of a ballot for a free flight, Miss Sylvia Lee, was duly given her "joy ride." On both the Saturday and the Sunday the Brighton Railway Military Band gave an excellent programme of music. The "Blériot Day" meeting will be held to-morrow (Saturday), and the principal event will consist of a speed race for a trophy and cash prize presented by the Brighton and Hove hotel proprietors. M. Blériot is also giving prizes, consisting of a bust of himself, a model of the first aeroplane to cross the Channel, and a pair of Blériot lamps. Another event will be a bomb-dropping contest for a prize presented by Miss Kate Carney.

Special displays will also be given on the Sunday following by the Shoreham aviators, including G. M. Dyott.

EDDIES.

BEATTY is blossoming out as an engine designer. He has been engaged for some time past on a 90 h.p. 8-cylinder water-cooled vee engine, embodying several very interesting features. The cylinders are mounted upon a one-piece aluminium crankcase, suitable openings being provided for the placing of the crankshaft, which, by the way, is solid, in position. The inlet valves are of the automatic type. No carburettor is employed, but the fuel is injected into the inlet manifold of each set of four cylinders by two separate petrol pumps in a manner reminiscent of the old Wright system, and the engine control is effected in a peculiar fashion. The control lever operates over an arc of approximately 180 deg., divided into three parts of about 60 deg. each. A special Bosch magneto is fitted with a 60 deg. variation in timing, and when the control lever is at the extreme end of the quadrant, the engine is working at full power, with the ignition fully advanced. By retarding the spark through the full 60 deg., a wide variation in power output is obtained, but when this point is reached, the ignition of the charge in one set of cylinders is cut out, and during the next 60 deg. the exhaust valves in that set are raised and the petrol injection pump is put out of action, so that the remaining set of cylinders is operating alone on a retarded spark. Further movement of the control lever cuts out the ignition for this latter set, raises the exhaust valves and disengages the fuel pump, so that when the back end of the quadrant is reached, the engine is running quite freely.

The various parts are now under manufacture by specialists in the individual classes of work, and when completed they will be assembled at Hendon. The estimated weight per h.p., including radiator, is 4 lbs.

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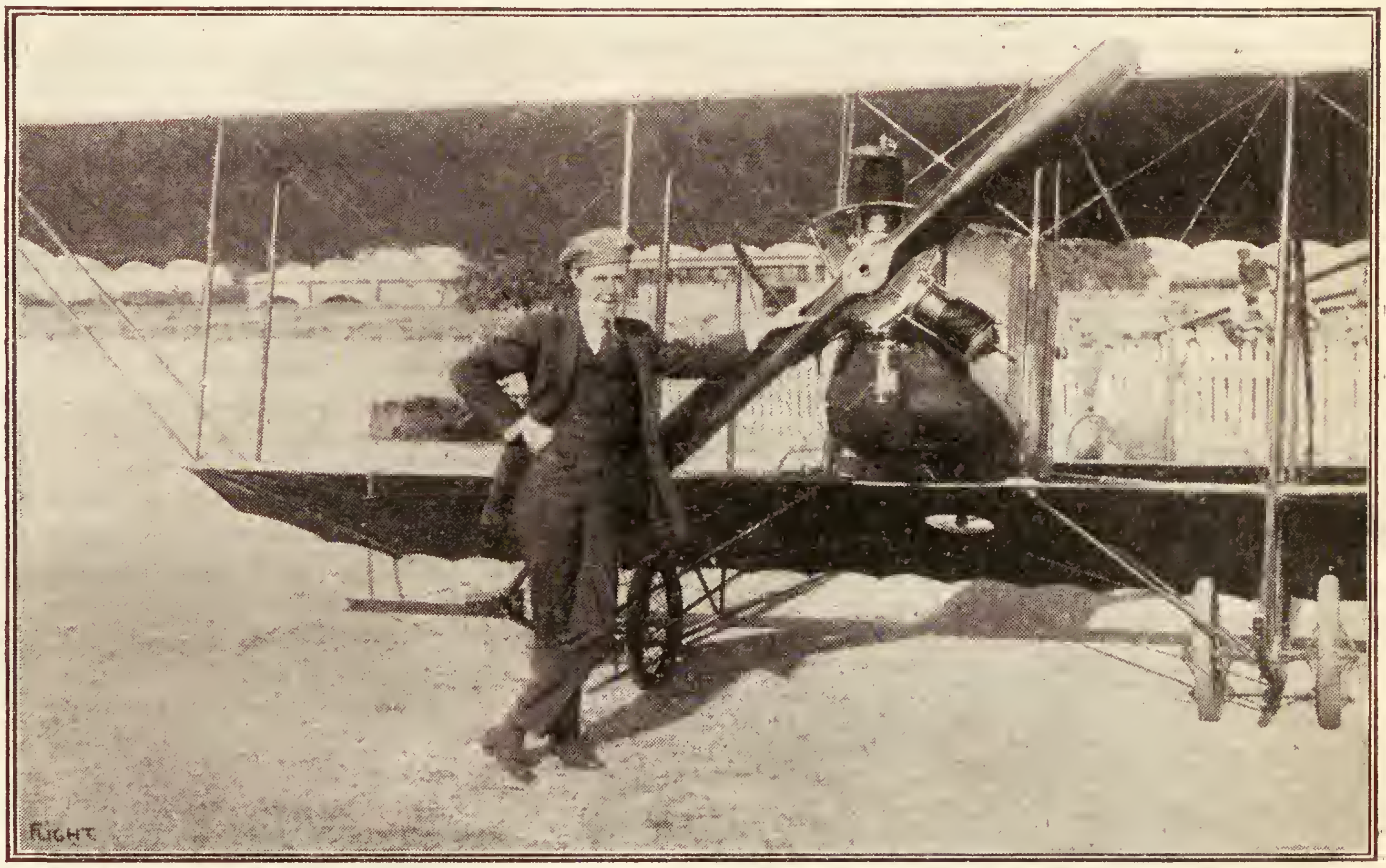

Mr. A. W. Jones and his Anzani-Caudron in South Australia.

Mr. J. J. Morgan, manager for Mr. A. W. Jones, who took a British-built Caudron biplane, 35 h.p. Anzani engine, out to Australia, where Mr. Jones has been flying it for about eighteen months, sends us the following interesting communication :—

"When being shipped from London the machine was badly smashed, and had to be practically rebuilt on arrival at Brisbane, Queensland. Since then Mr. Jones has given exhibitions at all the principal towns in Queensland, N.S.W. and South Australia. One of his best flights was made in South Australia on January 2nd of this year, when he flew over Adelaide at a height of 3,500 ft.,

MR. A. W. JONES FLYING HIS ANZANI-CAUDRON IN AUSTRALIA.—On the left at Cheltenham Race Course, Adelaide, South Australia; on the right at Perth Oval, Western Australia.

covering about 20 miles. He is practically the pioneer of aviation in Australia, as outside of Sydney and Melbourne there had not been any flying at all. We have found great difficulty in securing grounds especially in such out-back places as Charters Towers (North Queensland) and Broken Hill (N.S.W). The temperature at the latter was 115 degrees, rather trying for an air-cooled engine. The Caudron has covered in all about 3,000 miles in Australia, and has proved itself ideal for flying, its one great drawback for exhibition work being the cost of transport; in a country like this, where you have to travel thousands of miles, it costs a small fortune in freight. The little 35 h.p. Anzani has done exceptionally well, not having given the slightest trouble till we came to Perth a week or so ago, when we were unable to get the right lubricating oil. No doubt the weight of the pilot (9 stone) has something to do with its success. Perhaps these notes and photo. may be of use to you, and I may state that I have come across your paper in all sorts of out-back places in Australia. Mr. Jones is giving exhibitions in Perth and Kalgoorlie and other towns in this state."

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By flying from Brooklands to the Brighton-Shoreham aerodrome on Saturday week in order to compete in the speed event in the afternoon, Jack Alcock added a little bit more to the steadily growing tale of cross-country flying on his Maurice Farman biplane with 100 h.p. Sunbeam engine. It may not be generally realised that the mileage is now somewhere in the neighbourhood of 30,000 miles, an excellent record for pilot as well as both aeroplane and engine. The little jaunt from Brooklands to Brighton with a passenger was made in just over half an hour.

"Flight" Copyright.

Jack Alcock in the pilot's seat of his M. Farman biplane, 100 h.p. Sunbeam engine, at the Shoreham Aerodrome.

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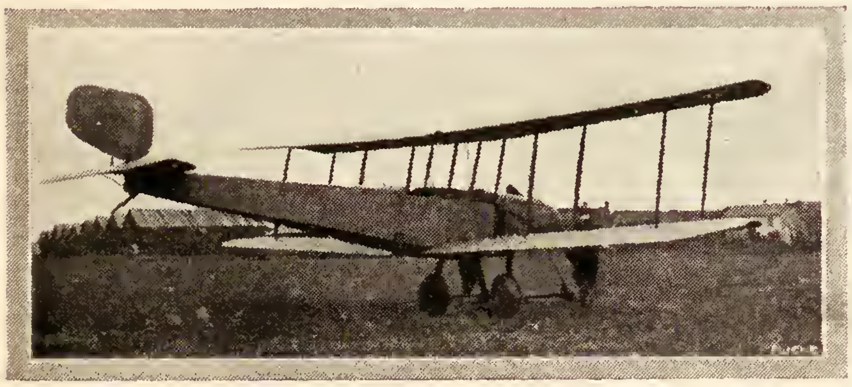
That the aeroplane constructors who have entered machines for the Circuit of Britain are very busy just now getting their machines ready for the great race is hardly surprising. The Beardmore biplane is rapidly nearing completion, 20 mechanics working on it night and day, in addition to the ordinary staff, and the trial flights are expected to take place at Southampton Water by the end of this month. I understand that Lieut. Collet, R.M.A., whose masterful handling of the D.F.W. biplane at Brooklands and elsewhere will be remembered by our readers, will pilot the Beardmore biplane. The biplane entered by the Grahame-White Aviation Co. is also practically finished, and will probably be taken down to Southampton Water in the course of a day or two to be tested over the sea.


The graceful 80 h.p. Clerget-engined "Bristol" biplane at Brooklands purchased by Mr. Richard P. Creagh.

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Mr. Howard L. Flanders, who, it will be remembered, has been on a recuperation trip to such corners of the British Empire as Australia, New Zealand, the Fiji Islands and South Africa, returned to this country on Tuesday of last week, and on the following Friday he was at Brooklands, where he indulged in a flight with Mr. Barnwell on the Vickers gun-carrying biplane. Mr. Flanders has returned in better health than he has enjoyed for years, and as he had strict orders from his doctors not to read any aeronautical papers whatever he was naturally eager to put himself in touch with the progress that has been made during his absence. It will be remembered that Mr. Flanders started on his trip just about a year ago, and had therefore never seen such machines as the Bristol and Sopwith scouts or the new 80 h.p. Avro, to mention just a few of the new types which have been evolved since he left these shores.

Mr. Howard L. Flanders pays his first visit to Brooklands after his return to England.

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Although under doctor's orders in no way to allow his mind to be obsessed with matters aeronautical, I am afraid that Mr. Flanders has hardly succeeded in keeping his thoughts so entirely away from this, to him, almost vital subject, and I have a grave suspicion that, injunctions or no injunctions, Mr. Flanders has employed at least part of his leisure in thinking out the design of a new machine. I hope to hear of him very shortly in association with one of our aeronautical firms.

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In the imposing shed specially built for it at Brooklands, is now being erected the huge Martinsyde monoplane which was constructed for the Trans-Atlantic flight, and which was to have been piloted by the late Gustav Hamel. Although no information is at present available as to the future of this machine, I gather that it is intended to try the monoplane at Brooklands as soon as she is finished, which is expected to be in about six weeks' time. The landing chassis will be of the simplest type, and will be rigid except for the large Palmer cord tyres which will be fitted. Whilst busily engaged on the construction of this special machine, the Martinsyde firm have not lost sight of the advisability of aeroplanes for more general purposes, for a tractor biplane of the small fast scouting type is now in the course of building at their Brooklands works. In its general lines the Martinsyde scout will follow more or less standard practice, but a considerable amount of originality is displayed in the details. Needless to say, throughout both the small scout and the large monoplane are well up to the high standard which has always been maintained by the Martinsyde firm.

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An amusing incident occurred at the Newbold Revel, near Rugby, where Mr. Manton was giving exhibitions of looping last week. Mr. Ivan B. Hart-Davies, who, it will be remembered, obtained his pilot's certificate at the Grahame-White school some time ago under the instruction of Mr. Manton, was in charge of a company of Boy Scouts, and had occasion to give certain imperative orders to some of the boys. This rather insensed one of the spectators, who called out "Instead of sittin darn theer making a noise, why dust-na-tha git up in the air and do what 'e is doing." Mr. Hart-Davies at once jumped up, walked towards the man and asked him to repeat his question. Much to the astonishment of the interrupter he then pulled out his pocket book and produced his pilot's certificate. It was then Mr. Davies' turn to smile, whilst the abashed spectator sought obscurity in the crowd.

THE (H)AIRMAN
A WILD SKETCH of MARCUS MANTON BY HIS MANAGER
Harold Pontefract
13 7. 14.

A leaf from Marcus Manton's autograph book.

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From Lord Carbery I learn that the reason for his coming down in the Channel during the London–Paris–London race was that before the start from Buc only one of the two tanks with which the machine had been fitted, in order to enable a non-stop flight between London and Paris to be made, had been filled, and that he therefore ran out of petrol when over the Channel. Fortunately, as our readers already know, he was picked up by a passing steamer. The machine was kept afloat for some little time by the empty petrol tank, and Lord Carbery did not even get a wetting. It was found impossible to get the machine on board intact, so the wings were sawn off, and only the engine and front portion of the *fuselage* were saved.

An explanation is also to hand from a correspondent as to why, in starting from Hendon for Paris, Lord Carbery got off in a shaky manner, as described in our report. It appears that, as he was getting into the machine prior to the start, Lord Carbery accidentally bent his throttle lever, which thus worked loosely. Having noticed this, he managed to bend it back to its original position whilst getting off, thereby reducing the danger of engine trouble later on, but sacrificing to a certain extent the gracefulness of his get-away.

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Mr. B. C. Hucks' method of obtaining a revenue from Scarborough visitors who last week watched his flights over the seafronts for nothing, was quite a novel one. An aviation button had been prepared, and these were sold at 6*d*., and the idea caught on so quickly that the person without a button hardly dared to show himself when Mr. Hucks was flying. To stimulate business one day, Mr. Hucks went round on his car with a box of buttons, and offered them for sale himself. Two ladies refused point blank to buy a button because they thought Mr. Hucks was an imposter. Fortunately Mr. Hucks had a postcard of himself which he produced. This was carefully compared with the original, and when the doubters were finally convinced they expressed their contrition by buying a dozen buttons each.

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During the week Mr. Hucks was asked to present the prizes at the annual sports of a Girls' School. Not only did he do this, but he participated in a tug-of-war composed of men against a team of girls—and Mr. Hucks' team lost. He says he is going to stick to flying in the future.

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Many of my readers will recall that Mr. Hucks was the first airman to fly over Scarborough. This was during his 'prentice days at Filey, when he taught himself to fly on a Blackburn monoplane. Thinking he would like to revisit the scene of his early efforts, he flew over from Scarborough one afternoon last week with a passenger in his 80 h.p. Blériot and had tea in the hangar on the sands, returning to Scarborough in time to give his evening demonstration of looping.

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At one of the towns where Mr. Hucks has recently been giving demonstrations, the winner of the height estimating competition got within two feet of the actual altitude reached. Mr. Hucks was rather interested to know how the young man came to guess so accurately, so after presenting the prize he asked him to give him the secret. "To tell you the truth," said the youth, "I did not guess at all. I put down my father's telephone number!"

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Mr. Hall's 50 h.p. Avro biplane, after having been thoroughly overhauled, has put up some very good performances lately. On July 14th, for instance, he made the trip from Shoreham to Hendon in 45 minutes, accompanied by a lady passenger, Miss Louise Elliott,

A nice cool job in the July sun at Brooklands. Painting the roof of the Blériot works.

from whose pen there appears this week an account of her impressions and a well-deserved tribute to Mr. Hall's skill. During his recent stay at Shoreham, Hall flew from Worthing to Shoreham, a distance of nearly five miles in 2½ minutes. True, this flight was accomplished with a following wind, but even so the performance was a very good one.

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I am glad to see that George Prensiel has now almost entirely recovered from the nasty accident he had some time back whilst testing his new type life-saving parachute apparatus—which, Irish like, nearly killed its inventor—from a motor car. It should be noted, however, that the accident was not due to any fault of the apparatus, which, as a matter of fact, worked better than anticipated—but before Mr. Prensiel was ready. During his enforced stay in hospital, Mr. Prensiel has thought out one or two little improvements which should add still further to its efficiency.

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The ill-luck which pursued Mr. Louis Noel during the recent London–Paris–London race did not by any means end when he had managed to land on the cliffs, after being obliged to return on account of a leaky tank, for he was then confronted by the problem of how to get his machine to the nearest railway station, which was about eight miles away. Leaving his Morane in care of a shepherd, Noel wended his way to a neighbouring golf course in the hope of finding somebody there willing to give him a hand. On arriving at the club he obtained permission to use the 'phone for the purpose of letting the Grahame-White Aviation Co. know his whereabouts. Later he related his experiences, and explained to some of the members the difficulties of transporting his machine to the station, secretly hoping that someone would offer to tow it behind a motor. But his desires were not understood, and no response was forthcoming. Evidently in that part of the country there is not much sympathy to be expected from golfers by a brother sportsman who has got stymied in his own particular line. Noel then had a little lunch at the Club, during which he made up his mind that the only way out of it must be a pushing job. So it came about that he set his teeth and trundled his mount, assisted by a couple of onlookers, over eight wearisome miles of country road in the glaring sun to the railway station. The tale of that tramp should make interesting reading, but it is to be feared that Noel's thoughts would scarcely bear publication. As to his words—well, French is a pretty language. "ÆOLUS."

THE ROUND-THE-WORLD RACE.

IN our issue of February 7th this year, we published, it will be remembered, a sketch map showing the proposed route for the Round-the-World flight organised by the Panama Pacific International Exposition of San Francisco. From Mr. Arnold Kruckman, Chief of the Bureau of Aeronautics at the Exposition, who is at present in this country making arrangements for the patrolling and for stationing supplies along the route, we have received some details as to the arrangements which have been made.

The event will be an open international race, and is to be known as the Panama Pacific International Exposition Round-the-World Aerial Race. The Exposition authorities will pay as capital prizes $150,000 to the first three competitors to complete the course round the world within 121 days, San Francisco time. The capital prizes will be distributed as follows: 1st prize, $100,000 to the competitor finishing first; 2nd prize, $30,000, to the competitor finishing second; 3rd prize, $20,000, to the competitor finishing third. It is intended to make an effort to obtain from cities and individuals an auxiliary prize fund of $150,000, to be awarded to competitors in addition to the $150,000 capital prize fund.

As all the auxiliary prizes have not been obtained yet, the regulations for the distribution of these have not been decided on, and Mr. Kruckman would appreciate any suggestions as to the best method of distributing these prizes among the competitors. It is intended to start the race from the Panama Pacific International Exposition Grounds, San Francisco, California, U.S.A., on May 15th, 1915, and the race must be completed before 12 o'clock noon, December 4th, 1915—San Francisco time. Subjects or citizens of either sex, and of any country or race, will be allowed to participate as either entrants or pilots, but each pilot must hold a pilot's certificate issued by some organisation or club affiliated to the International Aeronautic Federation.

Aeroplanes, dirigible balloons, or any other kind of motor-driven aircraft of any size or category may be used, and at any control the competitor may leave the aircraft previously used and resume his flight in another aircraft, which, however, must be of the same class as that in which he started; that is to say, if he starts in an aeroplane he must use an aeroplane throughout the race. Competitors may carry passengers, and are allowed to change same *en route*, and also to increase or reduce the number of passengers, but the pilot must be in control of the aircraft at all the starts from and alightings at the various controls.

In case the first competitor fails to finish within 121 days, but does finish on or before December 4th, 1915, the first prize shall be reduced by $1,000 per day for each day over 121 required to finish. The second prize shall be similarly reduced by $300 for each additional day, and the third prize by $200 for each additional day.

If no competitor succeeds in traversing in flight the entire course, but one or more of them do complete in flight all of the course overland, and have their aircraft transported across the Atlantic and Pacific Oceans, from the first prize there will be deducted $20, from the second prize $6 and from the third prize $4 for each nautical mile not traversed in flight.

Competitors are allowed to make repairs to their aircraft between any two controls, even to the extent of fitting new engines, but at least five parts of the aircraft proper will be stamped before leaving each control, and at least two marked parts must be in place on arrival at the next control.

Entries will be received any time between 12 o'clock noon, November 1st, 1914, and 12 o'clock noon, May 9th, 1915, and should be made in writing, and addressed to Chief Bureau of Aeronautics, Panama Pacific Exposition, San Francisco, California, U.S.A. An entrance fee of $500 must accompany each entry. The entrance fees of all entrants declared admissible will be turned over to the Pacific Aero Club, San Francisco, and used by that club in defraying necessary expenses in connection with the race.

Mr. A. Kruckman says that very elaborate preparations are being made in connection with the organisation of the race. Steps are being taken to secure the co-operation of the Governments of the various countries traversed, and several have already consented. Special arrangements have been made with American railways for the transport of competitors' machines to and from San Francisco at a reduced rate. Special maps are being prepared, and every effort has been made to help competitors to find their way across the American Continent. The sleepers will be whitewashed for a distance of a couple miles at junctions where two railways meet, in order to indicate to the pilot which track to follow. The control stations will be situated some 300 miles apart, but petrol, oil, and other supplies will be provided between the controls along certain routes which will be indicated later. Mr. Kruckman further states that huge supplies of petrol, oil and other spare parts are being despatched to Labrador, Greenland and Iceland, and that the open stretches of sea between these places will be patrolled by warships of different nationalities. The portion of the course traversing Russia and Siberia is to be patrolled by Russian militia, and depôts of supplies will be stationed at frequent intervals along the route. On the whole, it would appear that the race is being thoroughly well organised, and in view of the recent performances of duration flights, it should be possible by next year to have machines capable of traversing the distances necessary in this round-the-world race.

Some misunderstanding appears to have arisen between the organisers of the race and the Aero Club of America, which is the American body recognised by the F.A.I., due to the fact that the prize money has been deposited in a San Francisco bank, but that this bank has not sent a formal agreement to make the prize money payable to the persons declared by the Aero Club of America to be the winners of the race. It is hoped, however, that this matter will be settled to the satisfaction of all concerned, as it would be impossible to hold the race without the sanction of the American Aero Club, since all competitors would be automatically disqualified under the regulations of the International Federation.

OUR NAVY PLANES AT THE SPITHEAD REVIEW.

For the first time in the history of the British Navy a special place was reserved for seaplanes in the anchorage arrangements at Spithead for the Naval review or mobilisation which took place last week-end, and aircraft generally played a most important part in the operations. During the previous week several flights of machines assembled at Calshot, including one from the Isle of Grain, another from Dundee, a third from Felixtowe, and another from Yarmouth, in addition to the equipment at the Calshot station. As the accommodation at the station is limited, most of the visiting machines were housed in large Piggott marquees. There were also several land machines from the Naval Flying School, Eastchurch, temporarily encamped at Hilsea.

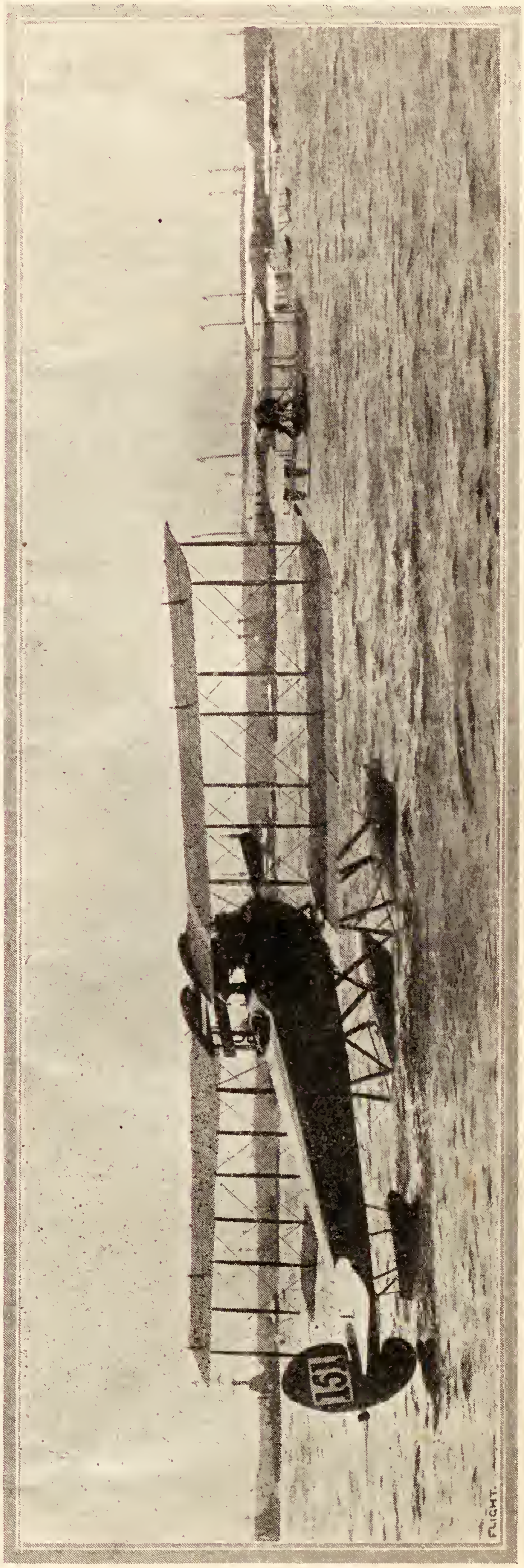
On Saturday morning, according to the programme, the seaplanes had to be flown over to the special moorings which had been laid down for them, off Fort Monckton, in the entrance of Portsmouth Harbour, in order to be in position for the review. The Isle of Grain flight, composed of 160 h.p. Gnome-Shorts, under Squadron-Commander Seddon, led the way at 5.30 a.m. It was followed by the Dundee flight of 100 h.p. Gnome-Short tractors, under Squadron-Commander Gordon, the M. Farmans—three with 100 h.p. 12-cylinder Renaults and one with 130 h.p. Salmson motors—from Felixstowe led by Squadron-Commander Risk and the 120 h.p. Gnome-H. Farmans from Yarmouth with Squadron-Commander Courtney in charge. The rear was brought up by the Calshot contingent, under Squadron-Commander Longmore, whose machine was, unfortunately, put *hors de combat* at the last moment. It included, however, a 160 h.p. Gnome-Short, a 100 h.p. Green-Sopwith and a Sopwith bat-boat on which Flight-Commander Travers had made a trip over the assembled fleet the previous night. After the machines had been moored the pilots and passengers went on board the gun-boat Niger, which was acting as mother ship. It was a disappointment that the King's visit had been postponed, and after an inspection by the First Lord of the Admiralty, who was accompanied by Lord Fisher and Admiral Sir Hedworth Meux, the seaplanes, about 1 p.m., commenced to return to Calshot.

About 5 o'clock His Majesty arrived at Portsmouth, and the Royal yacht was escorted out of the harbour by the Astra-Torres and Parseval airships, which had arrived not long before, the former from Kingsnorth and the latter from Farnborough, while three aeroplanes and several seaplanes carried out a number of evolutions.

Monday morning opened dismally, after a heavy downpour of rain, but the weather gradually cleared. The turn of the aircraft did not come until the great collection of warships had slowly filed past the Royal yacht, and put to sea. Then on a message by wireless from a M. Farman scout that the last warship had left Spithead, seventeen machines set out in single file to fly from Calshot down to the Royal yacht, on passing which each one dipped, then banked, showing its number, and returned to Calshot. One machine had to alight owing to engine trouble before reaching the Royal yacht, while another on the return trip had to come down owing to a broken petrol pipe; both were towed in by torpedo boats.

The machines which took part in the "fly past" were three of the big 160 h.p. Gnome-Short machines, which have wings capable of being folded back when at rest, four of the 100 h.p. Gnome-Short tractors, four of the 100 h.p. Gnome-Henry Farmans, three 100 h.p. Maurice Farmans, the Sopwith tractor, with its 100 h.p. Green engine, and the Sopwith batboat, which has a 90 h.p. Austro-Daimler motor.

After this there was a demonstration by three of the land machines from Eastchurch, an 80 h.p. Sopwith and a couple of B.Es. They came up in the form of a Λ, and then Commander Samson, on one of the B.Es., made some spiral flights which were closely watched by His Majesty. Commander Samson's machine was rejoined by the other two, and they flew off in company just as another trio, composed of an 80 h.p. Bristol, a 50 h.p. Avro and a 50 h.p. Short, came out and flew round and over the "Victoria and Albert" for some time.



THE GREAT NAVAL REVIEW AT PORTSMOUTH.—A view of some of the Navy seaplanes at their moorings with the battleships at Spithead, awaiting the King's inspection.

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Report of the Advisory Committee for 1913-14.

This report has been issued in the form of a White Paper. The Technical Reports have not been included, but they will be issued later in volume form. Considerable attention has evidently been directed to the problem of stability during the past year, especially as regards the application of an extension of the mathematical analysis given in last year's report to the determination of the disturbed motion of an aeroplane. Tests have also been made on aerofoils (one set of experiments were carried out on a wing of which the section could be varied during flight by the rotation of the rear portion), propellers, fabrics and floats, while an account is given of some of the full scale work conducted at the R.A.F.

MR. B. C. HUCKS AT SCARBOROUGH.

EVERY day last week except Thursday, Mr. Hucks gave splendid looping demonstrations over the seafront at Scarborough. On several occasions the fog was very bad, and once Mr. Hucks almost grazed the flagstaff of the Grand Hotel. On Tuesday nine army airmen under the command of Major Burke arrived at Scarborough on their way to Montrose, and were held up for a day or two with bad weather. They showed keen interest in Mr. Hucks' evolutions. On Saturday Mr. Hucks landed on the sands in the South Bay, where he was received by the Mayor, who made a congratulatory speech, and afterwards presented Mr. Hucks with a souvenir in the form of a cigar case.

On Wednesday last, when testing his new 60 h.p. Blériot "looper," Mr. Hucks made a chain of 15 successive loops.

The Scarborough Corporation have now commenced the erection of an aerodrome, so that it is evident Mr. Hucks' visit will have a lasting effect. Many thousands of aviation buttons were sold, and Mr. Hucks' flights attracted an enormous number of visitors, who displayed the keenest interest and enthusiasm.

LORD CARBERY IN IRELAND.

DURING the last fortnight Lord Carbery has been giving several exhibitions in Ireland on his 80 h.p. Morane-Saulnier. On Wednesday, the 15th inst., he was at Waterford in connection with the Agricultural Show there. The wind was rather troublesome, but he nevertheless put up several displays of looping, turnovers, tail slides, &c., with and without passengers. The next evening, Thursday, he repeated his demonstrations, after which the machine was taken by rail to Woodbrook, Bray, where he gave his next round of exhibitions on Saturday last. Ascending early in the afternoon from the Cricket Ground in a series of spirals to a height of 3,000 ft., passing the meanwhile over Bray Head, he executed several loops and tail slides. He then took up several passengers, and caused some alarm by descending in a field outside. His reason for doing this was on account of the Cricket Ground being rather unsuitable for fast landing, and, moreover, somewhat unpleasantly crowded. He next flew over to Powerscourt, where he was received by Lord and Lady Powerscourt, after which he returned to Woodbrook. In the evening he gave further looping demonstrations, taking with him on one occasion Lady Carbery, who is exceedingly keen on flying, having looped with her husband three times previously in France. Arrangements are being made for further exhibitions in various parts of Ireland.

MR. MANTON AT RUGBY.

IN the grounds of Newbold Revel Hall near Rugby, last Saturday, Mr. Marcus Manton demonstrated aerially for the Monks Kirby Farmers' Club Show, and attracted a record "gate," which included a large contingent from Rugby College. The flying ground was a nice flat patch, but surrounded by numerous trees, and Mr. Manton had to corkscrew his way out with climbing turns to left and right. In the afternoon the loop was duly looped, the bank banked and the steeple chased amid much enthusiasm. During the evening demonstration, whilst Mr. Manton was doing a double loop, the engine spluttered out when the machine was standing on its tail. At once it started to tail slide. The whole machine rattled and wobbled as though it were breaking up, but after falling a considerable distance, a side slip developed and then a nose dive, which was easily corrected.

On Tuesday, this week, Mr. Manton appeared at March in Cambridgeshire, in connection with the Annual Horse Show. The weather was ideal all the morning until the time fixed for the first flight, when the wind rose, and Mr. Manton found it called for fine judgment to get in and out of the long and narrow ground. Five flights were made, and during one he made three loops. During his first flight Mr. Manton noticed an ominous rattle from the neighbourhood of the propeller, and subsequent examination showed that the shield over the engine had cracked. Mr. Manton reports that although the surrounding country is very flat, he noticed there was hardly any ground suitable for landing, owing to the fact that it is all arable and bearing ground crops.

On Saturday he will be at Leagrave near Luton.

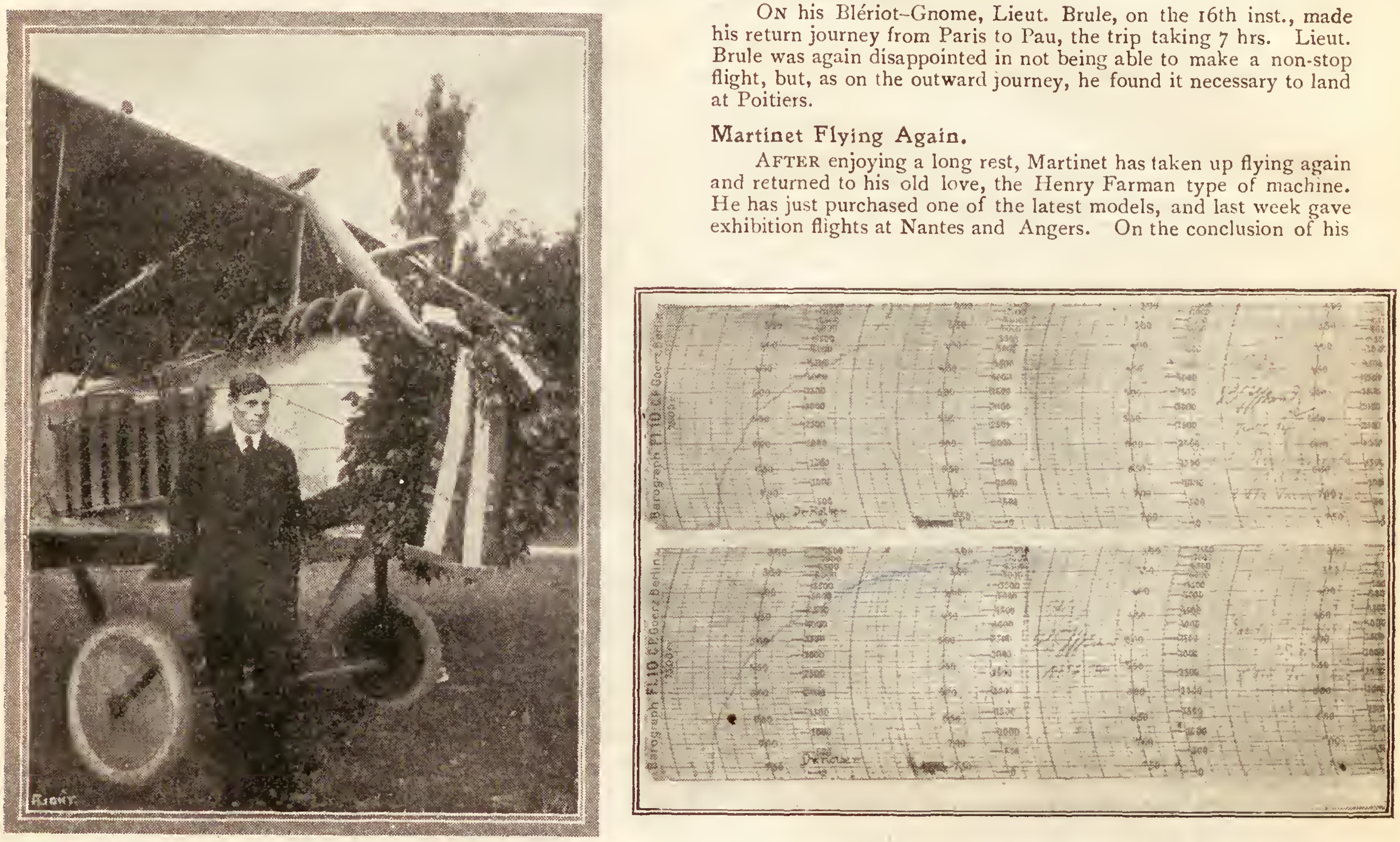
"Flight" Copyright.

The "Gamma" sailing over the trees on its way to Portsmouth.

FOREIGN AIRCRAFT NEWS.

More Records by Laporte.

ON his Voisin biplane, fitted with 130 h.p. Salmson-Canton-Unné motor, Laporte beat the records for speed, distance and duration for pilot and two passengers, at St. Petersburg on the 19th inst. He flew continuously for 9 hrs. 5 mins., and covered a total distance of 980 kiloms., his average speed working out to 108 kiloms. an hour.



THE NEW WORLD'S HEIGHT RECORD.—On the left, Oelrich standing by the record-breaking D.F.W. biplane, with its laurels, while on the right is a photograph of the barograph records duly attested.

A Japanese Record.

DURING an exhibition of looping, &c., in Japan on the 13th ult. Liger, on his Morane-Saulnier-Gnome went up to a height of 2,300 metres, beating the previous Japanese height record by 600 metres.

A Monument to Capt. Ferber.

UNDER the auspices of the Aero Club du Rhone a movement has been started with the object of erecting a monument to the memory of Capt. Ferber, the French pioneer, in the square on the Quai des Brotteaux, at Lyon.

Paris to Pau on a Blériot.

ON his Blériot-Gnome, Lieut. Brule, on the 16th inst., made his return journey from Paris to Pau, the trip taking 7 hrs. Lieut. Brule was again disappointed in not being able to make a non-stop flight, but, as on the outward journey, he found it necessary to land at Poitiers.

Martinet Flying Again.

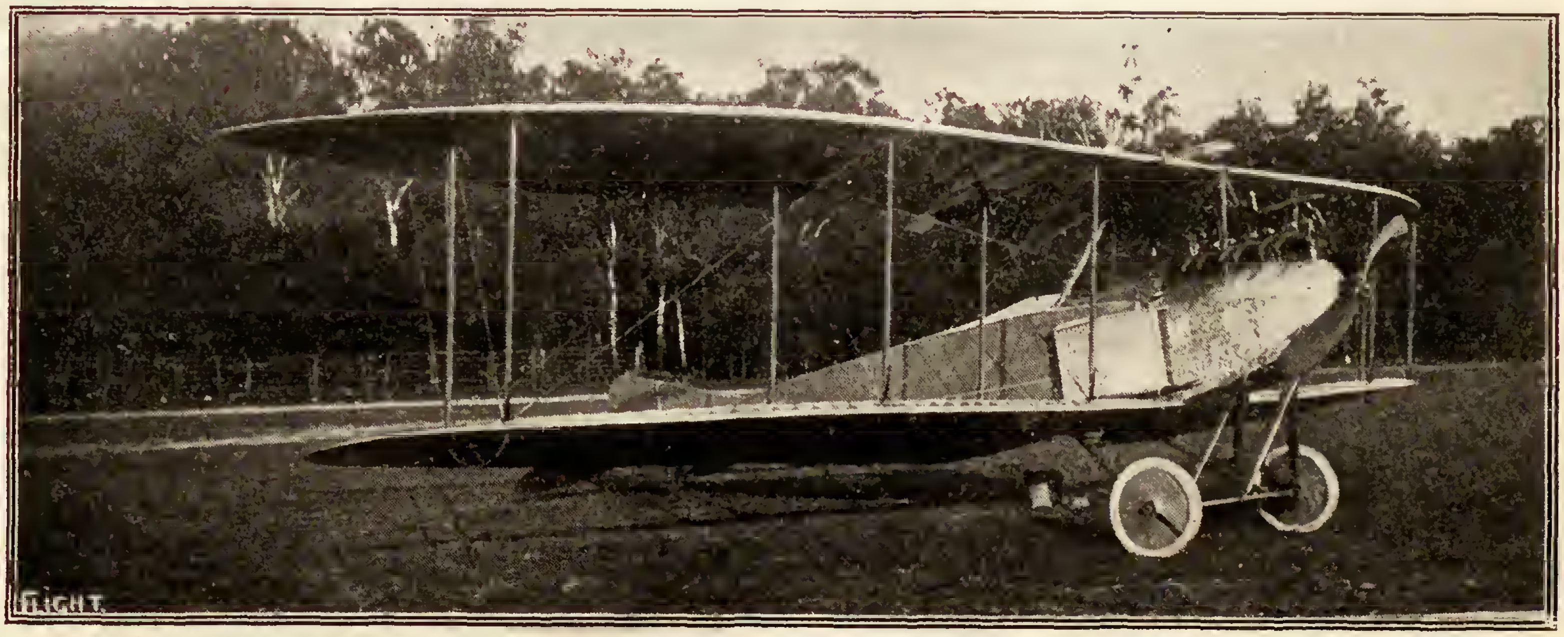
AFTER enjoying a long rest, Martinet has taken up flying again and returned to his old love, the Henry Farman type of machine. He has just purchased one of the latest models, and last week gave exhibition flights at Nantes and Angers. On the conclusion of his flying at Angers, Martinet flew with a passenger to Buc in two hours.

Nice to Marseilles in Two Hours.

LEAVING Nice at 6 a.m. on the Sunday morning, Maicon on his Caudron waterplane flew to Marseilles in a couple of hours; his average height during the flight was 2,000 metres.

Hirth and Garros Return to Paris.

ON Friday last, Hirth and Garros on their Morane-Saulnier monoplanes flew back to Paris in company. Starting from Hendon after lunch, they landed at Hardelot at 3.10 p.m., and after resting till 4.50 p.m., flew over to Villacoublay in an hour and forty minutes.



The D.F.W. biplane, fitted with 100 h.p. Mercedes engine, on which Oelrich last week beat the world's height record by going up to 7,860 metres.

Naval Aviation in France.

THE necessary credits having been voted, the French Naval authorities are now setting to work to properly organise a Naval Flying Service. It is proposed to proceed very much on the lines of the British Naval Air Service, with a Central Air Office in Paris and various flying stations round the coast. Of the latter the principal one will probably be Frejus, where the aeroplane mother ship "Foudre" is stationed.

An Armoured Farman Biplane.

SEVERAL tests with a new armoured Farman biplane were witnessed at Buc on Sunday last by a deputation of French military officers. Fitted with an 80 h.p. V-type motor, the machine climbed 500 metres in 5 mins., carrying pilot and passenger and four hours' supply of fuel, the useful load lifted being 275 kilogs. The machine got off and pulled up in a distance of 60 metres.

Fatal Collision in Germany.

TWO machines collided in mid-air at the Goerries aerodrome on the 15th inst. The pilot of one—Instructor Geignant—was killed on the spot, while the other pilot, Lieut. von der Luehr, died from his injuries two days later.

More German Fatal Accidents.

ON the 16th inst. a biplane piloted by a non-commissioned officer named Wilke, fell at Bohl, near Saarburg. The pilot died shortly afterwards without having regained consciousness.

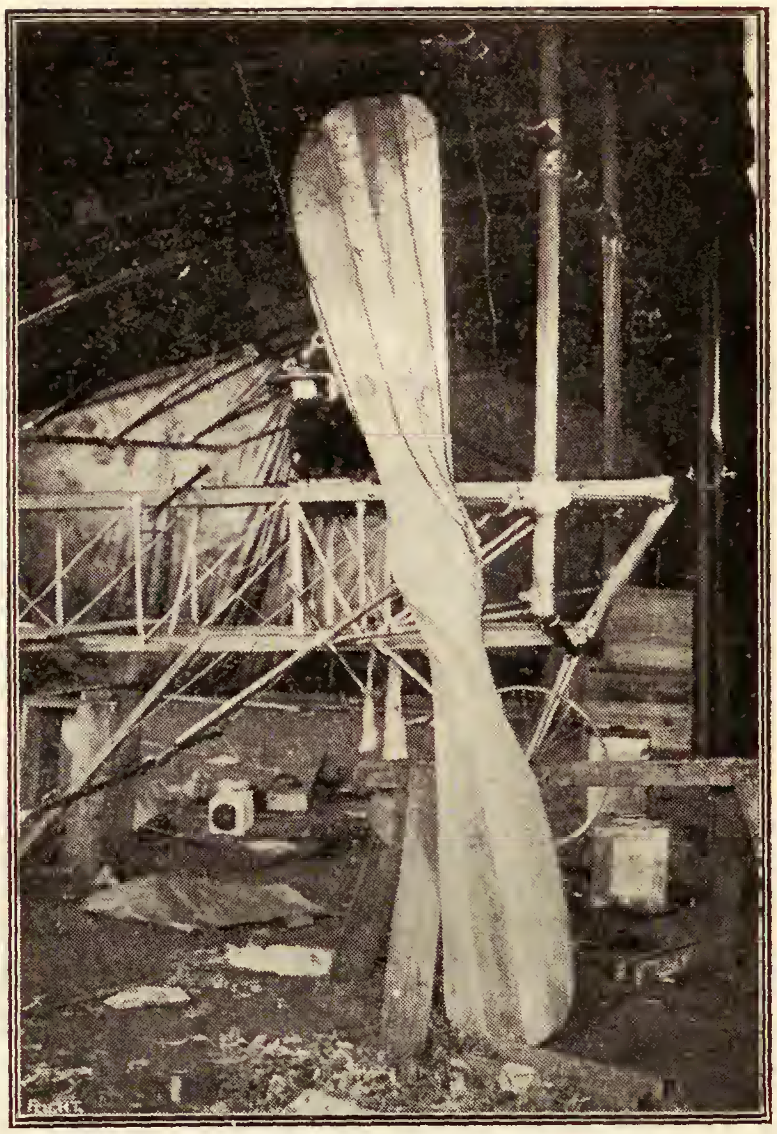
On the 19th inst. a German military biplane fell into the Rhine near Winslaken, and both pilot and passenger were drowned before help could reach them.

The Scandinavian Waterplane Circuit.

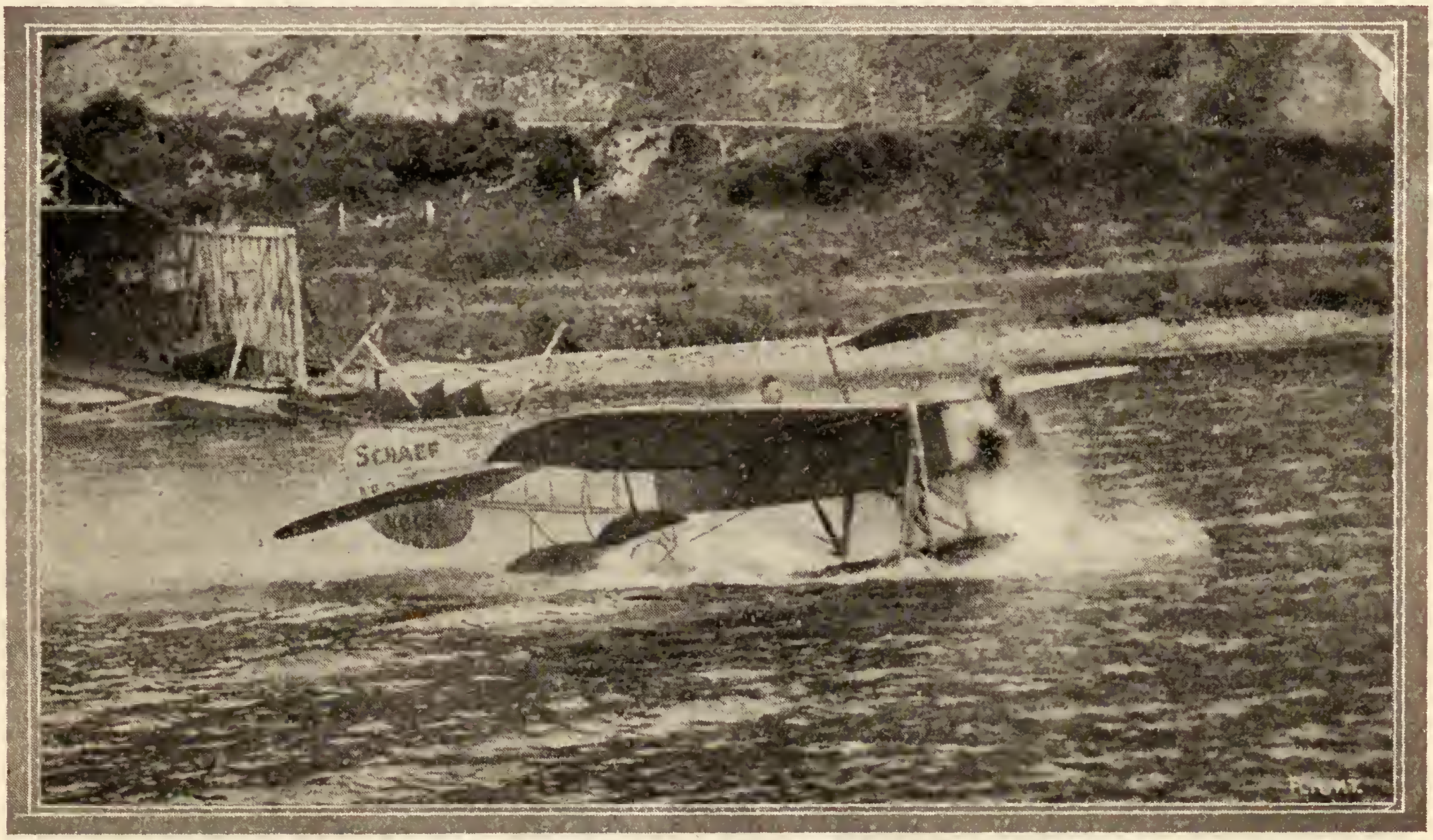
AT the closing of the entry list at single fees on the 15th inst., eighteen entries had been received for the waterplane competition which is to be held from August 21st to 30th over a course starting from Germany and finishing in Norway. The entries are made up of nine Germans, six French, two Swedish and one Italian. They are:—E. Stoeffler (Aviatik), Boutard (M. Beese), Vollmoeller (Brandenburg), Reiterer (Brandenburg), Thelen (Albatros), Böhm (Albatros), Schuler (Ago), Dahm (Gotha), De Waal (Fokker), Debrueres (Morane-Saulnier), Renaux (M. Farman), Fischer (H. Farman), Bill (H. Farman), Chevilliard (H. Farman), Laporte (Voisin), Thulin (Morane-Saulnier), Sunstedt (Flying Boat), Landini (Flying Boat).

Melbourne to Sydney by Aeroplane.

LAST Saturday Guillaux arrived at Sydney, New South Wales, having flown on his Blériot from Melbourne. He, however, took three days for the journey, as he stopped at six of the principal places



AVIATION IN NEW ZEALAND.—A. W. Schaef's workshop at Wellington, N.Z., where he built his monoplane, No. 1, in 1909, without any knowledge or experience other than that he obtained from the pages of FLIGHT. Our photograph shows the *fuselage* and landing chassis in its early stage, also the self-made propeller.



AVIATION IN NEW ZEALAND.—A. W. Schaef on his Anzani-engined Amphibian monoplane (No. 2), which he constructed entirely himself. The photograph shows preliminary tests at Lyall Bay, Wellington, N.Z., in March last year, when it flew about 20 ft. above water for a short stretch.

A photograph typical of the sort of country which has to be flown over in New Zealand, sent to us by Mr. A. W. Schaef, who is helping so much to push aviation in that country.

Another photograph typical of New Zealand country, sent to us by Mr. Schaef, incidentally showing the type of conveyance which in time the aeroplane will probably compete against.

en route and made exhibition flights. His actual flying time between the two cities was about 9 hours. Guillaux not only carried a message from the Governor of Victoria to the Governor of New South Wales, but he was also entrusted with a bag of mails. The weather was very unsettled, and Guillaux found flying over the mountains an arduous task.

Double Fatality in Russia.

WHILE flying in the neighbourhood of Odessa on the 16th inst. a machine piloted by Capt. Firsof fell from a great height, and both pilot and passenger were killed.

The Grand Prix Balloon Race.

MORE notable than usual was the start of the annual balloon race for the Grand Prix of the Ae.C.F., from the Tuileries Gardens, on Sunday, for a tablet commemorating the first ascent of a gas balloon from the Tuileries, on December 1st, 1783, was unveiled, while 5,000 carrier pigeons were released. Twenty-three balloons actually started, and owing to the calm weather they disappeared very slowly in a north-westerly direction. One balloon, piloted by M. Blanchet, with M. Duval as passenger, collided with the trees, and the car was torn from the gas-bag. Both the occupants were seriously injured.

The majority of the balloons crossed the Channel, and it is probable that M. Rumpelmayer on the "Sagittaire," who landed near Carnarvon 630 kiloms. from the starting point, will be declared the winner, with M. Demuyter, on "Belgica II," who landed at Abergele, second, and M. L. Gerard on the "Reine Elisabeth," who came down at Towyn, third. The next best performances in order were Herr Henoch ("Barmen"), Welshpool; Herr Apfel ("Leipzig"), Foel; M. J. Dubois ("Touraine"), Aberystwith; Mdlle. Marvingt ("Etoile-Filante"), Aberystwith.

The World's Distance Record for Balloons.

THE F.A.I. has been asked by the German Federation to accept as a world's record, the voyage of Berliner from Bitterfeld to Bissertsk, Perm, in Russia, made last February. The distance is given as 3,052·7 kiloms.

A Zeppelin under Fire.

THE Zeppelin "Z 4," which was concerned in the Luneville "incident" in April of last year, strayed over the Russian frontier on the 14th inst. For the past year or so the dirigible has been stationed at Konigsberg, and on the occasion in question she was making a cruise in the direction of Allenstein. The Russian frontier guards promptly opened fire on the "invader," but the Zeppelin was able to get back without being hit.

22-Hour Cruise over North Sea.

LEAVING Fuhlsbuttel aerodrome, near Hamburg, at 5 a.m. on Friday last, the German naval airship "L 3" cruised to Heligoland, where she arrived at 10.30. She was over Nordeney at 12.15, and then after passing Borkum and Heligoland disappeared westwards. She was next reported at Wilhelmshaven at 2 a.m. on Saturday morning, and eventually returned to her headquarters after being in the air for 22 hours. Throughout her voyage she was in communication with Fuhlsbuttel by wireless telegraphy.

Fatal Parachute Accident at Brussels.

ON Sunday and Monday last a series of exhibition flights, including looping, &c., were given at Brussels by Olieslaegers and Chemet. Mme. Cayat de Castella also made two parachute descents from M. Champel's biplane from a height of 1,000 metres on Sunday, but when she endeavoured to repeat the performance on Tuesday, the parachute failed to open, and she was killed.

* * * *

THE EVOLUTION OF THE HYDROPLANE.

THE uninitiated frequently confuse the hydroplane with the hydro-aeroplane, the former being a very fast type of motor boat designed to skim the surface of the water, and the latter being, of course, an aeroplane designed for the purpose of alighting on and rising from the water.

As it is necessary for any hydro-aeroplane to acquire its flying speed by driving over the water before it can ascend into the air, the ability to skim the surface of the water—thereby reducing the resistance to motion, and so increasing the speed—is a matter of very great importance.

It may be interesting, therefore, to refer quite briefly to the evolution of the hydroplane as a type of boat; for some, at least, of the floats that have been designed for use on hydro-aeroplanes have been intended to belong to this class of water-craft.

The inventor of the hydroplane was a clergyman, by name the Rev. C. M. Ramus, who in 1872 held the living of Playden, near Rye, in Sussex. In that year he wrote a letter to the Admiralty informing them of certain experiments he had made, which led him to suggest a radical departure from the orthodox design of ships.

The Director of Naval Construction accorded him an interview, and subsequently issued an official memorandum relating to the matter. The hydroplane was described as a ship "formed by two wedge-shaped bodies, one abaft the other."

The essential feature in Mr. Ramus's boat was the presence of what is commonly known as the "step." The bottom of the boat was flat, but constructed on two levels, that is to say the fore part of the bottom of the boat ended abruptly somewhere about the middle of the boat, where the aft part of the bottom of the boat suddenly commenced on a higher level.

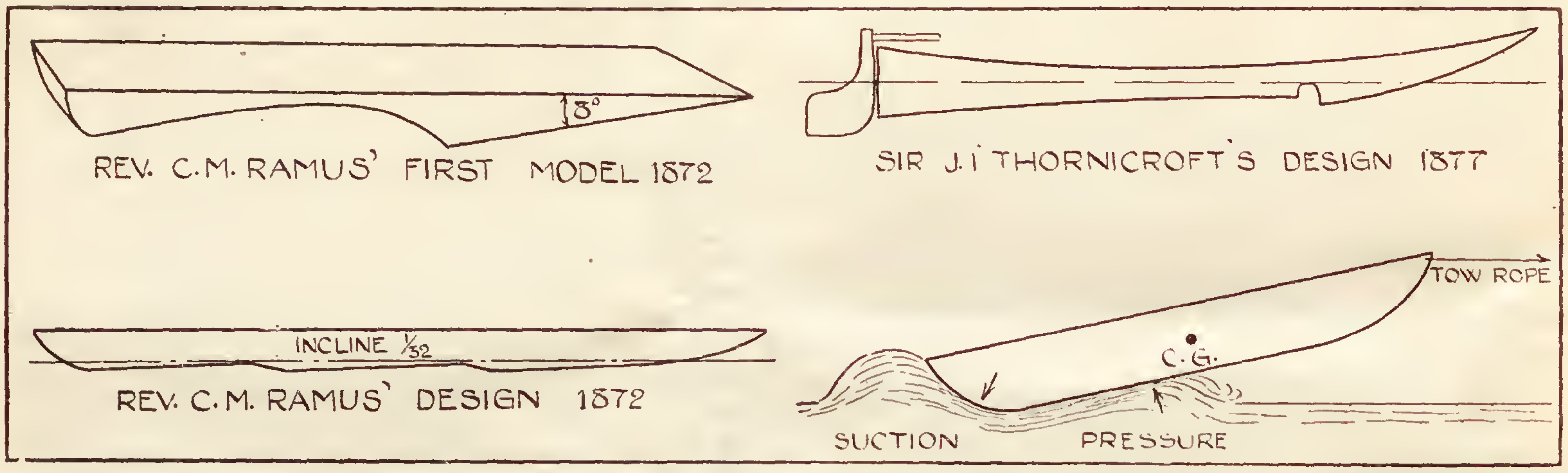
The fore and aft portions of the bottom of the boat thus served as two inclined planes when the boat was in motion, and these tended to lift the boat out of the water on a level keel.

Those who have witnessed modern motor-boat races are very well aware that most of the fast motor boats of the present day have flat bottoms without a step, and it is a characteristic feature of the races that most of these boats go round the course with their bows clear out of the water.

The absence of a step is due to the regulations prohibiting its use in most races that are for motor boats proper, and not for hydroplanes as such. The restriction doubtless originated through the peculiar character of the early hydroplanes, which did not have the sea-going qualities of motor boats, although they were fast enough to win races in smoother waters. Nowadays, however, the hydroplane boat has been developed on much the same lines as the ordinary motor boat.

It is to Sir John Thornycroft that the earlier work in connection with the development of the hydroplane boat is due, but Sir John Thornycroft was also extremely interested in the idea from the time it was put forward by Ramus in 1872. In 1877 Sir John designed his first hydroplane, the outline of which is shown in one of the accompanying sketches.

There is also shown a sketch illustrating the general principle on which a boat, and especially a boat with a rounded stern, has its bows raised out of the water even when towed from a point above and in front of the centre of gravity.



REV. C.M. RAMUS' FIRST MODEL 1872

SIR J. I THORNICROFT'S DESIGN 1877

REV. C.M. RAMUS' DESIGN 1872

"Flight" Copyright.

Sketches illustrating the original design for a hydroplane invented by Ramus in 1872. Sir John Thornycroft's design of 1877 is shown, also a diagram illustrating the forces that tend to tip up the bows of a boat that has a round stern.

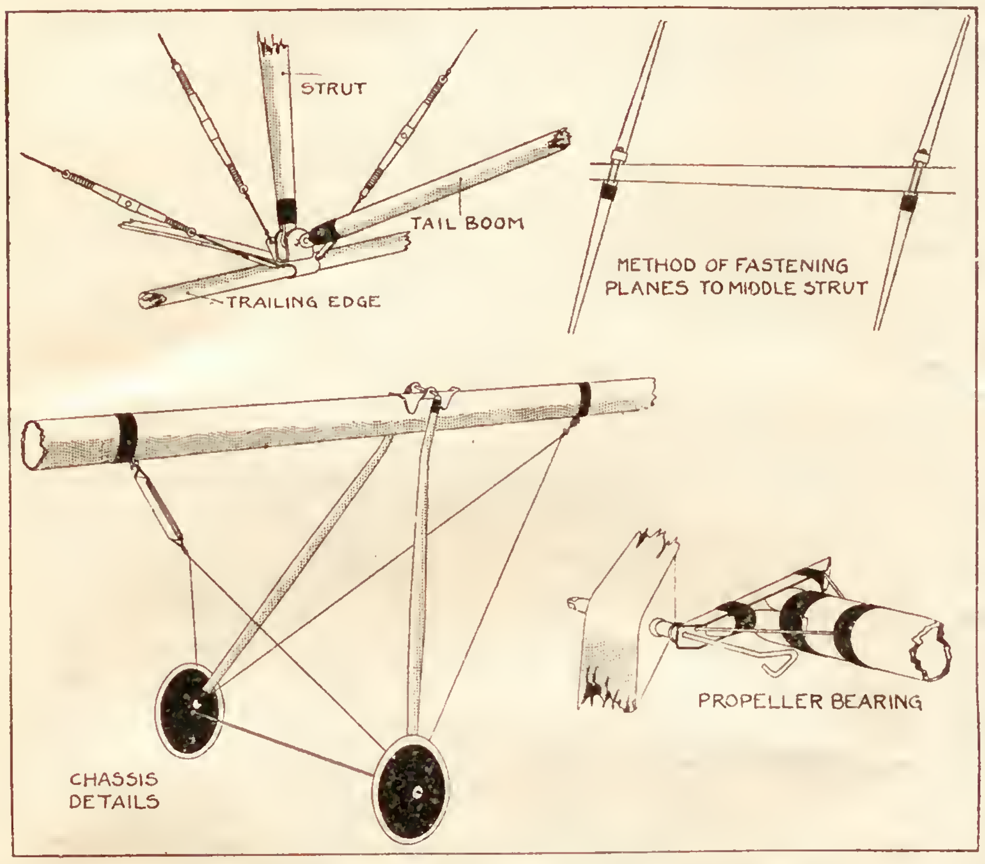
Models

Edited by V. E. JOHNSON, M.A.

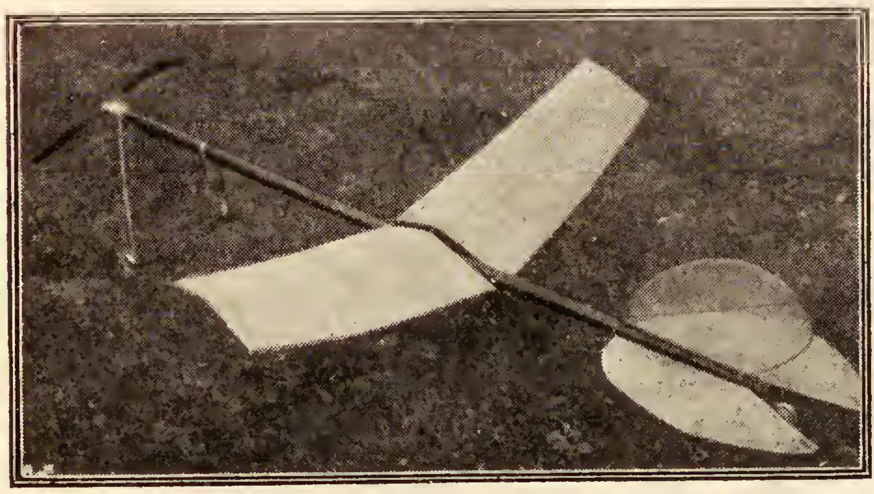
Mr. S. Kitchenham's Olympia Model.

DIMENSIONS of top main plane, 48 ins. by 8 ins., *i.e.*, 384 sq. ins.; bottom main, 32 ins. by 8 ins., *i.e.*, 256 sq. ins.; tail, 78 sq. ins.; rudder, 62 sq. ins.; propeller, 14 ins. in diameter, driven by 12 strands of rubber 44 ins. long; weight of rubber, 2·6 ozs.; total weight of machine, 14 ozs.; loading about 3 ozs. per sq. ft.

"As you will no doubt agree," says Mr. Kitchenham, "I have made a mistake in making the tail so small. The machine is very sluggish in recovery after a dive. I am sending you a sketch of the landing chassis, which I have found very good in actual practice; the machine is able to land on very rough ground (a potato patch for example) without doing itself any damage. The planes are detachable, being fastened by clips attached to the middle struts. By detaching four of the diagonal bracing wires, the two main planes will fold down quite flat, in fact the whole machine can be packed into a space of 48 ins. by 12 ins. by 3 ins., which is a great convenience when the flying ground is a long way off. The assembling is a matter of about 4 minutes. I did not have an opportunity of trying this model off the ground until the competition at Hendon, when it got off in about twice its own length, but, unfortunately, being under elevated, the flight ended a few yards from the starting point. The best duration to date is 25 secs.



Details of Mr. Kitchenham's Olympia model.



Mr. J. F. L. Corkett's hollow tube tractor model.

A Hollow Tube Tractor. By JOHN F. L. CORKETT.

Having taken great interest in the "war against the non-scientific side of model-aeroplaning," and having incidentally noticed a suggestion in FLIGHT of March 21st, 1914, regarding the hollow tube machine, I have constructed the tractor illustrated in the photograph. A hollow tube was suggested to take the place of the kind of *fuselages* so common in models, *i.e.*, the single stick, and by so doing (1) improve the appearance of the machine, since the rubber is in this case enclosed; (2) increase the strength of the *fuselage*, for the strain is evenly divided; (3) decrease wind resistance. The machine was constructed with these theories in view; a hollow tube built up of veneer wood and varnished silk was employed, the tube being purchased from Messrs. W. G. Evans and Sons.

The details of the machine are as follows:—

Fuselage.—Tube 3 ft. 6 ins. in length, inside diameter 0·75 in.; weight 1 oz. 3 drms.

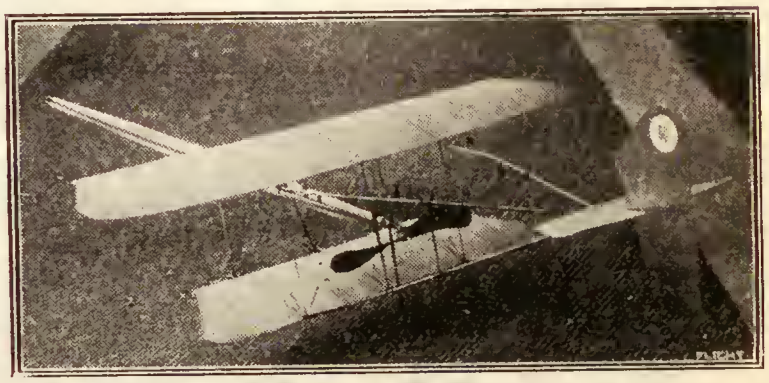
Main plane.—Span 3 ft., chord at centre 7 ins., at tips 3·5 ins., built up with bamboo, and covered with Hart's silk.

Tail.—Of piano wire, semicircular in shape, with flexible tips; diameter 14 ins.

Fin.—To match tail.

Chassis.—Bamboo, V-type, mounted on two aluminium wheels.

Power.—Eleven strands of $\frac{1}{4}$-in. strip rubber driving a 12-in. tractor screw.



Mr. Sidney Kitchenham's Olympia model.

The machine rises in about 5 yds. and flies with the tail parallel to the ground, showing very good stability, owing, perhaps, to the large tail and fin and the long chassis, which acts like a pendulum. When hand launched it flies some 300 ft. at a high altitude and a very slow but even speed.

Messrs. T. W. K. Clarke's New Aero Silk.

We have received from the above well-known firm a sample of their latest Flight Proof Silk. The silk is well proofed and light, its weight working out at ·75 oz. per square yard. The price of the same is extremely reasonable, viz., 1*s.* a yard 18 ins. wide, and 2*s.* a yard 36 ins. wide. Aeromodellists who have not so far given it a trial should certainly do so; we are quite certain they will not be disappointed.

Crystal Palace and District Model Aero Club.

Mr. A. M. Hawes, 125A, Croydon Road, Anerley, writes, saying that he has been appointed secretary of the above club, and that he will be pleased to hear from anyone in that district who may be interested in model aviation.

Model Club for Coventry.

Mr. P. Haselock, 152, Gulson Road, Coventry, also writes as follows:—"I am desirous of forming an aero club in Coventry for the building of models of every description. I shall, therefore, be greatly obliged if anyone interested will kindly write me at the above address. There has been a club before in Coventry; I believe this club is still in existence when the president wishes to call a meeting, but it is practically dead, and this may, of course, make it a little harder for the new one to start. I hope the proposed club will be run on scientific lines, something after the same idea as sketched out from time to time in FLIGHT."

The Power-Driven Competitions of August 8th and 13th.

Several correspondents have written to us with respect to the

Lady Shelley Competition for power-driven hydro-aeroplanes, at the Welsh Harp, on August 8th, and the Sir John Shelley Competition for r.o.g.-engined or power-driven models, at Hendon, on August 13th, with respect to the following rule governing these two competitions, viz. : The design of models submitted must be applicable to full-size machines. The best advice which we can give to anyone having an engined model which will really fly is to enter for the competitions. It remains for the judges to decide whether any or none of the designs submitted are applicable to full-sized machines. Many, if not all, of the competitors will be in the same boat, and it will be most unfortunate if this rule keeps any intending competitor from "trying his luck."

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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

Baden-Powell Competition.—The sixth annual competition for the Baden-Powell Challenge Shield for the best kite of the year took place on Wimbledon Common on July 18th. There were 16 competitors, including the holder, A. W Brown, who has held the shield for four years. The judges were Major B. Baden-Powell (donor of the shield), Mr. M. Balston, and Mr. F. T. Pringuer. The following are the results of the first seven :—

Place.	Competitor.	Make.	Angle.	Stability.	Strength.	Portability.	Total marks.
1	W. Collins	Box and wing ...	154	95	60	50	359
2	A. W. Brown	" " ...	145	85	74	50	354
3	H. Stewart	Double box Brootype	143	92½	60	50	345½
4	B. Varnals	Roloplane	128	90	65	50	333
5	A. Collins	Box and wing ...	136	85	60	50	331
6	T. Brown	" " ...	114	95	70	50	329
7	Mrs. W. H. Akehurst	Admiralty	106	105	64	50	325

Mr. Collins, therefore, holds the shield for one year (from date of prize distribution), and wins the gold medal of the Association. Messrs. A. W. Brown and H. Stewart won respectively the silver and bronze medal of the Association.

A group of competitors prior to the start.

After the Major announced the results, the gen. hon. sec. proposed a vote of thanks to Major B. Baden-Powell and the judges for having so kindly acted as judges, which was carried amid applause.

Women's Aerial League Competitions.—These Kite and Model Competitions will be held on Saturday, 25th, on Wimbledon Common. The Model Competition will be held first, commencing at 3 o'clock sharp. To enable those competitors who have entered in both events to compete, the Kite Contest will follow directly after the Model Competition.

Model Competitions at the London Aerodrome, Hendon.—August 12th, at 2.30 p.m. ; entries close first post August 6th. Event I—Single-Screw Weight-Carrying Competition for the London Aerodrome Model Challenge Trophy for models rising off the ground. Prizes : 1st, the London Aerodrome Model Challenge Trophy and Silver Plaque (presented by Mr. Claude Grahame-White) ; 2nd, silver medal of the Association ; 3rd, bronze medal of the Association. Tests : A, duration of flight (minimum of 25 secs.) ; B, stability ; marks, duration actual seconds, 25 for stability. Additional rules governing this competition : 1. Models must not weigh less than 16 ozs. unloaded. 2. Each model must carry a dead-weight of a quarter of its own weight. This weight or weights must be supplied by each competitor, and be easily detachable for weighing. 3. Competitors must be at the judges' flag at 2.45 p.m. ; any competitor not present at that time will be disqualified. Event II—Competition for Sir John C. Shelley's Trophy, for power-driven models rising off grass. Prizes : 1st, silver trophy ; 2nd, silver medal of the Association ; 3rd, bronze medal of the Association. Marks : Design 100 ; duration actual seconds ; minimum duration 25 seconds. Additional rule governing this competition : 1. The design of models submitted must be applicable to full-size machines.

27, Victory Road, Wimbledon. W. H. AKEHURST, Gen. Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Bristol and West of England Aero Club (Model Section) (42, ROYAL YORK CRESCENT, CLIFTON, BRISTOL).

Bristol International Exhibition.—As announced in FLIGHT last week, the Summer Model Aeroplane Competition has been postponed from July 18th until August 1st. The amended programme is as follows : — July 27th to August 1st. Models on view in the International Pavilion daily, 11 a.m. to 10.30 p.m. ; Saturday, 11 a.m. to 1 p.m. August 1st, at 3 p.m. Model Flying Competition in the Pageant Ground—Event A. Contest for Single-screw Models ; 1st, 2nd, and 3rd prizes. Event B. Contest for Multiple-screw Models ; 1st, 2nd, and 3rd prizes. Events A and B will be judged on a marking system which has been introduced with the idea of improving the trend of model design, and encouraging experimental research. Marks will be awarded for : Design 25 per cent. and construction 15 per cent., longitudinal stability 15 per cent., lateral stability 10 per cent. and directional control 15 per cent., rising 10 per cent. and landing 10 per cent. Event C. Target Contest ; 1st and 2nd prizes, awarded to models which land nearest to the bull's eye. Event D. Looping the Loop Contest ; 1st and 2nd prizes ; awarded to the models which complete the greatest number of loops in one flight. A number of exceptionally fine model aeroplanes have been entered in this competition, and everyone interested in aviation in the West of England should make a point of seeing the models on view in the International Pavilion, and of being present at the flying competition.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

JULY 26TH, flying Wanstead Flats, 6.30 and 10.30 a.m. until further notice. All correspondence to Mr. H. Bond, 23, Woodhouse Road, Leytonstone, E.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

JULY 25TH, competition for single propeller models. August 1st, open competition for the Paddington cup. For particulars *see* club notice in FLIGHT, July 3rd. Latest time for receiving entries Monday, July 27th.

UNAFFILIATED CLUBS.

Finsbury Park and District (66, ELFORT ROAD, HIGHBURY, N.).

JULY 25TH, flying at Finsbury Park, 3.30 p.m.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

JULY 26TH, Blackheath, 6.30 to 10 a.m.

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PUBLICATIONS RECEIVED.

Flight without Formulæ. By Commandant Duchene ; translated by John H. Ledeboer, B.A. London : Longmans, Green and Co. Price 7*s.* 6*d.* net.

Aircraft in War. By J. M. Spaight, LL.D. London : Macmillan and Co., Ltd. Price 6*s.* net.

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IMPORTS AND EXPORTS, 1913-1914.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see FLIGHT, January 25th, 1912, and for 1912 and 1913, see FLIGHT for January 17th, 1914 :—

	Imports.		Exports.		Re-Exportation.	
	1913.	1914.	1913.	1914.	1913.	1914.
	£	£	£	£	£	£
January	12,097	5,945	4,005	210	1,510	879
February	17,361	28,132	3,447	106	690	441
March ...	20,425	27,731	1,924	1,934	1,042	1,440
April ...	15,593	11,384	5,524	1,175	1,413	1,473
May ...	31,241	17,062	3,726	4,059	830	9,484
June ...	14,905	15,967	1,408	5,082	1,106	142
	111,622	106,221	20,034	12,566	6,591	13,859

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Aeronautical Patents Published.

Applied for in 1913.

Published July 23rd, 1914.

14,936. A. E. PUPIN. Transmission of power to aerial propellers.
15,727. A. E., H. L. AND H. O. SHORT. Aeroplanes.
17,033. J. A. STEINMETZ. Destruction of aircraft.
20,308. H. FABRE. Aeroplane undercarriage.
27,132. FRIED KRUPP AKT. GES. Sighting devices for missile-dropping appliances.

Applied for in 1914.

Published July 23rd, 1914.

10,708. BALLONHALLENBAU GES. Sliding door for airship sheds.
10,723. BALLONHALLENBAU GES. Sliding door for airship sheds.

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CONTENTS.

Editorial Comment: PAGE
War in the Air 799
The Central Flying School at Upavon 802
What Tail-Sliding on a Blériot feels like. By Marcus Manton 807
Royal Aero Club Official Notices 808
From the British Flying Grounds 810
Eddies. By "Æolus" 812
The Donath Signal Mirror 815
An Aerodynamic Balance 816
Prensiel Life-Saving Parachute 816
Aerodrome and Exhibition Flying 817
Correspondence... 820
Models. Edited by V. E. Johnson, M.A. 821

EDITORIAL COMMENT.

War in the Air. Had Mr. H. G. Wells been a less famous author than he is, his story "The War in the Air," which was published some six years ago, would in all probability have been treated as the product of the imagination of an amiable lunatic. At that time dynamic flight had actually been achieved, but that is about all that could have been said of the matter. It was a vivid, enthrallingly interesting story, but one which, even to those who were most closely in touch with contemporary flying, was scarcely convincing, save as such a prophecy as might have been indulged by a thirteenth century writer inditing a story of Waterloo, and describing how men were mown down by Brown Besses and smooth-bore cannon. Apparently, Mr. Wells was at least half-a-century too early in the date he fixed for his world-war in the sky, but the indications of the moment are, unfortunately, all pointing to a too painful accuracy of the forecast.

As we write Europe is arming in preparation for a war which, unless it can be averted, will constitute at once the most colossal catastrophe, and the worst crime against civilisation in all history. That it may be averted by wise and sane statesmanship is the earnest desire of the least responsible of us. But if it *must* come, then at least we have the comforting knowledge that we are prepared at all points, and we can look at the future with the quiet confidence with which we as a nation have always approached these times of acute crisis in our history.

If this catastrophe of war should be let loose, what shape will it take initially, and what bearing will the air-fleets of the nations have on the ultimate results? Almost beyond doubt the first move will be made by aircraft, but who can say what their work will be? Naturally, reconnaissance will be the first and principal object, but it can hardly be imagined that they will be allowed to carry it out without interruption from hostile air fleets. And then what will happen? Will there be fought fleet actions in the air, or how will things work out? Will the slow craft be used as a covering force to retard the movements of the enemy's craft while the faster machines urge their way back with the information that has been secured? Will it be found that aircraft after all are comparatively valueless to their armies because of the impossibility to collect information of vital consequence because of the enemy's craft? Shall we find that the possession of comparatively equal air forces will bring about a position of stalemate, in which both sides find that the game is not worth the candle in view of the enormous casualty bill consequent on the meeting of two hostile air-fleets? Or will it be found that machines will be able to come and go almost without let or hindrance owing to the utter uncertainty of finding each other over the vast areas they will cover? All these are questions that only the real thing can answer. Without pretending to any deep military knowledge, or to be able to exactly assess the value of these things, we cannot say that anything approaching reality can possibly be judged by the results of peace manœuvres where aircraft are concerned. They seem to have far less approximation to the conditions of real war than is the case with any other service or branch of service. For example, the probable results of an infantry attack in manœuvres can be assessed with tolerable certainty, because of the many known factors that enter into the calculations. The strength of the position and the number and discipline of the men holding it; the *morale* of the attacking troops; the nature of the ground over which the attack has to be delivered; and comparative strength in artillery. All these are matters which can be duly weighed by expert umpires and the lessons and conclusions based on decisions given in the field are possibly not very far out.

Again, although the naval experts have not the same fund of active experience of the behaviour of modern ships and armaments in serious actions to draw upon as have their colleagues in the sister Service, manœuvre calculations can be brought reasonably near the mark because of the number of exact factors that enter into them. Number of ships and weight of armament concentrated at a particular moment in a particular place as compared with those of the enemy will govern a decision, principally because we know exactly how those ships would be used were the business one of serious war instead of make-believe. Therefore, leaving out the always unknown quantity of the comparative tactical fitness of the respective commanders, who would be pitted against each other, we can arrive at a very just approximation of what would be likely to happen. But in the case of aircraft the lessons of manœuvres must be applied to real war with a great many reservations, because we are really entirely ignorant of the things that are likely to happen—we have no line through past performance in war—or at any rate in war in which both sides possessed anything properly describable as an air force—upon which to base a sound judgment. But, after all, these things must be left in the lap of Time. We can only hope that we are not in reality on the verge of learning the grim lessons that a big European war has in store for us.

So far as our own aerial forces are concerned, we can at least say that we feel more comfortable about their preparedness and efficiency than if this crisis had had to be faced even a year ago. Our seaplanes are as good as any—probably better—and we have a sufficient superiority in numbers. Our *personnel* we have the utmost confidence in. If IT comes, we know they will acquit themselves to the full in accordance with the best traditions of the two Services—and more than that it is impossible to say.

⁂

ROYAL FLYING CORPS.

THE following appointment was announced by the Admiralty on the 24th inst. :—

Commander R. M. Groves, to "President," additional, for service in the air department, temporary. July 12th.

The following appointments were announced by the Admiralty on the 25th inst. :—

Flight Lieuts. F. W. Bowhill, to the "Pembroke," additional, for duty at the Central Air Office, and W. C. Hicks, to the "Pembroke," additional, for Kingsnorth Naval Air Station, and for Naval Airship No. 3. Both to date July 24th.

Carpenter J. V. Collins, appointed Warrant Officer (Second Grade) in the Royal Naval Air Service. July 1st.

The following appointments were announced by the Admiralty on the 29th inst. :—

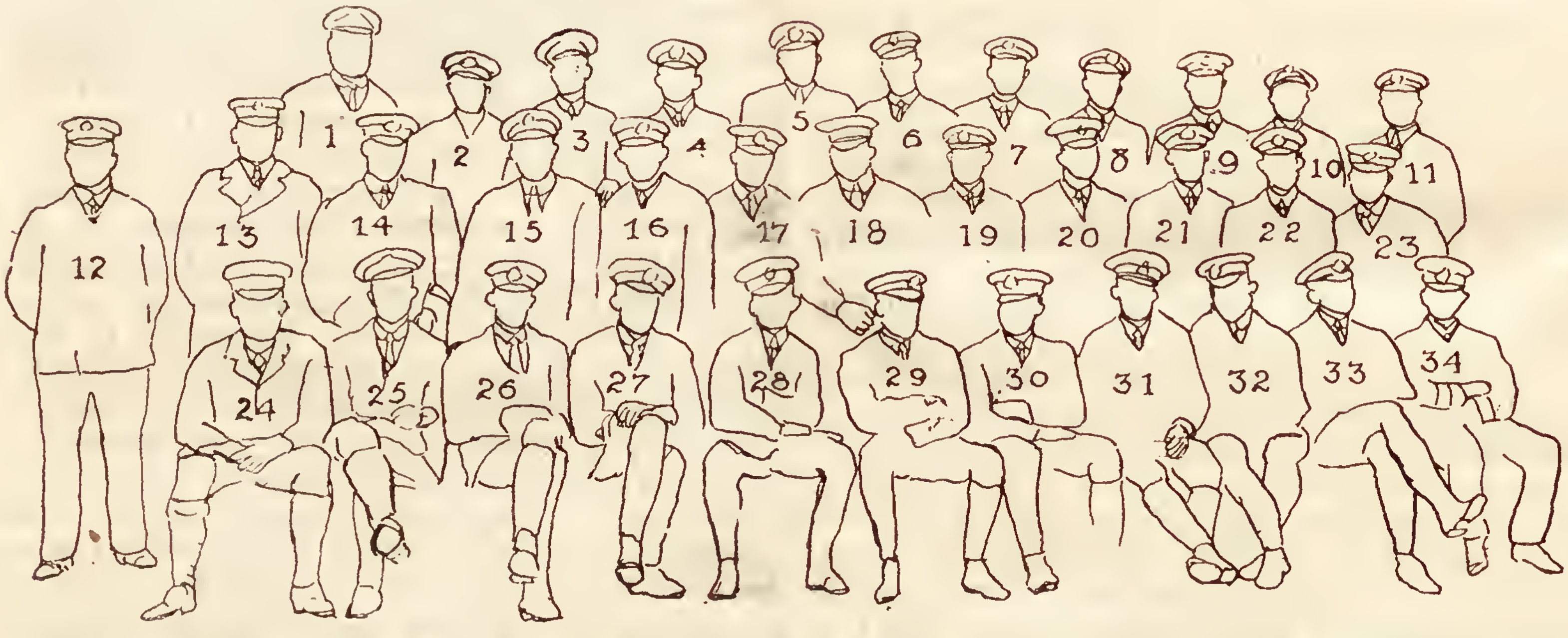
Hugh C. Fuller has been entered as Probationary Flight Sub-Lieutenant, and appointed to the "Pembroke," additional, for Farnborough Naval Air Station, July 25th.

The *Daily Mail* Circuit of Britain.

AMONG the official notices of the Royal Aero Club on page 808 will be found some further details regarding the nine machines which have been entered for the *Daily Mail* Circuit of Britain. It will be seen that Mr. Victor Mahl is to pilot the Gnome-Sopwith to which is assigned No. 1, and for which Mr. H. G. Hawker was originally nominated as pilot; Lieut. C. H. Collet is to pilot the Beardmore D.F.W. biplane with 120 h.p. Beardmore-Austro-Daimler engine which is No. 2; while C. H. Pixton will start on No. 3, the Sunbeam-Sopwith batboat. It will be noticed that Mr. Claude Grahame-White has been nominated as the pilot of the Grahame-White machine, Full particulars are also given with regard to the various controls as well as the names of the gentlemen who are so willingly giving their services as officials at the different places. The official information regarding the exemptions granted under the Aerial Navigation Acts is also set out in full.

The Gordon-Bennett Race.

IT will be noticed with regret from an official announcement by the Royal Aero Club on p. 809 that the British and Colonial Aeroplane Co., Ltd., have had to withdraw from the Gordon-Bennett Race owing to the pressure of work in other directions. The Royal Aero Club has decided not to hold the proposed eliminating trials at Upavon, but if such trials are necessary they will be held at Buc a few days prior to the actual race, which is fixed to take place on September 27th and 28th. The remaining entrants are the Sopwith Aviation Co., Ltd., A. V. Roe and Co., Ltd., Messrs. Vickers, Ltd., and the Cedric Lee Co., Ltd.



OFFICERS OF THE ROYAL NAVAL AIR SERVICE AT CALSHOT DURING THE RECENT NAVAL DEMONSTRATION AT SPITHEAD.—Key to group on page 801.

From left to right:—

Back row:—(1) Staff-Surgeon O'Connell, (2) F. Lt. F. G. Brodribb, (3) F. Lt. A. J. Mackean, (4) F. Lt. E. R. C. Nanson, (5) F. Lt. Lord Ed. Grosvenor, (6) F. Lt. I. G. V. Fowler, (7) F. Lt. W. G. Sitwell, (8) F. Lt. R. H. Kershaw, (9) F. Lt. D. Hyde-Thomson, (10) F. Lt. R. P. Ross, (11) F. Lt. H. A. Busk.

Middle row:—(12) Mr. W. A. Hancock, (13) Mr. F. W. Scarff, (14) F. Lt. H. A. Williamson, (15) F. Lt. Cave-Browne-Cave, (16) F. Lt. J. T. Cull, (17) F. Lt. F. W. Bowhill, (18) F. Lt. A. C. Barnby, (19) F. Lt. E. T. R. Chambers, (20) F. Lt. H. Fawcett, (21) F. Lt. A. W. Bigsworth, (22) Squad.-Commdr. J. W. Seddon, (23) F. Lt. R. J. Bone.

Seated:—(24) F. Commdr. C. E. Rathbone, (25) F. Commdr. J. T. Babington, (26) F. Commdr. D. A. Oliver, (27) F. Commdr. F. E. T. Hewlett, (28) Squad.-Commdr. C. E. Risk, (29) Wing-Commdr. F. R. Scarlett, (30) Squad.-Commdr. A. M. Longmore, (31) Squad.-Commdr. R. Gordon, (32) Squad.-Commdr. R. H. Clark-Hall, (33) F. Commdr. J. L. Travers, (34) Staff-Surgeon O'Hea.

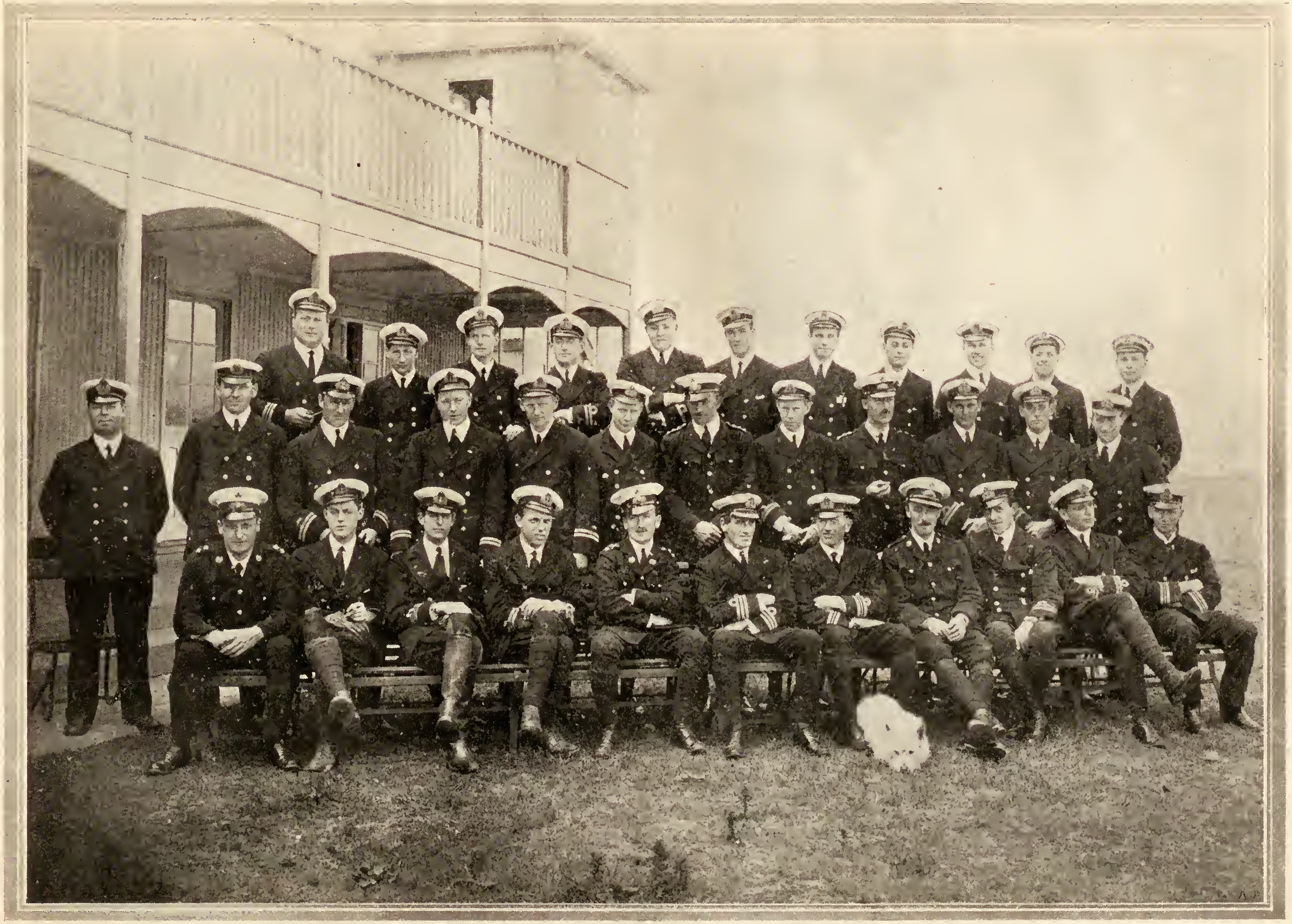


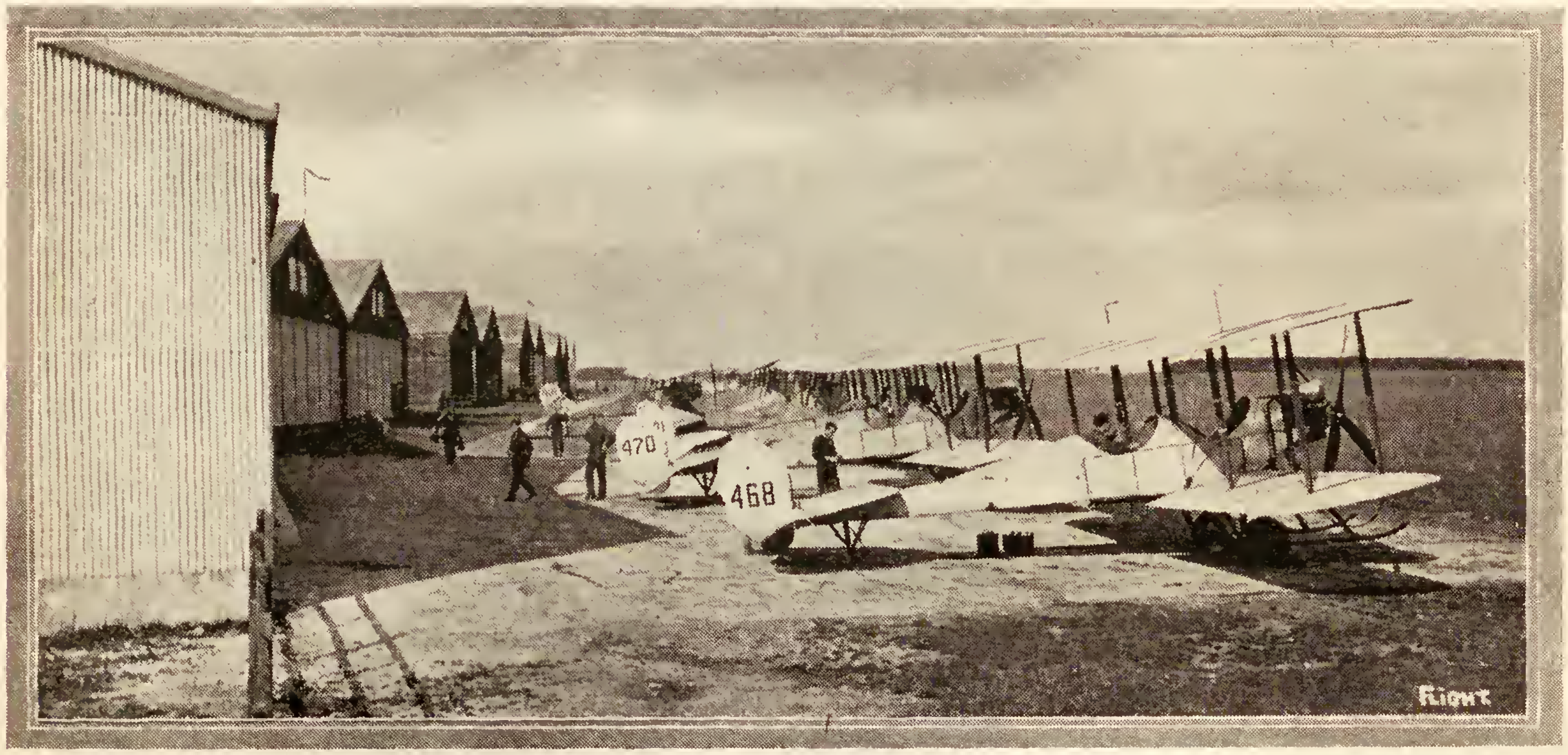
Photo by F. N. Birkett.

THE OFFICERS OF THE ROYAL NAVAL AIR SERVICE AT CALSHOT DURING THE RECENT NAVAL DEMONSTRATION AT SPITHEAD.
(For key to the group see page 800.)

THE CENTRAL FLYING SCHOOL AT UPAVON.

(Concluded from page 780.)

Training.—So far we have dealt with the personnel and the matériel of the School; we shall now turn to the scheme of training in operation there. This may be divided into three distinct parts—(a) Mechanical training; (b) Flying; and (c) Lecture work. The work done by both officers and men comes under these three headings, but differences exist in the amount of time devoted by them to each, and in the character of the work to which attention is specially directed.



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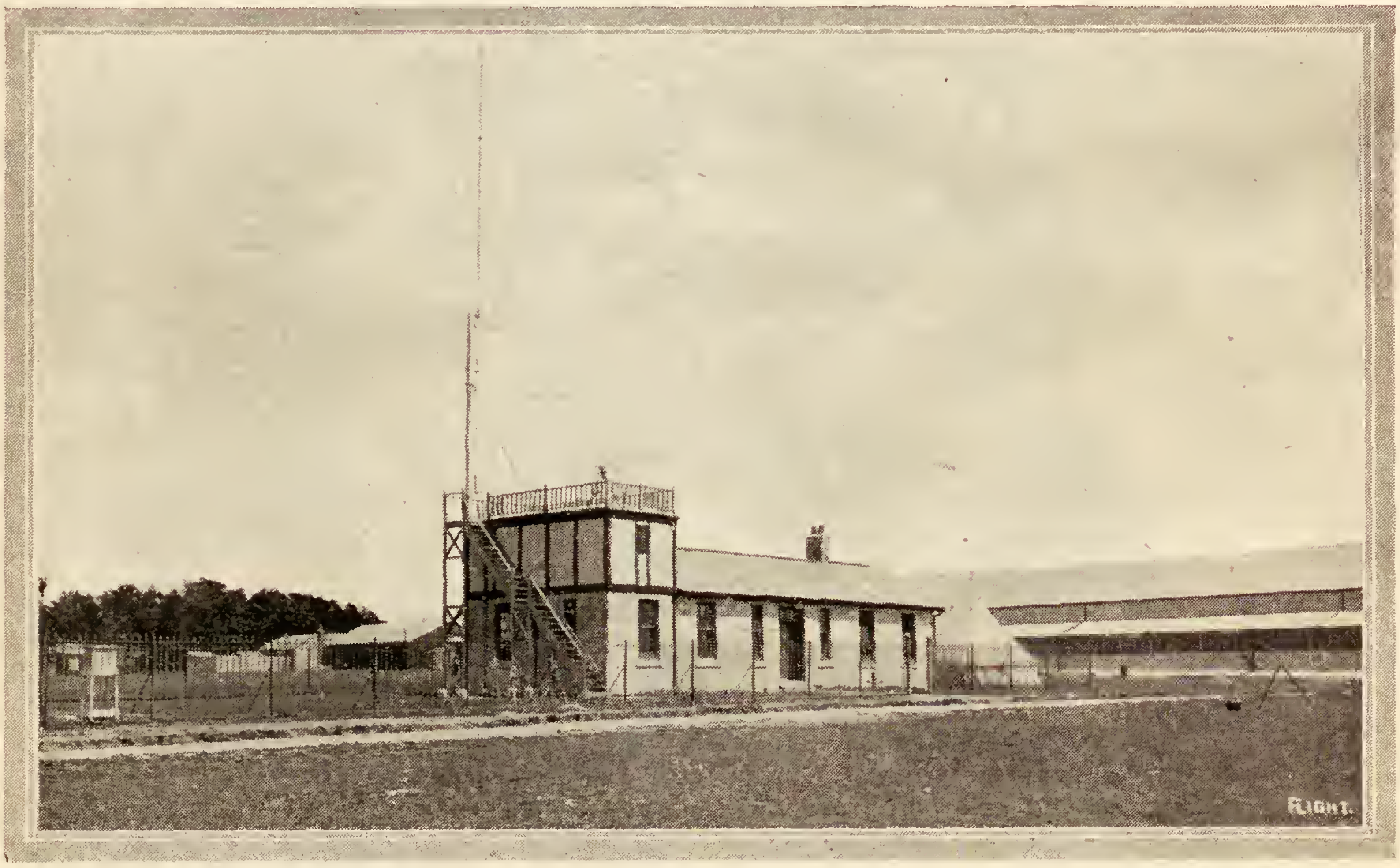
CENTRAL FLYING SCHOOL, UPAVON.—A view of the machines of A, B and C Flights from the rear, with the B.Es. of A Flight nearest the camera.

Mechanical Training.—Officers spend about three weeks in special mechanical training in the shops, and for this purpose are divided into classes of about twelve—each batch as it finishes its course being succeeded by another. The time during which they are employed in this manner is not, however, the only practical mechanical instruction in which they are engaged, or in which experience in this class of work is gained, since whenever it is possible to do so, repairs are carried out by the staff in the flights. Of the three weeks in the shops, ten days are spent in the engine shop and ten in the rigging shop; but, as before mentioned, some



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CENTRAL FLYING SCHOOL, UPAVON.—The Meteorological Observatory, with the repair shop in the background. Note the theodolite on the roof and the 86-ft. mast for anemometer.

CENTRAL FLYING SCHOOL AT UPAVON.—A B.E. 2a in flight over the gallops, with Netheravon in the distance. "Flight" Copyright.

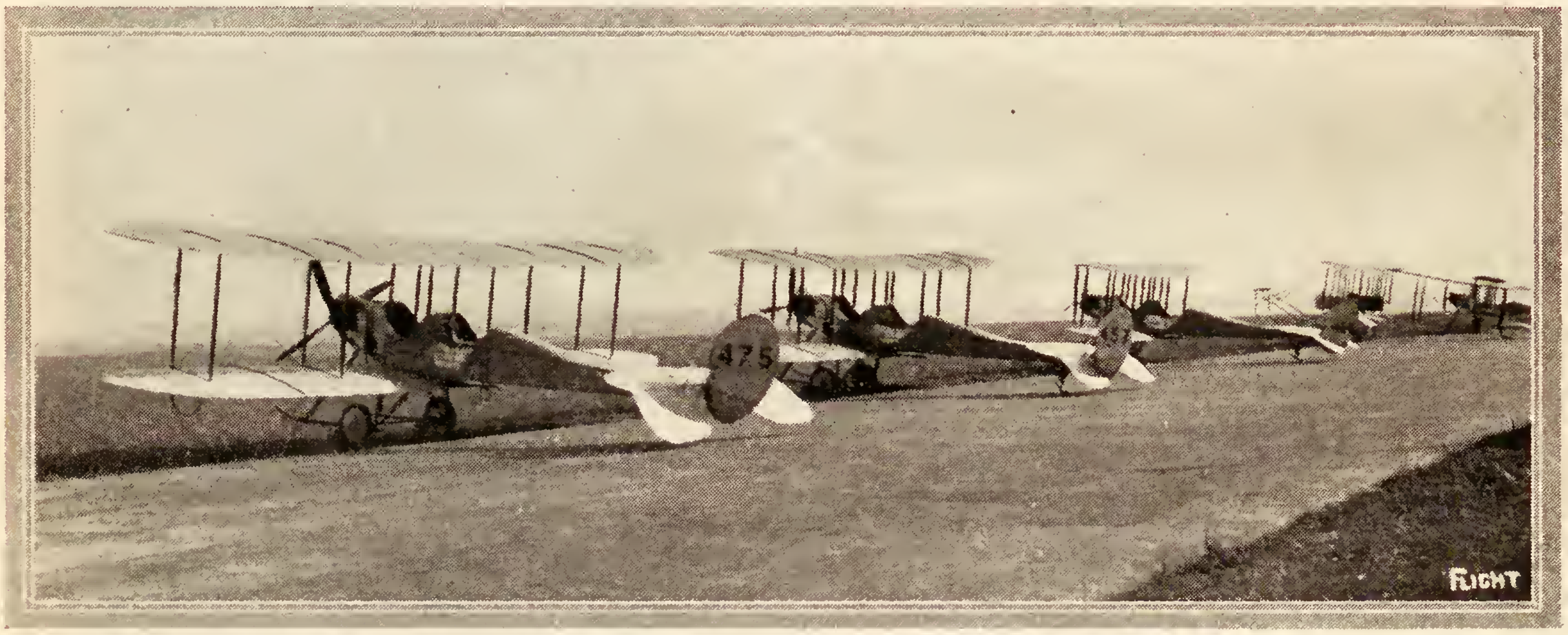
officers devote a portion of the time during which they would be otherwise engaged, in furthering their knowledge of these branches of the work, especially as regards engine construction and maintenance, with the view of qualifying for employment later on mechanical transport duties.

"Flight" Copyright.

CENTRAL FLYING SCHOOL, UPAVON.—The Maurice Farmans of B Flight.

As regards the N.C.Os. and men, the period of training in mechanical work is much more prolonged, as it lasts for about three months. Riggers are employed for about ten weeks in the rigging or constructional shop and two weeks in the flights; while for the fitters, two weeks are spent in the flights and ten weeks in the engine repair shop. These periods are, of course, proportioned in this manner according to the relative importance of the work upon which they will be subsequently engaged when with the Squadrons. In the case of some men it is found necessary to acquaint them with the method of making the simplest forms of joints in connection with woodwork, and various examples of their handicraft were to be seen on the occasion of our visit. The officers are, however, not placed upon any of this work, as apart from the consideration that it is not altogether necessary, the time at their disposal does not permit of them engaging in it.

Flying.—The scheme of training for officers and for such men as undergo instruction in flying is somewhat similar to, and differs little in the early stages from, the procedure followed in private flying schools. At first they are sent up with an instructor, of whom there are two attached to each flight—one a senior instructor, and the other an assistant instructor—on a dual control machine, of which there are several of each type at the school. These early flights are in the nature of "joy rides," and a pupil gradually acquires the "feel" of the machine and the knowledge as to what movements are made by the instructor under certain circumstances, while the latter gradually allows the pupil to assume entire charge of the controls of the machine. Afterwards, and after some "rolling" instruction, the pupil is sent up alone and allowed to make straight flights. There are gradually made more extended, and practice is given in rising from the ground and landing. During the time these are in progress, the pupil is watched by the instructor, until he considers him to be sufficiently proficient to be able to attempt right and left-hand turns, after which he is permitted to fly anywhere within the aerodrome, with the strict injunction, however, before he starts—"no spirals" until such time as the instructor considers him sufficiently experienced to practice them.



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CENTRAL FLYING SCHOOL, UPAVON.—Some of the machines of C Flight.

So far, the pupil has been kept to one type of aeroplane, and his instruction upon that machine is continued until he has become thoroughly conversant with its peculiarities under varying conditions. He is then sent up in a different type of aeroplane. Should he have been at first on a "pusher," a change is made to a tractor machine; while should both of these machines be fitted with a fixed engine, he is placed in charge of a Gnome-engined aeroplane, and so on. In this way a pilot becomes acquainted with the method of handling and the behaviour of different machines, until finally he can be trusted with two or three of the more familiar types. He then is called upon to land on strange ground, so as to gain that experience which it may be imperative for him to possess when he commences to make cross-country flights, should he be compelled at any time to descend from some cause.

Having proved himself capable of piloting a machine within the limits of the aerodrome and of landing successfully on strange ground, he is permitted to make short flights away from the school, the distance flown being lengthened from time to time. In this

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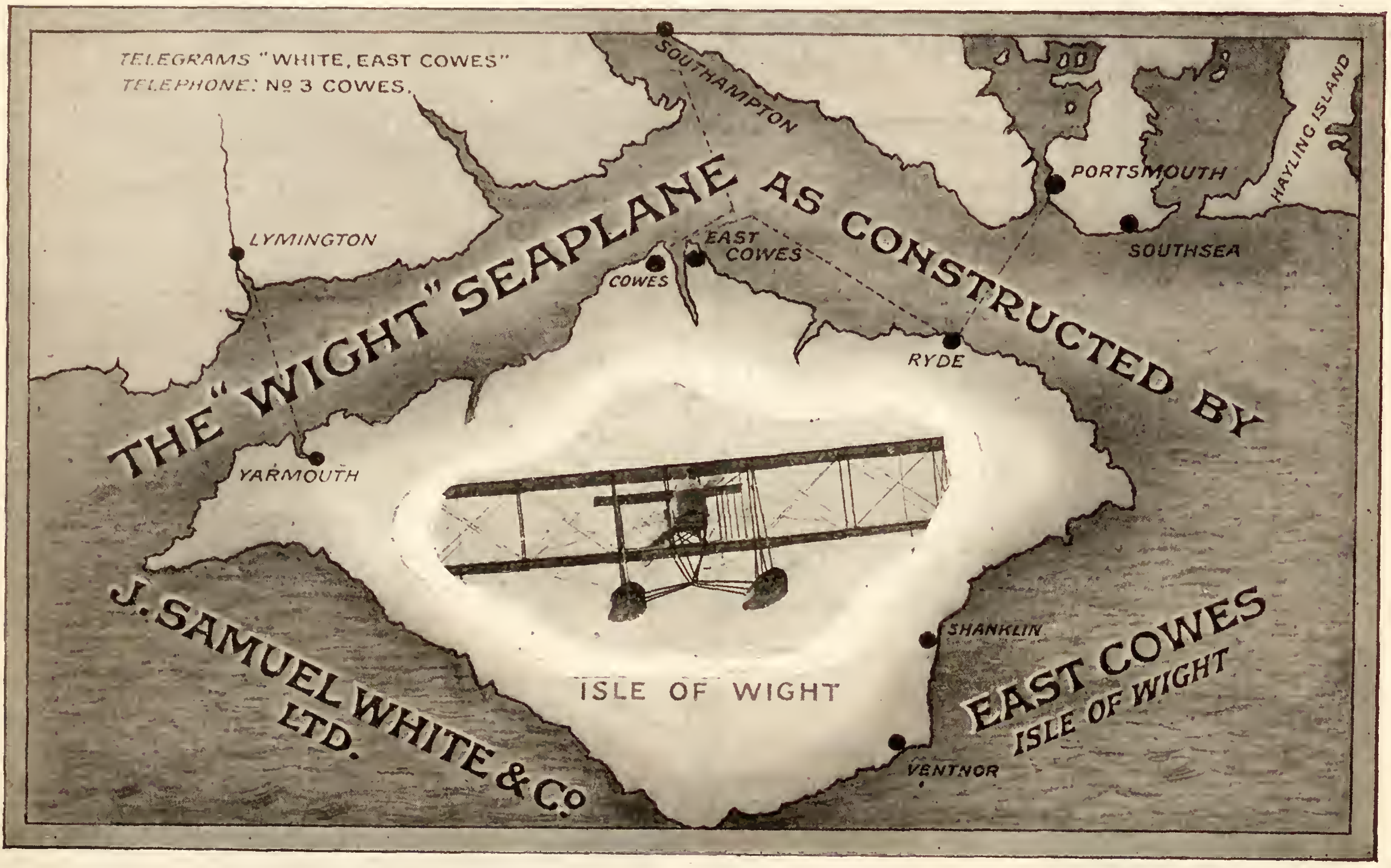


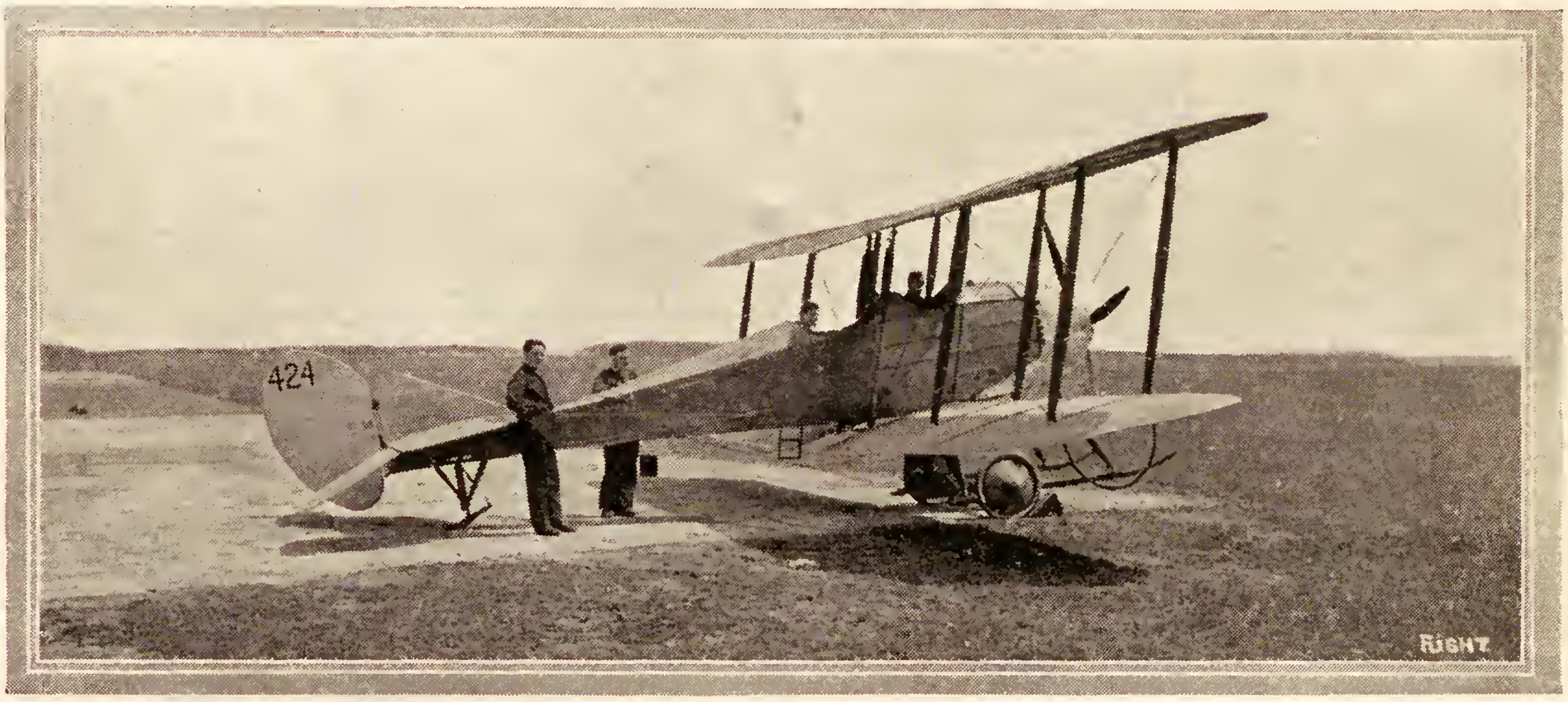
way experience in cross-country flying is acquired, until at length trips to Warminster, Newbury, Southampton, Bournemouth and other places up to about 50 miles distant are eventually frequently made, and continual practice, combined with the exercise of the faculty of observation, are all that are now required in order to fit him for more extended flights.

The period over which this course extends varies with different individuals according to the aptitude of the pupil, as is to be expected; but practice always proceeds step by step, proficiency in one kind of flying being expected before any attempt to make more difficult flights is permitted, and on one particular type of aeroplane before another type is flown in; while stunts are rigidly tabooed, as serving no useful purpose.

Reconnaissance.—No attempt is made to teach the practical side of reconnaissance at Upavon, owing to the fact that the time available limits any serious efforts in this direction. But it must not be imagined that nothing is done, as a perusal of the lectures delivered shows that a considerable amount of attention is devoted to observation and its kindred subjects; which thus enables the student-pilot to know what to look for, where to expect to find it, what it will appear like on the ground, how to record the information gained, and many other essential points that the efficient observer must ultimately become conversant with, much of which he can make use of while still at the school. Furthermore, the cross-country flights made during the later portions of the course, none of which are attempted until after the pilot has worked out the details of the route upon which he intends to fly, afford excellent practice in observation, as well as in piloting; so that the peculiar qualities requisite for success in this particular class of work are incidentally developed by these exercises, which also include the spotting of different landmarks, map reading, &c. In addition, a good observer is not produced in a day, and the extended practice required for his evolution can be done, at least, equally efficiently subsequently, when he has joined one of the Squadrons.

Lectures.—The subjects of the lectures form an important part of the course of training for men as well as officers. The lectures delivered to the air mechanics vary according to the work upon which they are engaged. Thus, fitters are taught the principles of construction, examination, the method of handling and repair of engines, and the attention of riggers is directed to the erection, trueing up and repair of aeroplanes, but both classes of men receive instruction on the care and maintenance of aeroplanes and engines, while in actual use. N.C.Os. and men who are training as pilots attend lectures on map reading and the use of the compass, while all are given instruction in First Aid.

The officers have, however, a much more extended series of lectures, as one would have anticipated from the greater importance attaching to, and the more responsible nature of their duties. The following is a list of principal subjects upon which lectures are delivered, some of the subjects extending over as many as ten lectures. The first lecture deals with the rules of the air and of the aerodrome, and then follow lectures on the Theory of Flight, Aerial Navigation and the use of Maps, Internal Combustion Engines, Magnetos, Compasses, Hints on Flying, Meteorology, Formation of Troops, Types of Warships, Care of Aeroplanes, Cross-Country Flying and the use of Maps, First Aid, Trueing up Aeroplanes,



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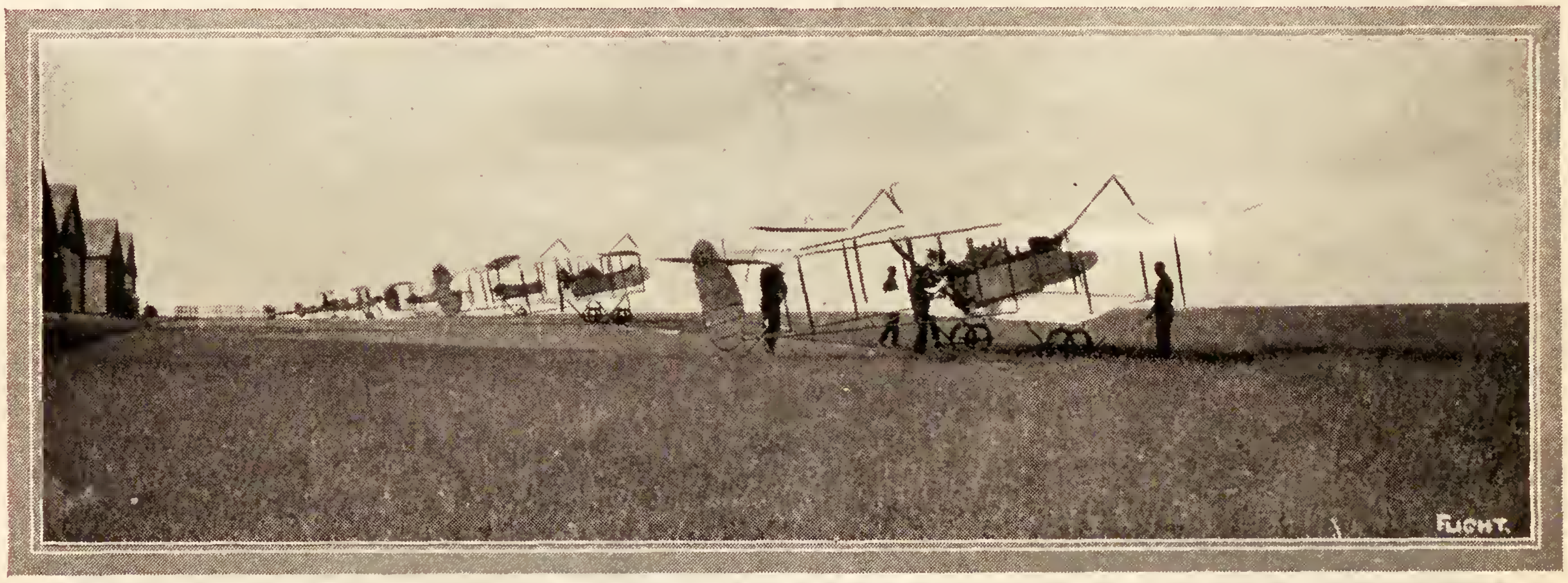
CENTRAL FLYING SCHOOL, UPAVON.—A B.E. 8 of A Flight, with air-mechanics in attendance, tuning up before a cross-country flight.



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CENTRAL FLYING SCHOOL, UPAVON.—The Henry and Maurice Farmans of D Flight.

Strength of Materials, Observation, Propellers, Instruments and Motor Transport. These are delivered by lecturers who have had long experience in the class of work upon which they speak, and it will be readily admitted that the subjects dealt with form a most comprehensive and valuable course of study, which cannot fail to benefit all who attend the lectures.

Meteorology. — This department, which is under the direction of Mr. G. Dobson, M.A., undertakes the repair and overhaul of instruments, as well as meteorological observation; but a large amount of time and trouble is involved in making deductions from the observations taken so as to extract the fullest information from them. In addition to the usual periodic observations of temperature, barometric height, humidity of the atmosphere, rainfall, the direction and velocity of the wind, &c., the wind velocities at various elevations and the air currents in the atmosphere are charted. These are obtained by following the movement of pilot balloons in the lower regions of the atmosphere and by observing the movement and velocities of clouds; and are conducted in order to ascertain the effect of variations in the contour of the ground and the proximity of clumps of trees and buildings. The direction and elevation of the balloons are obtained by locating them at definite intervals of time by the aid of a theodolite, from which, knowing their distance from the observatory, the exact influence of the factors mentioned can be graphically represented. Readings are sometimes made at another station about 2,000 yards away, which, in conjunction with the observations made at the principal station, enable the exact distance of the balloon to be ascertained.

In determining the velocities and directions of clouds at various heights, it is important to get rid of the effects of perspective, and for this reason a special instrument is employed, a description of which may be of interest to our readers. This consists of a five-pronged fork set on its vertical axis, with the prongs in a horizontal line pointing upwards, the vertical column being assembled upon a stand on which a dial showing the points of the compass is mounted. As the fork is rotated, a needle moves over this dial, and indicates the direction in which the horizontal bar connecting the prongs is pointing. When a cloud is placed under observation, the fork is rotated until the cloud appears to be moving parallel to the points of the prongs. Perspective is then eliminated, and by noting the time taken for a part of the cloud to pass between two or more of the upright bars, and knowing the distance between the observer and the prongs, and the height of the cloud, or its distance from the observer, its velocity may be calculated. The direction of movement of the cloud is given by the reading on the dial on the stand.

Conclusion. — It will be realised that in the Central Flying School we have a model institution for the purpose in view—namely, the training and education of pilots and air mechanics in the theory and practice of aeronautics. The organisation is complete in every branch of its work; the course of training—mechanical, piloting and lectures—

"Flight" Copyright.

A B.E. and a Henry Farman flying at Upavon.

"Flight" Copyright.

CENTRAL FLYING SCHOOL, UPAVON.—A Henry Farman in flight and some of the Maurice Farmans of B Flight on the ground.

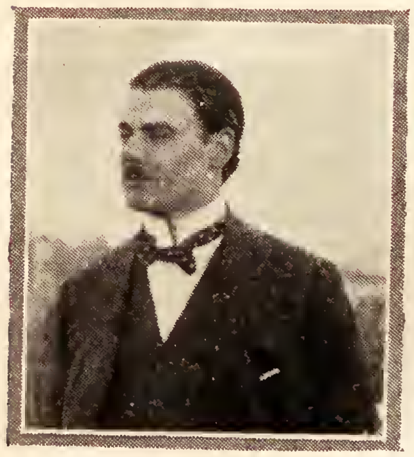
leaving nothing to be desired, since theory and practice—both of which, as we have seen, are exhaustively dealt with—are combined in such proportions as to be of the maximum practical value to the officers and the men; while the spirit which pervades the School and the Corps is admirable.

The life at Upavon is a strenuous one; but notwithstanding this, it is one that is enjoyed by all. The officers have built a court for squash rackets, a nine-hole golf course has been laid out at the rear of the School, and two tennis courts are to be found in the valley below the Mess; while for N.C.Os. and men, there is a large recreation ground provided, suitable for football, cricket and other games, tennis courts are available, and they have a Regimental Institute. Hence from the consideration which is given to the development of both sides of a man's character, to the advancement in military efficiency and the cultivation of the love of out-door amusements—it is not surprising that such excellent results are obtained from those who pass through its curriculum, and of which there is ample evidence on joining the Squadrons.

WHAT TAIL-SLIDING ON A BLÉRIOT FEELS LIKE.

By MARCUS MANTON.

EDITORIAL NOTE.—Mr. Marcus Manton learnt to fly at the Grahame-White School at Hendon just over two years ago, being only 18 years of age when he obtained his brevet. Thereafter he joined the Grahame-White staff of instructors, and for two years flew regularly in all weathers at the week-end exhibitions at Hendon. He has carried numberless passengers, has trained scores of pilots, and is looked upon as one of the world's finest pilots of the box-kite type of biplane, on which he can do marvels of banking and spiralling. Early this year he was engaged by Mr. B. C. Hucks to give looping demonstrations and also act as his understudy. Manton soon mastered the 50 h.p. Blériot monoplane as effectually as the biplane, and he has already given numerous exhibitions of upside-down flying and looping-the-loop in various parts of the country, his total of loops being well over the century. Mr. Manton is a careful and observant flyer, and uses his head as much as his hands. In the following article he describes a recent experience whilst looping on a Blériot.



The experience I am going to describe took place at Newbold Revel Hall, near Rugby, on Saturday, July 18th. The atmosphere was full of *remous* even at 1,500 ft. I had already given a demonstration of vertical banking and steeplechasing, and I then went out to loop the loop.

I climbed to nearly 2,000 ft. to try to get out of the *remous*. After completing one loop successfully, I immediately started another vertical dive for another loop. This preliminary dive, by the way, is very necessary on a looping Blériot, as it is a comparatively slow machine, and has only a 50 h.p. Gnome. Gently pulling the control lever towards me, the nose began to rear up and I climbed till the machine was standing on its tail. Then, to my consternation, the motor started to splutter, and the next instant had ceased to work. For a fraction of a second the monoplane remained poised in the air absolutely stationary. Then it commenced to fall backwards, tail first. The noise it started to make is almost indescribable. The wires vibrated and screamed and whistled. Each wing seemed to flap and rattle like a flag in a stiff breeze—this, of course, being due to the wind getting hold of the thin and flexible trailing edge—the metal engine cowl joined in the chorus of noise in a lower key, and for a few seconds it certainly seemed as though the machine was going to break up.

Having plenty of altitude, I did not make any desperate efforts to get the machine back to its proper position. I just let her do what she liked. Down, down, we came, the speed increasing with every second until the rattling and roaring were simply deafening. All this time I kept my control lever pulled back in the normal position for looping. This would mean that the elevator was up, and in the ordinary way should have had the effect of bringing up the tail and levelling out the machine. But the tail-slide continued, so I thought I would make a little experiment. I pushed the lever forward until it was in a neutral position. I was able to do this quite easily, although, theoretically, it would seem that the rush of air on to the elevator would cause such a pressure that it would need great strength to alter the elevator's position. To my great surprise the fall was immediately checked, then with a hefty kick the machine made a forward plunge, slightly sideways, and then nosedived, after which I got level once again.

One would imagine that pushing the elevator to the normal position would tend to make the machine tail-slide all the more, but it was not the case, and the explanation I offer (which is open to correction by the scientific readers of FLIGHT) is that the machine being in a somewhat sideways position the elevator had a ruddering effect, and helped the machine more than ever to turn over sideways and sideslip before it turned into the usual nosedive.

Though not by any means my only tail-slide on the Blériot, it is the first time that I have experimented with moving the elevator. I must say that tail-sliding on a Blériot is most unpleasant, though perhaps on a Morane the experience is not so unpleasant owing to the balanced elevator, the stiffer nature of the wings, and its streamlined *fuselage*. These experiences have, however, given me even greater confidence in the Blériot, for although the machine underwent a very severe straining, there were no signs of weakness when I came to examine it after landing.

And once more it has been proved that provided one has enough altitude it is possible for a good aeroplane to recover from the most impossible position.

Marcus D. Manton.
July 23. 1914.

The Naval Assembly Photograph.

THOSE of our readers who may wish for copies of the photograph on page 801 of the officers of the Royal Naval Air Service taking part in the recent assembly at Calshot, may obtain them from Mr. F. N. Birkett, 97, Percy Road, London, W. The price of unmounted prints, 12 ins. by 10 ins., is 2*s.* 2*d.* each.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Diary of Events.

Aug. 1–3 ...	Aviation Meeting. Hendon Aerodrome.
Aug. 10–22	*Daily Mail* £5,000 Circuit of Britain Race. Starting from Southampton Water.
Sept. 27–28	Gordon-Bennett Aviation Race. Buc, France.

HENDON AERODROME.

Members of the Royal Aero Club are admitted free to the Hendon Aerodrome on presentation of their Club Membership Cards. The Membership Card admits the Member only—motor cars must be paid for.

DAILY MAIL £5,000 CIRCUIT OF BRITAIN RACE.

List of Competitors.

Official No.	Pilot.	Aircraft.
1	V. Mahl ...	Sopwith Biplane, 100 h.p. English *Monosoupape* Gnome. (Sopwith Aviation Co., Ltd., Kingston.)
2	C. H. Collet ...	Beardmore D.F.W. Biplane, 120 h.p. Beardmore Austro-Daimler. (Wm. Beardmore and Co., Ltd., Glasgow.)
3	C. H. Pixton ...	Sopwith Bat Boat, 225 h.p. Sunbeam. (Sopwith Aviation Co., Ltd., Kingston.)
4	C. Grahame-White	Grahame-White Biplane, 100 h.p. English *Monosoupape* Gnome. (Grahame-White Aviation Co., Ltd., Hendon, N.W.)
5	F. B. Fowler ...	E.A.C. Biplane, 120 h.p. Green. (Eastbourne Aviation Co., Ltd., Eastbourne.)
6	Capt. E. C. Bass ...	White and Thompson Seaplane, 120 h.p. Beardmore Austro-Daimler. (White and Thompson, Ltd., Bognor.)
7	F. P. Raynham ...	Avro Biplane, 150 h.p. Sunbeam. (A. V. Roe and Co., Ltd., Manchester.)
8	S. Pickles ...	Blackburn Biplane, 130 h.p. Dudbridge Salmson. (Blackburn Aeroplane and Motor Co., Ltd., Leeds.)
9	A. Loftus Bryan ...	White and Thompson Seaplane, two 100 h.p. Curtiss. (White and Thompson, Ltd., Bognor.)

This Race will start at 6 a.m. on Monday, August 10th, 1914, from the "Enchantress" (the Headquarters of the Royal Motor Yacht Club), which is moored off Netley Abbey.

The Royal Motor Yacht Club has kindly allowed the Royal Aero Club the use of the "Enchantress" for its headquarters from August 6th till the start of the Race on August 10th. The cabins are all booked up, but Members may go on board to witness the start. The progress of the competitors in the Race will be communicated to the "Enchantress" throughout the day. Members going on board the "Enchantress" will be made Honorary Members, and will be able to obtain meals.

Officials.

Stewards of the Race.

The Competitions Committee of the Royal Aero Club.

Marking Officials at Southampton.

Frank K. McClean, J. H. Nicholson, and Capt. C. H. Saunders.

Clerk of the Course and Secretary.

Harold E. Perrin.

Headquarters: "Enchantress," Netley Abbey.
Telephone: 2 Netley.
Telegrams: Perrin, Netley Abbey.

Controls and Control Officials.

Ramsgate.—*Headquarters*: Granville Hotel.
Telegrams: Aeroplanes, Granville, Ramsgate.
Officials: Harry DelaCombe and Roy DelaCombe.

Yarmouth.—*Headquarters*: Naval Air Station.
Telegrams: Aeroplanes, Great Yarmouth.
Officials: Lieut. R. Gregory, R.N., Lieut. C. L. Courtney, R.N., Capt. Henry Fawcett, Lieut. William G. Sitwell, Sub-Lieut. Ronald H. Kershaw, and A. J. A. W. Barr.

Scarborough.—*Headquarters*: Grand Hotel.
Telegrams: Aeroplanes, Grand, Scarborough.
Officials: C. G. Grunhold and Robert Loraine.

Aberdeen.—*Headquarters*: Palace Hotel.
Telegrams: Aeroplanes, Palace Hotel, Aberdeen.
Officials: Capt. G. W. Dawes, R.F.C., C. J. Waldie and James Clinkskill.

Fort George.—*Headquarters*: Naval Air Station.
Telegrams: Aeroplanes, Fort George.
Officials: Lieut. D. A. Oliver, R.N., and Capt. C. S. Nairne.

Oban.—*Headquarters*: Great Western Hotel.
Telegrams: Aeroplanes, Western, Oban.
Officials: J. Allison, Jr. (Secretary, Scottish Aeronautical Society), Robert Chalmers, W. K. Chalmers, R. C. Kemp, and James G. Weir.

Kingstown, Dublin.—*Headquarters*: Royal St. George Yacht Club.
Telegrams: Aeroplanes, St. George Club, Kingstown.
Officials: John D. Dunville (Chairman, Aero Club of Ireland), Major E. H. C. Wellesley, E. White, J. C. Percy, F. Trench, Oliver Fry, and D. F. Gillman (Secretary, Aero Club of Ireland).

Falmouth.—*Headquarters*: Royal Cornwall Yacht Club.
Telegrams: Aeroplanes, Yacht Club, Falmouth.
Officials: Claude Foster, Capt. E. J. K. Nicholls, R. G. Borne, F. G. Dawson, and M. Wright.

Aerial Navigation Acts, 1911 and 1913.

Exemption.

The Secretary of State hereby grants the following Exemption from the Orders under the Aerial Navigation Acts, 1911 and 1913, made by him March 1st, 1913, and May 25th, 1914:—

Seaplanes taking part in the *Daily Mail* Circuit of Great Britain Race, 1914, may, during the course of the race, pass within the following prohibited areas, subject to the conditions specified below:—

1. *Spithead*: On condition that (1) all seaplanes, starting from Southampton Water near Calshot or Hamble, shall pass between the Calshot and Calshot Spit Lightships; they shall fly thence in a direct line to Horse Sand Fort, passing within a distance of 400 yards from that Fort, and thence East South East into the English Channel. Competitors desiring to proceed Westward after passing Horse Sand Fort as above, shall pass the Nab Lightship, leaving it on the right hand, and shall then pass South of St. Catherine's Point off the Isle of Wight. (2) All seaplanes returning to Southampton Water (*a*) if coming from the Westward, shall pass South of St. Catherine's Point, thence to the Nab Lightship, leaving it on the left hand, and thence to Horse Sand Fort; or (*b*) if coming from the Eastward, shall after rounding Selsey Bill proceed on a West North Westerly course towards Horse Sand Fort. They shall pass Horse Sand Fort within a distance of 400 yards of that fort, and shall then proceed to Southampton Water by the same course and under the same conditions as at the start. While in the Spithead prohibited area, no seaplane shall rise to a greater height than 300 feet above sea level.

2. *Dover Castle and Archcliffe Fort*: on condition that no competitor shall pass nearer the shore than a distance of 800 yards seaward from the end of the Admiralty Pier, nor at a height exceeding 300 ft.

3. *Newhaven, Lydd and Montrose*: these areas shall not be prohibited to persons competing in the race.

4. *All other Prohibited Areas in the Line of Flight*: on condition that no competitor flies within 800 yards of the land or at a greater height than 300 feet above sea level while passing through the prohibited area.

5. No departure from these conditions shall be permitted except in case of emergency.

(Signed) EDWARD TROUP, Under Secretary of State.
Home Office, July 18th, 1914.

COMMITTEE MEETING.

A Meeting of the Committee was held on Tuesday, July 28th, 1914, when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Prof. A. K. Huntington, Major F. Lindsay Lloyd, Mr. F. K. McClean, Mr. Mervyn O'Gorman, C.B., Mr. C. F. Pollock, Mr. T. O. M. Sopwith, and the Secretary.

New Members.—The following new members were elected:—George W. Beatty, Algernon Boyesen, Alexander L. Howard, J.P., William Thomas Vere-Wayte Wood.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

838 1st Class A.M. William Boyle Power, R.F.C. (Maurice Farman Biplane, Central Flying School, Upavon). July 1st, 1914.
839 Master Mariner Alfred William Clemson, R.N.R. (Vickers Biplane, Vickers School, Brooklands). July 14th, 1914.

840 Lieut. Alastair St. John Munro Warrand (Black Watch) Vickers Biplane, Vickers School, Brooklands). July 14th, 1914.
841 Thomas Forster Rutledge (Bristol Biplane, Bristol School, Brooklands). July 14th, 1914.
842 (Hydro-aeroplane) Rear-Admiral Mark Edward Frederic Kerr (Sopwith Biplane, Royal Hellenic Naval Air Station, Eleusis, Greece). July 14th, 1914.
843 Percy Dickson Robinson (Grahame-White Biplane, Grahame-White School, Hendon). July 16th, 1914.
844 Henry John Lloyd (1st Class Stoker, R.N.) (Maurice Farman Biplane, Central Flying School, Upavon). July 17th, 1914.
845 William Campbell Adamson (Bristol Biplane, Bristol School, Brooklands). July 17th, 1914.
846 Stephenson MacGordon (Sopwith Biplane, Sopwith School), Brooklands). July 17th, 1914.
(Subject to permission of Aero Club of America.)
847 John Scott Bradbury Winter (Grahame-White Biplane, Grahame-White School, Hendon). July 18th, 1914.
848 Henry Pagan Lowe (Grahame-White Biplane, Grahame-White School, Hendon). July 20th, 1914.
849 Arthur Gelston Shepherd (Grahame-White Biplane, Grahame-White School, Hendon). July 21st, 1914.
850 William Percy Parker (1st Air Mechanic) (Maurice Farman Biplane, Central Flying School, Upavon). July 21st, 1914.
851 Lieut. Thomas Ralph Wells (33rd Punjabis), (Vickers Biplane, Vickers School, Brooklands). July 21st, 1914.
852 Lieut. Angus George Gillman, R.H.A. (Vickers Biplane, Vickers School, Brooklands). July 21st, 1914.
853 Capt. Harry Tailyour Lumsden (Cameron Highlanders), (Vickers Biplane, Vickers School, Brooklands). July 22nd, 1914.
854 Thomas Hinshelwood (Vickers Biplane, Vickers School, Brooklands). July 27th, 1914.

Accidents Investigation Committee.—It was unanimously resolved that the following statement be published :—

The Committee of the Royal Aero Club has had its attention called to an article which has appeared in one of the journals devoted to aviation, on July 8th, 1914, over the initials "C.G.G.," dealing with a report of the Accidents Investigation Committee.

The Committee considers that the statements made in this article are untrue and uncalled for, and that the writer has improperly attacked the Accidents Investigation Committee by deliberately imputing unworthy motives without any foundation.

Gordon-Bennett Aviation Race.—The report of the Competitions Committee was received and adopted.

***Daily Mail* Circuit of Britain Race.**—The arrangements for this Race were reported and approved.

Accidents Investigation Committee.—The reports on the fatal accidents to Capt. C. R. W. Allen, R.F.C., and Lieut. J. E. G. Burroughs, R.F.C., and Mr. E. T. Haynes were adopted and ordered to be published *in extenso.*

(Full reports will be found following these Notices.)

COMPETITIONS COMMITTEE.

The Competitions Committee met on Friday, July 24th, 1914, at five o'clock.

Gordon-Bennett Aviation Race.—Letter was read from the British and Colonial Aeroplane Co., Ltd., withdrawing their entry for the race on account of pressure of work. It was decided not to hold the Eliminating Trials at Upavon as previously arranged. In the event of eliminating trials being necessary, they will be held at Buc a few days prior to the actual race, which is fixed to take place on September 27th and 28th next.

***Daily Mail* Circuit of Britain Race.**—The secretary reported fully on the arrangements at the various controls and Southampton, which were approved.

Gordon-Bennett Aviation Race, Buc, September 27th and 28th, 1914.

The Race for the Gordon-Bennett Aviation Cup will take place at Buc, near Paris, on September 27th and 28th, 1914. It is expected that the British Empire will be represented by a team of three competitors, to be selected from the following entrants :—

Sopwith Aviation Co., Ltd.
Messrs. A. V. Roe and Co., Ltd.
Messrs. Vickers Ltd.
Cedric Lee Co., Ltd.

Several Members have expressed a wish that the Club should organise a party to attend this International Race, thus obtaining railway tickets at reduced fares. Members wishing to join this party are requested to send in their names at the earliest possible moment to the Secretary of the Royal Aero Club, and, providing a sufficient number is forthcoming, the necessary arrangements both as regards railway fares and hotels will be made.

ACCIDENTS INVESTIGATION COMMITTEE OF THE ROYAL AERO CLUB.

REPORT No. 25.

Report on the Fatal Accident to Capt. Clement Robert Wedgwood Allen, R.F.C., and Lieut. James Edward Godfrey Burroughs, R.F.C., when Flying at Netheravon, Salisbury Plain, on Wednesday, March 11th, 1914, at about 9.25 a.m.

Brief Description of the Accident.—Capt. C. R. W. Allen was flying a B.E. Biplane, No. 204, fitted with an 80 h.p. Gnome engine, with Lieut. J. E. G. Burroughs as passenger, at Netheravon, Salisbury Plain, on Wednesday, March 11th, 1914. The aircraft, which had been in the air about 5 minutes, had made nearly a complete circuit and was turning in the direction of the sheds. When at a height of about 350 feet, the rudder was seen to leave the aircraft which then made a spiral dive to the ground. The pilot and passenger were both killed and the aircraft was completely wrecked.

Capt. C. R. W. Allen (aged 36) was granted his Aviator's Certificate, No. 159, on November 14th, 1911, by the Royal Aero Club, and Lieut. J. E. G. Burroughs (aged 30) was granted his Aviator's Certificate, No. 1213, on January 31st, 1913, by the Aero-Club de France.

Report.—The Committee sat on June 16th and 30th and July 14th and 27th, 1914, and received the report of the Club's representative who visited the scene of the accident within a short time of its occurrence, together with the evidence of eye-witnesses. The Committee also had before them the report of the National Physical Laboratory, dated May 20th, 1914, on the fracture of the rudder-post of B.E. Biplane No. 204. In this report the condition of the metal of the steel tube which formed the rudder-post has been very thoroughly investigated. The Committee was also furnished with the results of mechanical tests on similar rudders manufactured at the same time.

From the consideration of the evidence the Committee regards the following facts as clearly established :—

1. The aircraft was built by the Royal Aircraft Factory in June, 1912.
2. There was practically no wind at the time of the accident.
3. The main rudder tube was fractured at the base of the rudder just below where the rudder-post passes through the frame of the rudder and is welded to it.
4. The rudder which became detached from the aircraft in the air was picked up 126 yds. from the spot where the aircraft fell.
5. The control wires were found to be intact.

Opinion.—The Committee is of opinion that the rudder was sufficiently strong to withstand the ordinary stresses of flying but was insufficiently strong to resist the greatly increased stresses of modern flying and rough usage, and had probably been damaged in this way prior to this particular flight.

Recommendation.—In consequence of the greatly augmented stresses now imposed on aircraft due to the increased skill and daring of aviators in high winds in connection with sharp turns and similar manœuvres, it is recommended that the attention of constructors be drawn to the necessity of making due allowances for these increased stresses, combined with proper allowances for deterioration due to wear and tear, and the possibility of flaws in the materials themselves.

ACCIDENTS INVESTIGATION COMMITTEE OF THE ROYAL AERO CLUB.

REPORT No. 26.

Report on the Fatal Accident to Mr. Ewart Temple Haynes, when Flying as a Passenger with Mr. Ronald C. Kemp, at Wittering, near Chichester, on Monday, February 23rd, 1914, at about 11.45 a.m.

Brief Description of the Accident.—Mr. Ronald C. Kemp was flying an F.E. 2 Biplane, fitted with a 70 h.p. Renault engine, at Wittering, near Chichester, on Monday, February 23rd, 1914, at about 11.45 a.m., with Mr. E. T. Haynes as a passenger. The flight lasted about 5 minutes, and from a height of about 500 feet, the aircraft was observed to be making a steep right-hand spiral descent, but not heavily banked. The spiral descent continued until the aircraft hit the ground. The aircraft was completely wrecked, the pilot, Mr. R. C. Kemp, sustained serious injuries, and the passenger, Mr. E. T. Haynes, was killed.

Mr. Ronald C. Kemp (aged 24) was granted his Aviator's Certificate, No. 80, on May 9th, 1911, by the Royal Aero Club.

Report.—The Committee sat on July 14th and 27th, 1914, and received the report of the Club's representative who visited the scene of the accident within a short time of its occurrence, together with the evidence of eye-witnesses. Mr. Kemp also attended and gave evidence.

From the consideration of the evidence the Committee regards the following facts as clearly established :—

1. The aircraft was an experimental one and was built at the Royal Aircraft Factory, Farnborough, in August, 1913.
2. The wind at the time of the accident was about 30 m.p.h.
3. The pilot, Mr. R. C. Kemp, had flown the aircraft previously in several tests at Farnborough, under similar conditions of load.
4. The control wires were found to be intact.
5. The field where the pilot got into the aircraft was wet and muddy.
6. The pilot remembers nothing that occurred on the day of the accident.

Opinion.—The Committee is of opinion that there is no positive evidence to show why the accident occurred, but such evidence as is available points to the conclusion that the most probable cause was that the pilot's foot slipped over the rudder-bar, and that he thus lost control.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—Monday last week, rather windy. No. 152 Short sociable was the only machine up. Tuesday, fine. The undermentioned up several times during the day :—No. 45 Caudron, 34 and 1 Short, and 152 Short sociable. Wednesday, windy. No. 152 Short sociable, 45 Caudron, 1 Short, 34 Short. Thursday, windy. No. 41 Avro, 34 Short, 1 Short, 152 Short sociable, cross-country trips. Friday, showery. 152 Short sociable.

Civilian Flying.—Mr. F. McClean out on his 160 h.p. Short hydroplane, taking two passengers and mechanic at Harty.

Brooklands Aerodrome.

ON Monday morning last Mr. Mahl was testing the "Circuit of Britain" Sopwith (100 h.p. Gnome monosoupape) and Mr. Raynham an 80 h.p. Avro. In the afternoon Mr. Raynham, with his mechanic (Clifton) as passenger, to Farnham on 80 h.p. Avro; Mr. Mahl on 100 h.p. Gnome-Sopwith; Mr. Barnwell, with passenger on Vickers gun 'bus to Farnborough, where the machine was officially tested to do a fraction under 70 m.p.h., with a slow speed of 40 m.p.h. ; Mr. Merriam doing spiral on Bristol biplane, and Mr. Dukinfield Jones out on D.F.W. ; Bristol, Vickers, and Blériot pupils out.

Mr. H. Racine-Jacques, who recently secured his *brevet* at the Bristol Flying School, Brooklands.

Vickers, Blériot and Bristol pupils out Tuesday morning. Mr. Alcock started for Wolverhampton on the 100 Sunbeam, reaching there in 108 mins., after having to descend at Snitterfield, near Warwick, owing to fog. Mr. Barnwell cross-country on Vickers radial biplane ; in the afternoon Mr. Creagh taxying on his Bristol tractor biplane, Mr. Raynham with his mechanic (Clifton) to Farnborough to deliver another 80 Avro, Mr. Gower across country on 50 Blériot, Mr. Hawker "looping" on his Sopwith biplane, Mr. Barnwell in from Farnborough on the Vickers gun 'bus with Mr. Waterfall as passenger, Mr. Dukinfield Jones out on D.F.W. Blériot, Vickers, and Bristol pupils out. *Brevet* tests in excellent style by Lieuts. Wells (altitude 3,700), and Gillman (altitude 700).

Wednesday, Bristol, Blériot, and Vickers school work. Mr. Copland Perry and Mr. Glew straights on the Perry-Beadle biplane ; in the afternoon, Mr. Dukinfield Jones on D.F.W., and Mr. Serge de Bolotoff testing engine of triplane. Bristol, Blériot, and Vickers school work. *Brevet* tests in good style by Capt. Harry Lumsden (altitude 600).

Mr. T. F. Rutledge, an Australian pupil, who on July 14th obtained his *brevet* at the Bristol School, Brooklands.

Lieut. Lawrence, with Lieut. Waterfall as passenger in from Farnborough on B.E., Thursday afternoon, Mr. Gower out on 50 Blériot.

Capt. J. F. A. Kane (2nd Devonshire Regt.), who recently took his certificate at Vickers Flying School, Brooklands.

On Friday, Mr. Hawker on Sopwith "scout" to Farnborough, Messrs. Jullerot and Stutt out on Bristol biplanes.

Saturday morning, Lieut. Waterfall on Martinsyde monoplane to Farnborough, Mr. Barnwell with passenger on Vickers gun 'bus: in the afternoon, Mr. Hawker flying well in strong wind on his Sopwith "looper."

Sunday afternoon, Mr. Hawker gave some excellent demonstrations of "looping-the-loop" on his Sopwith biplane in a very gusty wind, and also took up one or two passengers. One enthusiast wanted to "loop-the-loop" with Mr. Hawker, but was persuaded to postpone it for more favourable conditions. The winner of the ballot for the free passenger flight—Mr. W. H. Norton, Hon. Secretary of the Reigate, Redhill and District Aero Club—elected to defer his trip until there was less wind.

Blériot School.—Rolling and straights on 25, 28, and 35 h.p. Messrs. R. Creagh 14 mins., G. Pitt 24 mins., L. Treloar 48 mins., J. Brooke 20 mins., Comte FitzJames 20 mins., Lieut. Commanch Fraser 46 mins. Circuits: Mr. A. Crick 8 mins.

Bristol School.—Monday, last week, passenger tuition to Lieut. Sanders (2), Lieut. Hewitt (2), Lieut. Moule (3), solo and figure of eight by Lieut. Lawrence.

Tuesday, passenger tuition to Lieut. Sanders (4), Lieut. Hewitt (4), Lieut. Moule (2), solo by Mr. Collins and figure of eight by Lieut. Lawrence.

Wednesday, passenger tuition to Lieut. Hewitt (4), Lieut. Moule (3), solos by Mr. Collins, Lieut. Sanders (4), Lieut Coles (2).

Thursday, windy. Friday and Saturday, no school work possible.

Vickers School.—Monday, last week, with instructor: Capt. Lumsden, Lieut. Wells and Gillman solos.

Tuesday, with instructor: Capt Lumsden, Lieuts. Wells and Gillman solos. Lieuts. Wells and Gillman for *brevets* in excellent style, Lieut. Wells ascending to 3,700 ft. in height test, constituting a record performance for a pupil. Capt. Lumsden solo.

Wednesday, Capt. Lumsden solo, and for *brevet* in fine style.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Messrs. Duncan, Wyles and Courtney straights with Instructors Howarth and Lillywhite. Mr. Lowe *vol plané*, &c., obtaining his pilot's certificate.

Tuesday, Mr. Shepherd competing for and obtaining his *brevet*. Messrs. Murphy, Liu, Hain, Duncan, Stalker and Upton straights with Instructors Barrs, Dunn and Howarth. Messrs. Carabajal, Hawkins and Strickland (new pupils) rolling with instructors and alone. Mr. Palmer solo straights.

Wednesday, Mr. Palmer solo straights. Messrs. Duncan, Gruning, Strickland, Liu straights with Instructors Barrs, Dunn and Howarth. Mr. Carabajal rolling with Instructor. Mr. North first part of *brevet* tests.

Thursday, Mr. Lister (new pupil) and Mr. Carabajal rolling with Instructor Dunn. Messrs. Duncan and Courtney straights.

Beatty School.—Monday last week, Messrs. Allen 4 mins. and Ruffy 10 mins. up with Baumann. Messrs. Bentley 12, Leong 10, Roche-Kelly 10, and Grunning (extra practice) 25 up with Watts.

Tuesday morning, Mr. Roche-Kelly 10, Lieuts. Maguire 12, and Browning-Paterson 10. Evening, Messrs. H. Keating 12, Bentley 10, Roche-Kelly 5, and Lieut. Maguire 12 up with Baumann.

Wednesday, Messrs. Leong 15, Travers 12, and Lieuts. Browning-Paterson 10, Brown 13, up with Watts, and Messrs. Ruffy 13, Roche-Kelly 5, Lieuts. Settle 10 and Brown 4 up with Baumann.

Thursday, Messrs. Bentley 5, Allen 5 up with Baumann.

End of week very bad weather, so no school was held.

British Caudron School.—Monday and Tuesday, last week, too windy for school to go out.

Wednesday, the Caudron school out at 5.30 a.m. under the instruction of René Desoutter and R. M. Murray. R. Desoutter test flight. Mrs. Buller 20 mins. flight, reaching height of 1,000 ft.

Thursday, Friday and Saturday weather too bad for school.

Hall School.—Monday, last week, A. F. Arcier circuits on No. 1 Caudron.

Tuesday, A. F. Arcier two circuits and figure eights on Caudron.

Wednesday, A. F. Arcier took the first two-thirds of his Royal Aero Club certificate with well banked turns, and landing with well judged *vol plané*. Messrs. Henry Gearing and A. L. Brookes now ready to complete their certificates as soon as weather changes.

Shoreham Aerodrome.

Pashley School.—Instructors for week: B. F. Hale, E. and C. Pashley. New pupils: C. Winchester and C. Borton. - Up with instructor: E. Roberts, C. Winchester, and C. Borton. Circuits and 8's: W. Mortimer.

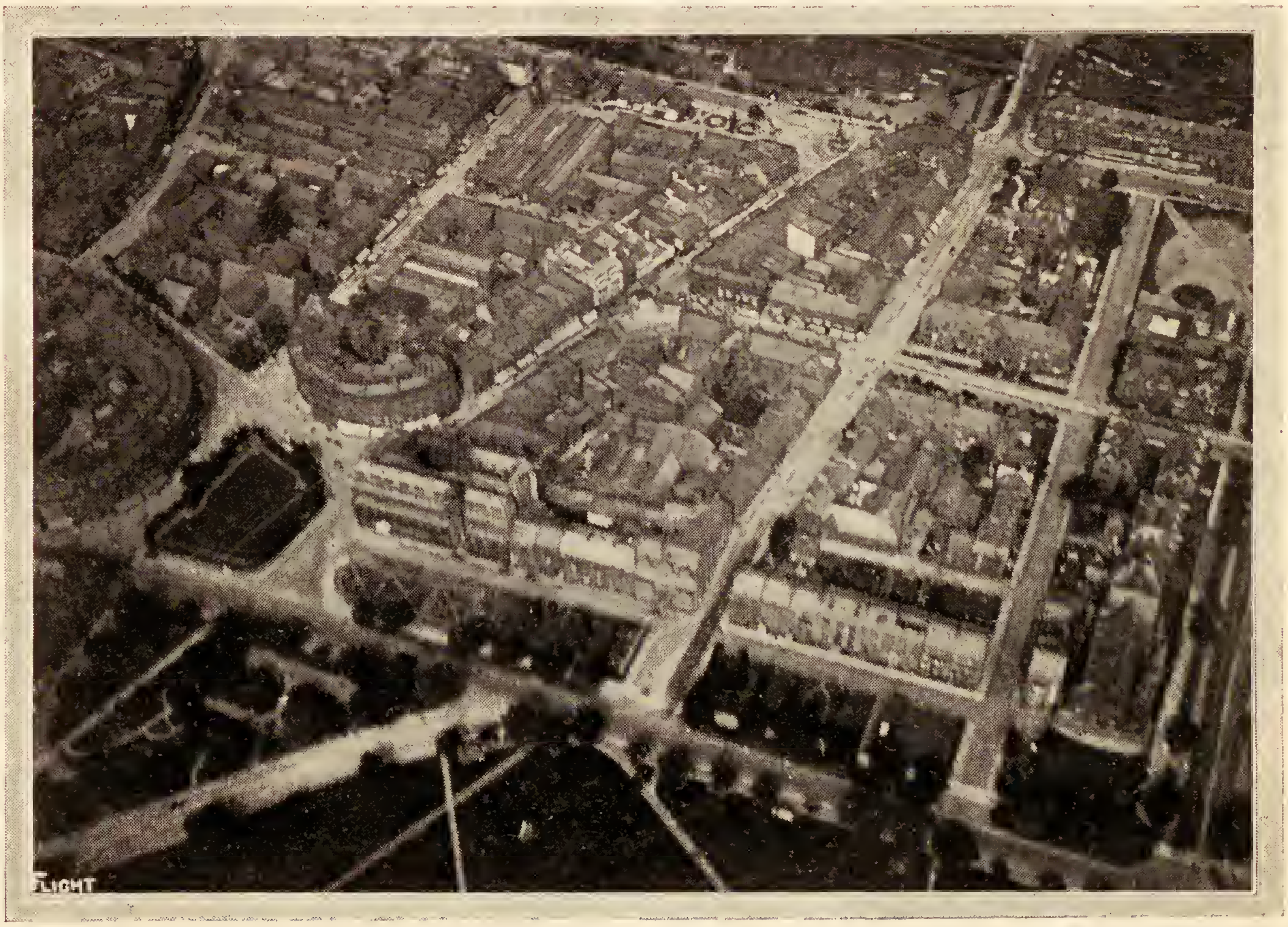


Photo Cornall.

A general view of Harrogate town, taken from Mr. W. Rowland Ding's aeroplane at 1,300 ft. high, showing the railway station, Victoria Monument, Station Parade, Albert Street, James Street, Prospect Hotel and Crescent, Alexandra Hotel and West Park.

EDDIES.

IT appears that pupils at the Vickers school at Brooklands are not always content with merely passing the required tests when flying for their brevet, but that some of them have such confidence in their ability as pilots, after the thorough tuition they have received from the instructors of the school, that they frequently go far beyond the stipulations of the tests, just by way of making doubly sure of their efficiency in piloting. The same probably applies to pupils of other schools, but when it comes to "calling down" a pupil I should think that Mr. Barnwell can claim the distinction of being the first instructor to back up his authority with a machine gun.

Quite recently a pupil when flying for his ticket, took one of the school machines up to an altitude of 3,700 feet. When he had reached a height of about 2,000 feet, and still showed no signs of intending to come down, and as the 'bus was wanted by another pupil, Mr. Barnwell gave chase on the gun-carrying biplane, presumably with the intention of opening fire if it was found impossible to bring the pupil down by gentler persuasive methods. For some time the two machines circled round and round, climbing steadily, before Barnwell could get near enough to attract the attention of the pupil, the latter shut off his engine, and came down in an excellent spiral *vol plané*. It was later ascertained that he had reached an altitude of 3,700 feet, a very fine performance considering that the machine was a school 'bus fitted with an engine of 50 h.p. only.

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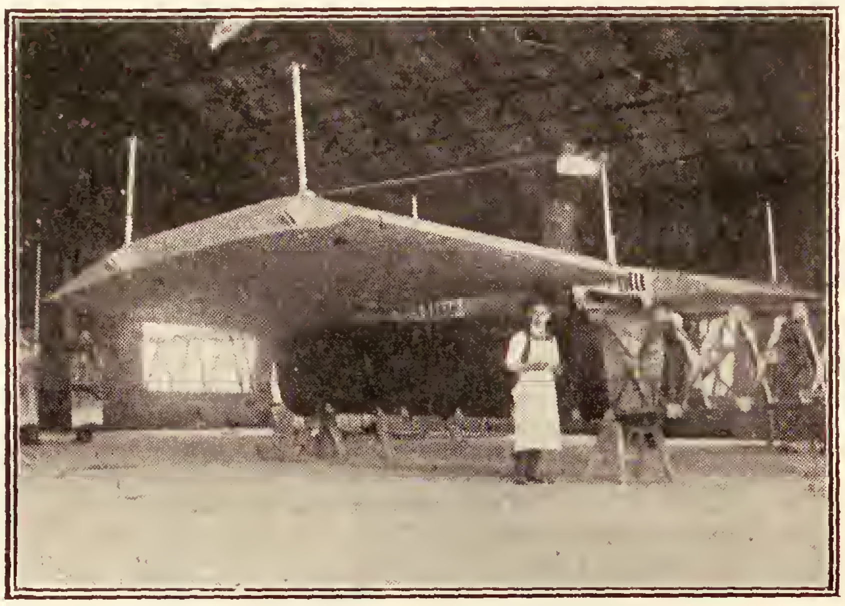
A new Vickers gun-carrying biplane made its first appearance at Brooklands last week. Mr. Barnwell had flown the older machine, which was described in FLIGHT a short time ago, over to the works at Joyce Green, and later returned on the new biplane, which had just left the stocks. In its general appearance the latest gun-carrier is a replica of the previous one, but several details have been altered. Head resistance has been reduced, wherever possible, as for instance in the arrangement of the control cables. The rudder and elevator cables pass along the tail booms in the usual way, but are then taken round pulleys and run parallel with the bracing cables of the inner bay of the main planes, whilst the *aileron* cables are taken through fair leads on the leading edge of the lower plane. Instead of the rotatable hand-wheel with which the previous machine was fitted, a single central lever actuates the *ailerons*. The bracing wires in the tail outrigger have been replaced by stranded cables, probably with a view to eliminate, as far as possible, any danger of breakage and consequent possibility of them getting entangled in the propeller. Constructionally, the machine is a beautiful piece of work, both as regards workmanship and finish, and aerodynamically it appears to be very efficient. Under the clever piloting of Mr. Barnwell, the new gun-carrier flies exceedingly well, and although it is comparatively new it has already been put through all manner of tests. The first day this machine was in the air Mr. Barnwell, on his arrival at Brooklands, did some fancy flying before coming down, including spirals and most alarming banks, that is to say, banks which would have been alarming had the pilot been less experienced.



The *fuselage* of the immense Martinsyde monoplane, showing central sections of wings in place. The wing extensions are considerably larger than these centre parts of the planes, to which they are secured by means of the lugs seen in the photograph.

THE GRAHAME-WHITE AVIATION CO LTD
THE LONDON AERODROME HENDON
FLIGHT

The G.-W. waterplane, constructed for the Circuit of Britain, leaving Hendon for Southampton on Saturday last.

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The enterprise and progress of the D.F.W. firm is a thing to be marvelled at. No sooner have that firm turned out machines which beat world's altitude and distance records, that Mr. Kny tells me of a new machine which we may expect to see over here shortly. If it is found possible to get this new biplane finished in time, there is a possibility of it being entered for this year's Gordon-Bennett Race. Although I am not permitted to disclose details at present, I will take the risk of incurring Mr. Kny's wrath by informing my readers that the span of this new "stunt" 'bus is only 18 feet. It is fitted with a 200 h.p. engine, and Mr. Kny anticipates a maximum speed of well over 2 miles per minute. In spite of this extraordinary performance, the new scout will, I am told, get off after a run of 150 yards.

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From Australia comes a letter from Mr. G. H. Johnston, Auburn, Victoria, which throws light on several subjects in connection with aviation in the Antipodes, particularly the lack of interest taken by the daily Press in the progress of the art. Mr. Johnston says: "As a reader of FLIGHT, from the columns of which I am gradually picking up a knowledge of aeronautics, in the hope of some day taking an active part in aviation, I am much impressed by your remarks anent the lack of interest displayed by the daily papers in the Monaco Aerial Rally. I feel that I must inform you that out here in Australia we are also deprived of a knowledge of these matters, which it is our right to know."

"We saw in the papers a few weeks ago that a man named Marty had been killed whilst flying, but that is about all that was said. If, as I suppose, it was poor Philippe Marty that was killed, I think that his position as a successful pilot entitled him to a bit more of a report than that. It took the loss of Gustav Hamel to wake them up for a few days, when they reported that he was missing, and then proceeded to tell their readers, two per cent. of whom had never heard his name or heard of his wonderful flights taking place almost daily in the old country, who he was in the world of flight."

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Turning his attention to flying in Australia, my correspondent continues: "On May 30th, M. Guillaux gave an exhibition of looping the loop at the Agricultural Show grounds, Melbourne. The performance was, of course, a revelation to the large crowds which had gathered both inside and outside the ground. I roughly estimate it at 25,000. A feature of the gathering was the great number of motorists who sink all their self-respect, if they have any, and get a free show rather than pay the few shillings necessary to admit them to the ground, a matter on which I was pleased to see you scathingly write a few weeks ago."

"It was the first time a monoplane had been flown publicly in Melbourne, although the Army aviators have flown one at their private grounds at Point Cook, fifteen miles from Melbourne, but it has long since become a total wreck. They are now flying two B.E. biplanes, and are getting pretty good results. On one occasion they flew over the bay and saw the landing of the new Governor - General. Later Lieut. Harrison with a passenger flew to Queenscliff and back without landing, a distance of about 80 miles." Finishing his letter with a criticism of the way the local daily papers report the flying meetings, Mr. Johnston says: "The evening papers on Saturday gave a report of Maurice Guillaux's looping and upside down flying, which for barrenness surpasses anything I have read in connection with flying matters. The daily papers on Monday tried to infuse a little life into their reports by going into what they are pleased to call 'details.' What would the lay mind make of this? 'The Blériot monoplane used on Saturday was driven by a rotary engine of the usual aeroplaning type.' 'Guillaux has announced his intention to fly Mr. Hordern's hydroplane from Sydney to Melbourne, a flight that has not been attempted yet. The distance is roughly 500 miles.'"

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Whilst Mr. Hucks was trying out his new 60 h.p. looping Blériot at Brooklands recently, rain started to fall. He was at a good altitude, so instead of landing he just turned his machine upside down and escaped the showers. Apparently, the modern aeroplane is quite a useful thing to have about the house.

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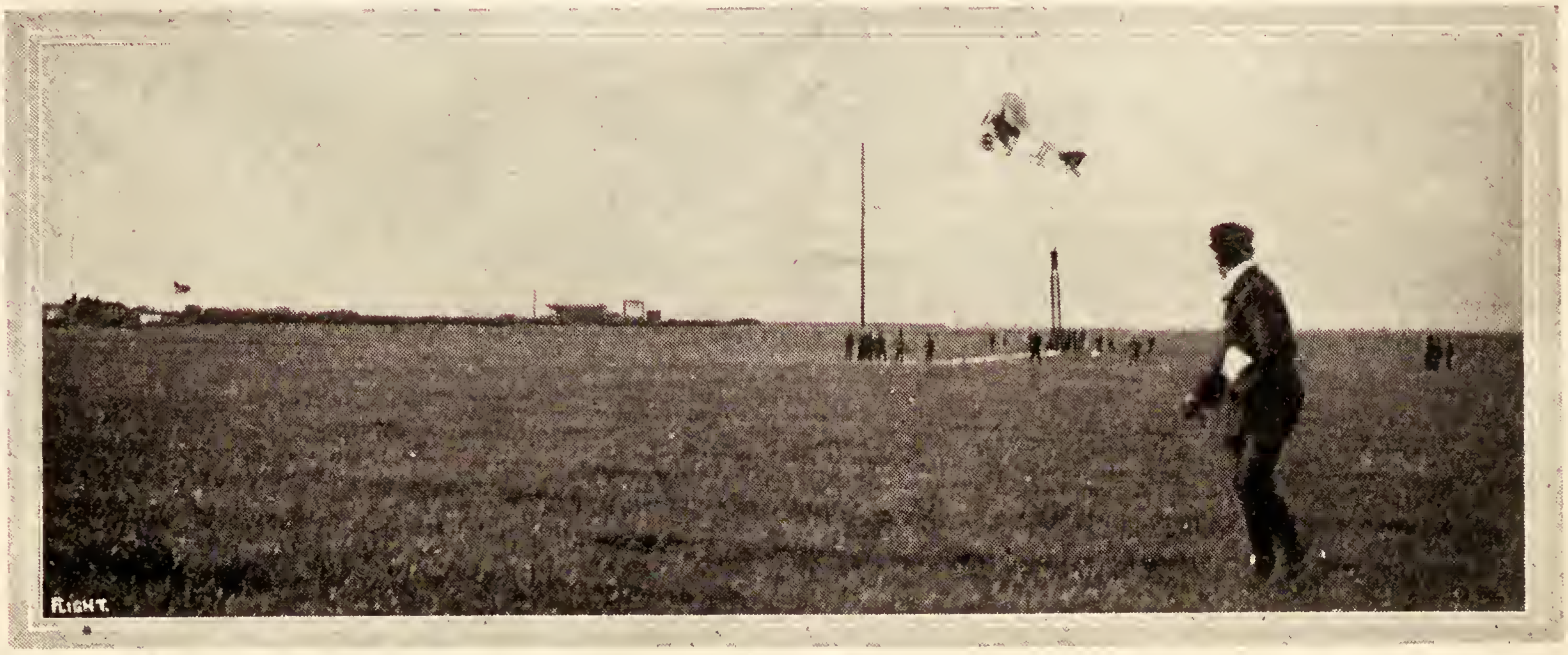
I had a chat with Mr. Sippe at Brooklands the other day about his experiences at the recent Vienna meeting, for which it will be remembered an 80 h.p. Bristol biplane had been entered. Unfortunately a refractory engine prevented Mr. Sippe from doing much flying over there, otherwise he feels confident that the Bristol would have compared very favourably with both the French and German machines entered for the meeting. It is all the more regrettable that Sippe's engine should so far forget itself as to leave him in the lurch at such an inopportune moment, since his was the only British machine entered.



A QUICK-RISING COMPETITION AT THE RECENT VIENNA MEETING.—Our photograph shows Poulet, on an 80 h.p. Caudron biplane, winning the contest by clearing a wire 10 metres high, starting 30 metres away, giving a climbing angle of 1 in 3.

Mr. Ridley Prentice, who has been on a voyage to South America, as mentioned at the time of his departure some weeks since, returned to this country a few days ago. A second glance at Mr. Prentice is hardly necessary to realise the enormous benefit which has resulted from his well-earned holiday. Although Mr. Ridley Prentice was under doctor's orders not to worry his mind with business cares, he was unable to keep his thoughts entirely from matters aeronautical, and apparently could not resist the temptation of perusing FLIGHT, as evidenced by a photograph on this page taken in the South Atlantic on board ship. With Mr. Prentice looking and—he tells me—feeling so fit, things may be expected to hum even more than they are already doing at the "G. A. C."

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A good many strange things happen to a pilot in the course of his career, but one of the oddest occurrences which have come to my knowledge struck Louis Noel recently when he was flying from Paris to Folkestone accompanied by Miss Trehawke Davies, in the latter's Blériot. In the neighbourhood of Abbeville, Noel had to come down in order to get his bearings, as mist and rain clouds prevented him from seeing the ground. A landing was successfully effected, but as the machine was running along the ground, Noel discovered—too late—a barbed wire fence right in front. The Blériot charged the fence, but by an extraordinary stroke of luck the propeller, which was still revolving, happened to be in a horizontal position for the short fraction of a second necessary for it to pass over the fence wire, so that no damage was done beyond a few scratches on the back of the propeller. And it was but a few minutes before Noel and Miss Davies were on their way again making for the French coast.

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In connection with Mr. Manton's visit to Leagrave last week, his mechanic Mr. Marmaduke Marsden had an unpleasant experience which also had its humorous side. Not being able to find a reliable night watchman to guard the machine in its tent, he elected to do the job himself. During the night, however, it came on to rain very heavily, and the rain found its way into the tent right on the spot where Marsden was sleeping. He was quickly drenched to the skin, and the aeroplane itself was getting very wet before he found the owner of the tent to repair the leaks. The night was still young and being a long way from dry garments he divested himself of his clothing, and improvised a suit composed of two sacks, tearing out holes for his head, arms and legs, the "suit" being held in position by strings round the waist. When Mr. Manton arrived at the tent in the morning the incongruity of a modern aeroplane receiving its morning toilet at the hands of what appeared to be a primeval cave-man, he describes as the funniest sight he has enjoyed for a very long while.

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The ever-growing list of "professionals" who have made the jump from the slanting boards to the pilot's seat has received a new addition in Mr. Chas. Weber, of Budapest, who has taken his "ticket" recently at the Grahame-White School at Hendon. Mr. Weber, who is an acrobat by profession, and who has appeared on many of the London halls, has done a considerable amount of flying on various machines in Hungary during the last two years, and has had several rather exciting experiences. On one occasion when Mr. Weber was flying for his ticket on a monoplane fitted with an experimental engine, and was doing some very artistic figures of eight, the engine and the machine dissolved partnership. The return to earth was nothing like as graceful as had been the figures of eight; in fact, it was very decidedly a case of "boys cassy." Fortunately Mr. Weber was not seriously hurt, but his judgment got the better of his patriotism, and he decided to journey to this country to learn flying on a real aeroplane.

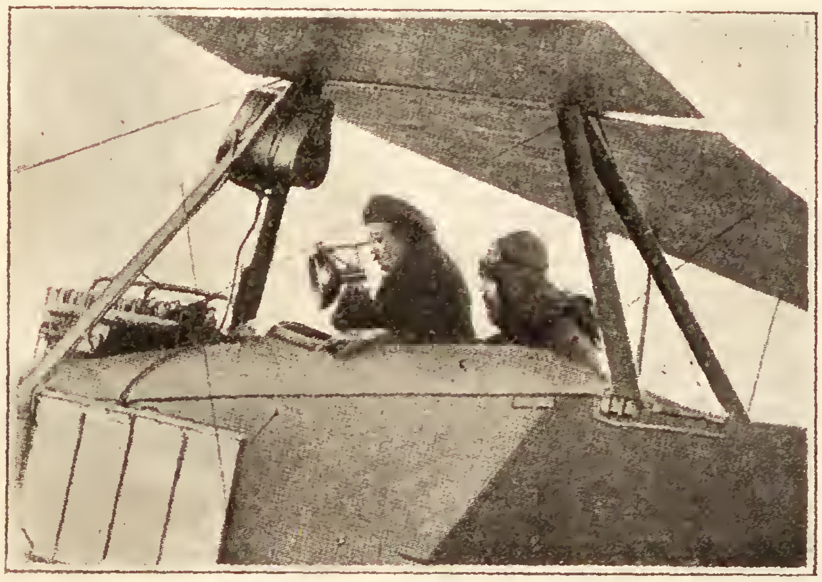
Chas. Weber, the Hungarian pilot who has taken his *brevet* at the Grahame-White School recently.

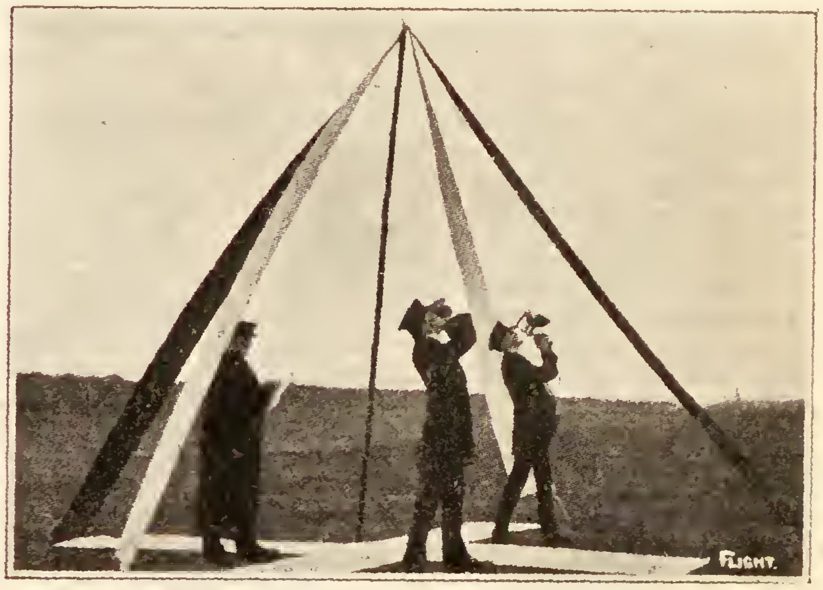
"ÆOLUS."

THE DONATH SIGNAL MIRROR.

A METHOD of visual signalling in broad daylight by electricity has been recently introduced by Professor Donath of Berlin. The principle upon which it is based is that at extremely high temperatures the light transmitted from incandescent lamps is greatly augmented, without a corresponding increase in the consumption of current. In consequence thereof, however, the life of the lamps is much diminished; but as, in signalling, the duration of a flash is so short, this consideration is entirely negligible, as many messages can be transmitted before renewal of a lamp becomes necessary. It is stated by the *Scientific American* that the full equipment necessary for signalling by this means, including a battery for the supply of electric current, weighs only 11 lbs., and hence the device is especially adapted for use on aeroplanes and airships.

The signal mirror itself, which is similar in appearance to that used in the motor headlight, contains a small incandescent bulb fitted with a special filament, and is so designed that the lamp can be adjusted axially inside the parabolic mirror, as may be required in order to transmit a parallel beam of light. The mirror and lamp are carried on a handle which is held by the signaller, the switch controlling the supply of current to the bulb being mounted on the handle. Above the top of the lamp is a sighting tube through which the signaller observes the point with which he desires to communicate, and by depressing the button on the lamp handle he may send out flashes of varying duration—a short flash (say) of two seconds corresponding to a dot and a longer one, of about six seconds, to a dash. Thus, by the adoption of some conventional system or code, such as the Morse alphabet, communication with distant points can readily be made. Under normal conditions, it is said that signals may be transmitted over a distance of about four miles.





From the Scientific American.

On the left, an observer in an aeroplane is shown in the act of transmitting a message to the ground, and on the right an observer is seen reading a message, while a signaller is standing by ready to reply thereto.

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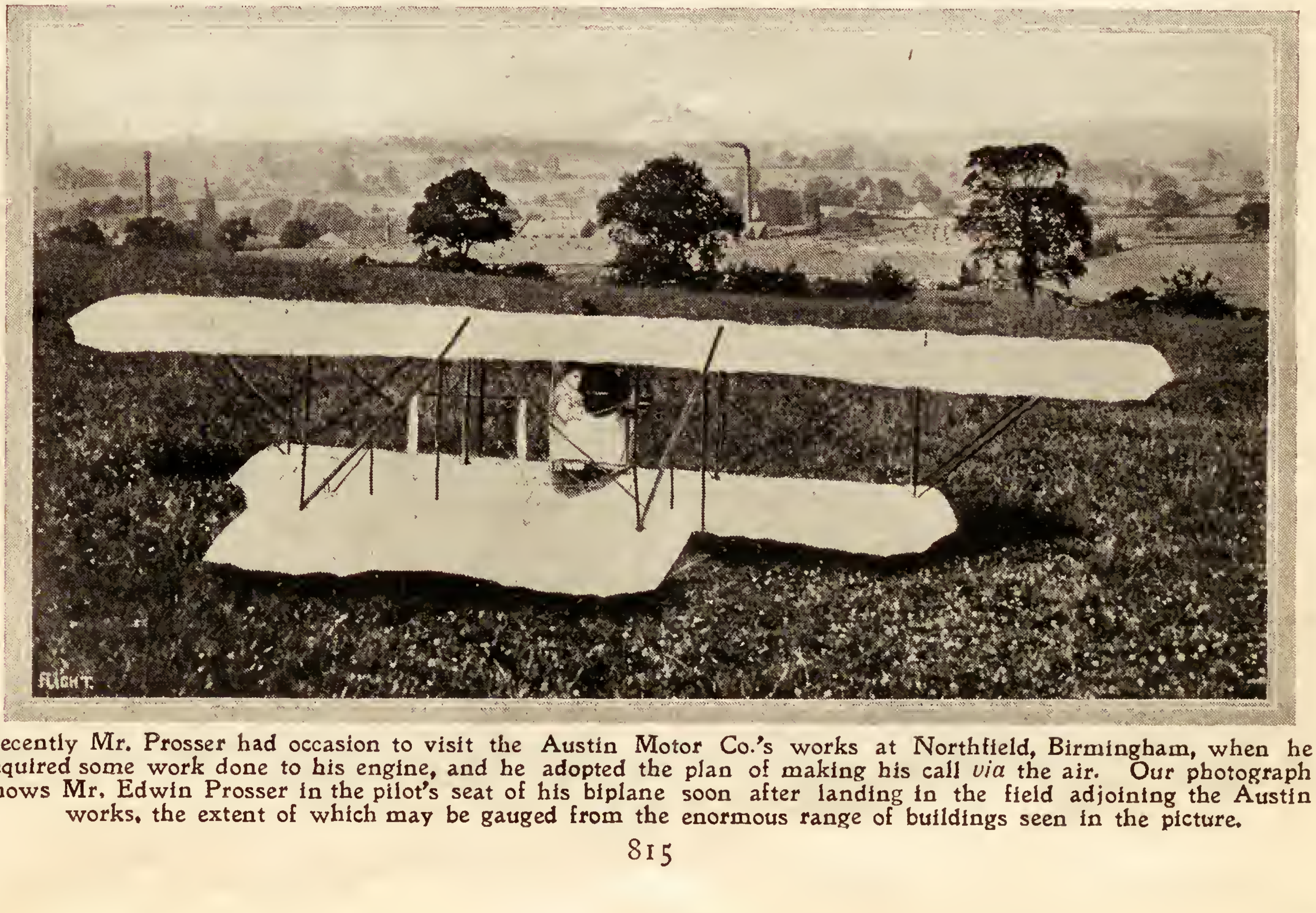
Aeronautical Society of Great Britain.

IT is officially announced that the date of the Associate Fellowship Election has been postponed until the middle of September, in order that candidates may be able to take advantage of the second part of Rule 28 with regard to payment of subscriptions.

The Trans-Atlantic Flight.

THE several alterations to the Curtiss flying boat "America," including the fitting of a third engine, not giving the required results, it is announced from Hammondsport, N.Y., that the hull is to be rebuilt. The attempt to cross the Atlantic is, therefore, postponed to October.

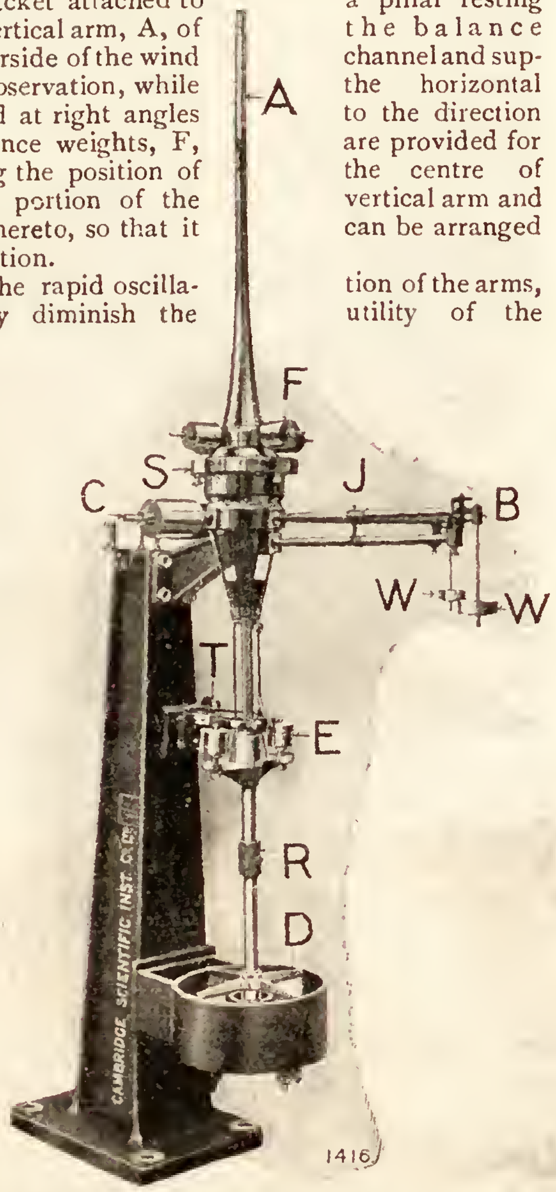


Recently Mr. Prosser had occasion to visit the Austin Motor Co.'s works at Northfield, Birmingham, when he required some work done to his engine, and he adopted the plan of making his call *via* the air. Our photograph shows Mr. Edwin Prosser in the pilot's seat of his biplane soon after landing in the field adjoining the Austin works, the extent of which may be gauged from the enormous range of buildings seen in the picture.

AN AERODYNAMIC BALANCE.

AMONG the apparatus exhibited by the Cambridge Scientific Instrument Co. at the Royal Society Soirée held on the 13th ult. was the Aerodynamic Balance which has been constructed for the Aeronautical Department of the Massachusetts Institute of Technology, U.S.A. The apparatus, which is shown in the accompanying illustration, is similar to those that were designed by the N.P.L. Staff for the experimental investigation of the stability of aeroplanes, and which are now in use at the N.P.L.

The main part of the balance consists of three balanced arms, A, B and C, at right angles to one another, the centre lines of which meet at a point where a steel centre is fixed. The weight of the balance, arms, &c., is carried by this centre which rests in a hollow cone supported by a bracket attached to a pillar resting upon the floor. The vertical arm, A, of the balance passes through the underside of the wind channel and supports the model under observation, while the horizontal arms are set parallel and at right angles to the direction of the wind. Four balance weights, F, are provided for the purpose of adjusting the position of the centre of gravity of the rotating portion of the vertical arm and of the model attached thereto, so that it can be arranged to lie on the axis of rotation.



The Aerodynamic balance, similar to those designed and used at the National Physical Laboratory.

In order to prevent the rapid oscillation of the arms, which would materially diminish the utility of the balance, dashpots are fitted at the several points — the largest being shown at D, where it is attached to an extension of the vertical arm below the point of support, the outer casing being carried on the vertical pillar. This dashpot damps the motion of the three principal arms of the balance in all directions.

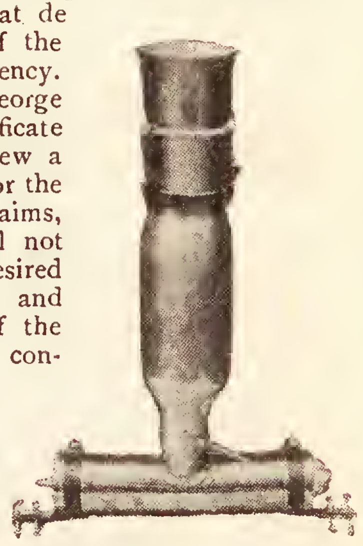
The arrangements made permit of the measurement of the forces acting upon a model, along the three fixed rectangular axes, as well as the moments of the forces about those axes. The determination of the forces and couples acting in the three planes — of which it is possible to make four simultaneously—is, however, rarely necessary, locking arrangements being provided for the purpose of reducing the number of degrees of freedom as may be desired. For the purpose of fixing the beams in a definite position, however, cross wires are attached opposite to each beam, and these are observed against lines ruled on mirrors attached to each balance arm. In order to avoid parallax, the line is made on the mirror surface, and the beam is in its position of equilibrium when this line is midway between the crosswire and its image, for any position of the observer's eye.

The forces on the model are counterbalanced by weights, W, which are suspended from the ends of the horizontal arms, a fine adjustment being provided by the movement of the jockey weights, J, along the arms. The force acting along the vertical axis is transmitted by a vertical rod, which slides freely inside the vertical arm of the balance, to a horizontal weighing lever, by means of which it is measured. To permit of rapid changes in the sensitivity of the balance, provision is made whereby weights can be placed upon the lower part of the vertical arm. The rotation of the balance about the vertical axis is prevented by a torsion wire, the torque being measured on the torsion head, T.

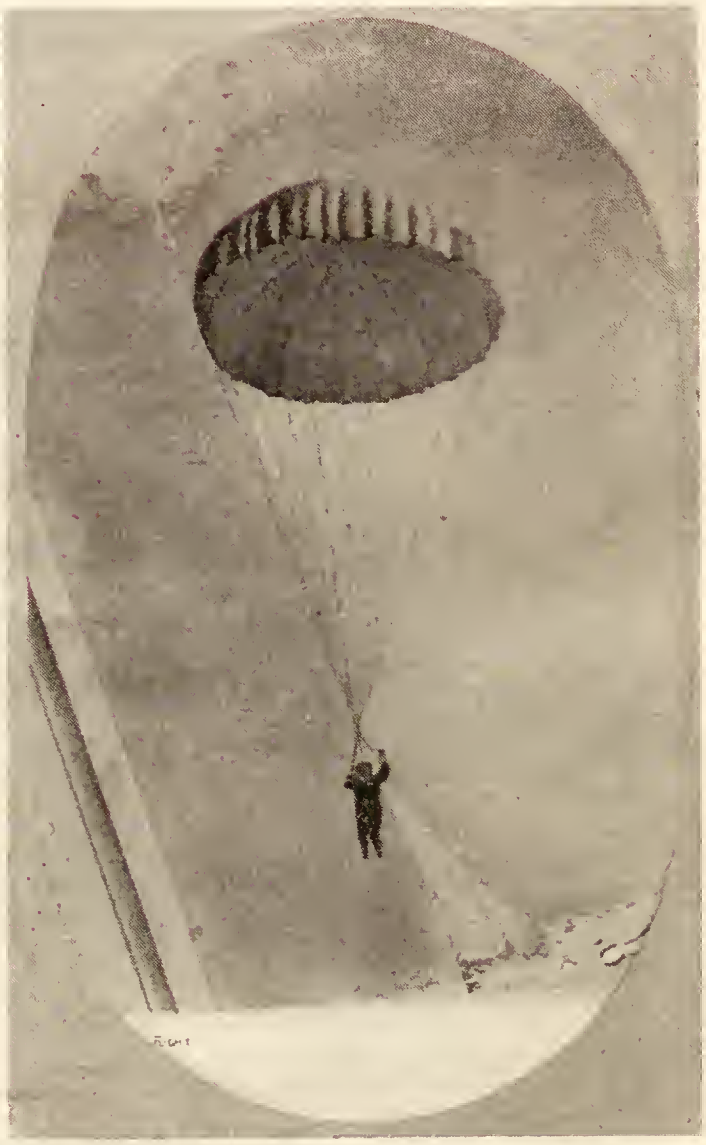
The model attached to the vertical arm can be rotated about two axes at right angles to the wind direction and to each other, so that experimental observations can be made for the determination of the lift and drift, and of the couples acting upon an aeroplane at any angle of incidence to the wind.

THE PRENSIEL LIFE-SAVING PARACHUTE.

THERE have been many advocates of the parachute as a means of saving life in case of accident to an aircraft, but this aspect of the problem has presented one or two difficult propositions that are not easily got over. Pegoud and others have demonstrated that it is possible to descend from an aeroplane by means of a parachute, but these descents have been made under pre-arranged conditions, whilst the recent fatal accident to Mme. Cayat de Castella has shown that the danger of the parachute not opening is a serious contingency. It is this latter problem at which Mr. George Prensiel—who obtained his pilot's certificate in January, 1912, and for some time flew a Blériot at Hendon—has been working for the last two or three years, and has, he claims, just produced an apparatus which will not only fully open the parachute at the desired moment, but will force the parachute and whatever is attached to it well clear of the aircraft. Briefly, the Prensiel apparatus consists of a steel cylinder containing compressed air at a high pressure, which is suitably mounted on the aircraft. Connected to this cylinder is a vessel in which is packed the parachute, which is attached to a movable seat occupied by the pilot. On opening a valve, the compressed air is admitted to the vessel containing the parachute, which is shot out of the container with some considerable force, opening fully immediately, and carrying the pilot and seat with it—leaving the machine to look after itself. A general idea of the apparatus can be obtained from the accompanying illustration, which shows Mr. Prensiel's latest model. The whole apparatus is exceptionally light, weighing only about 30 lbs., and is so constructed that it can easily be fitted to most modern machines. That it works successfully so far as expelling the parachute, opening the same, and lifting the weight of a man is concerned has been satisfactorily demonstrated on several occasions, and further developments will be awaited with interest.



The apparatus.



The Prensiel parachute, after having been "discharged," descending open near to one of the pylons at Hendon.

Aerodrome and Exhibition Flying.

FLYING AT HENDON.

The first event on Thursday of last week was the departure of Eugene Renaux for France on the 120 h.p. Maurice Farman which he flew in the London–Paris race. He left at 11 o'clock accompanied by Mme Renaux, and arrived in due course at Calais. Owing to the high wind, the biplane speed contest arranged for the afternoon had to be abandoned, so only exhibition and passenger flights were made. The first of these was made by Louis Noel, who ascended just before 3.30 p.m. on the 70 h.p. G.-W. Maurice Farman. He was followed five minutes after by R. J. Lillywhite on the 50 h.p. G.-W. bi-rudder 'bus who put up a really fine exhibition of "figure flying." The next up was R. H. Carr, who did some fast flying on the 80 h.p. Gnome-Morane-Saulnier, and shortly after, Pierre Verrier left for Farnborough on a new 70 h.p. Aircraft-Maurice Farman. Noel then took up a passenger on the Maurice Farman, after which W. L. Brock went up on another 80 h.p. Morane-Saulnier, and Lillywhite made four passenger flights on the bi-rudder 'bus. Carr also made another flight on the Morane-Saulnier, and A. E. Barrs took up a passenger on the bi-rudder 'bus. The last flight of the afternoon was made by Noel, who took up a lady passenger on the Maurice Farman.

On Saturday the wind had increased in violence considerably, necessitating the abandonment of the 12-mile speed handicap for the Stewart Dawson Trophy, which was the principal event down on the programme for the Blériot Meeting. The usual exhibition and passenger flying was also somewhat curtailed. Shortly after 3 o'clock W. Birchenough, who had been absent from the week-end meetings for some time, made a very fine flight on the G.-W. Maurice Farman. He was blown about considerably by the wind and received several nasty "bumps." Louis Noel then took over the machine, and he also had a very rough time of it. After waiting for half an hour or so in hope of the wind abating, Noel made another flight, but found conditions just as bad. At 5 o'clock R. H. Carr went up on the 50 h.p. G.-W. tractor biplane "Lizzie" with the intention of looping if conditions proved favourable. After making a sharp turn on getting off he commenced a circuit of the aerodrome, but when at the north end of the latter over the trees, he made a sudden drop and disappeared behind the trees. The aerodrome car and several mechanics and others at once went to his assistance, but it was some time before we could locate the machine from the top of the megaphone stand, from which point of vantage it appeared to be right amongst the trees. At last the car came back with the news that both pilot and machine were all right, a safe landing having been made in a medium sized field. Noel made one more flight on the Maurice Farman before it was returned to the hangar, and shortly after 7 o'clock Carr returned on "Lizzie," appearing over the trees and dropping into the aerodrome like the proverbial streak of lightning. A large party of the Australian Mounted Cadets paid a visit to the aerodrome during the afternoon and made a tour of inspection round the hangars.

Sunday was still very windy, and a succession of heavy showers of rain throughout the afternoon made matters far from pleasant. Several flights, however, were put up in between the showers by the following: W. Birchenough and Louis Noel both busy with passengers on the Maurice Farman, N. Howarth and R. J. Lillywhite on the G.-W. bi-rudder 'bus, W. L. Brock on the 80 h.p. Morane-Saulnier, making an altitude flight of about 7,000 ft., R. H. Carr on a similar machine, and later on the G.-W. tractor biplane "Lizzie" on which he made two loops and a tail-slide at an altitude of about 1,500 ft. In the morning, Edward Prosser, who took his pilot's certificate some two years ago, arrived from Bedford on a Caudron biplane.

The Ninth London Aviation Meeting opens to-morrow (Saturday), at 3 p.m., and the principal event will be a speed handicap for the Sassoon Cup (presented by Mr. E. V. Sassoon) in two heats and a final.

On the next day Sunday, special exhibition and passenger flights will be made. The aerodrome will be open to the public at 12 noon on the third day, Bank Holiday, and the first event down on the programme is a bomb-dropping competition for the London Aerodrome Cup. Two other events will be a 12-mile speed handicap for the London Cup presented by Messrs. Mappin and Webb, and a 16 mile cross-country race for the "Desborough" Challenge Bowl, presented by Lord Desborough.

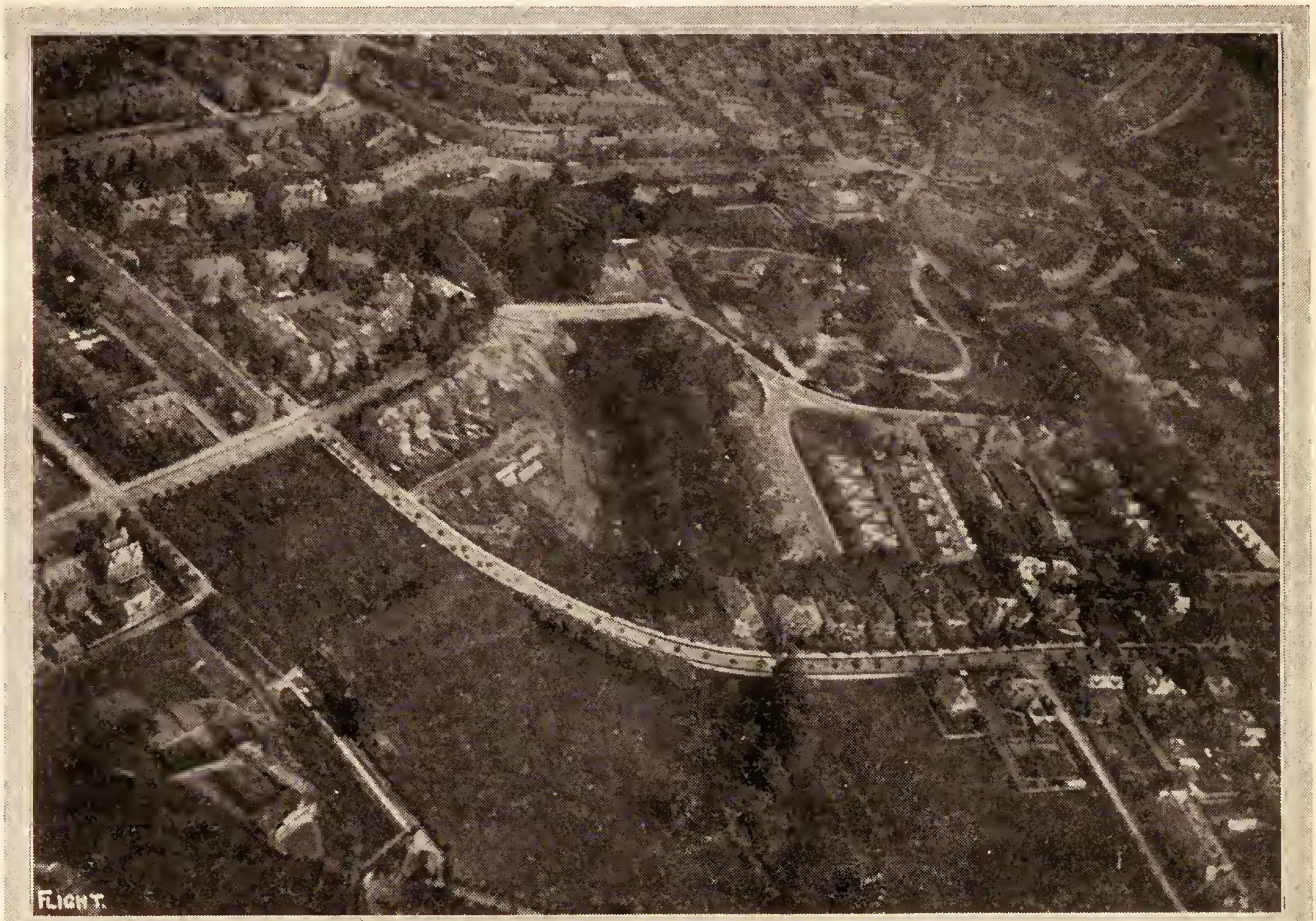


Photo Cornall.

A view of Harrogate taken from Mr. W. Rowland Ding's aeroplane at a height of 1,600 ft. In this can be seen the Royal Baths, Kursaal, Majestic Hotel, Cairn Hydro and Harrogate Hydro.

FLYING AT SHOREHAM.

Once again the weather was unkind to Shoreham on the occasion of the Blériot meeting last Saturday and Sunday. On both occasions the wind was blowing at a velocity well in the neighbourhood of 50 miles per hour, so the attractive programme that had been arranged by the management had to be abandoned. The visitors, however, were not disappointed, for on both days they witnessed a magnificent display of airmanship by Eric Pashley, who pluckily braved the elements on the new 50 h.p. Pashley biplane. On one occasion he was timed over a measured distance with the wind, and his speed worked out at 94·2 m.p.h., whilst when flying against the wind he hardly made any progress at all.

A four-day August holiday meeting opens to-morrow, Saturday, and weather and other circumstances permitting a number of interesting events will take place each day. To-morrow is the *Weekly Despatch* day, and the principal events will consist of looping demonstrations by J. L. Hall on his 50 h.p. Avro, special exhibitions by G. M. Dyott on his 50 h.p. Dyott monoplane, and in the evening illuminated night flying and firework displays. Coupons from the *Weekly Despatch*, which admit holders to the aerodrome at half-price, will be drawn by ballot to decide the winners of the tickets for three free flights. On Sunday, in addition to exhibition and passenger flights, there will be more looping by Hall. A cross-country race to Tunbridge Wells and back, a distance of about 70 miles, for a cup and cash prize presented by the *Daily Mail* will be flown on Monday. The entries are :—

J. L. Hall, 50 h.p. Gnome-Avro biplane ; Eric Pashley, 50 h.p. Gnome-Pashley biplane ; J. Alcock, 100 h.p. Sunbeam-Maurice Farman biplane ; G. M. Dyott, 50 h.p. Gnome-Dyott monoplane ; W. H. Elliott, 50 h.p. Gnome-Henry Farman biplane ; Cecil Pashley, 50 h.p. Gnome-Henry Farman biplane ; Pilot to be chosen, 120 h.p. Austro-Daimler-Martinsyde monoplane.

The pilots will leave Shoreham at one-minute intervals, and will make a compulsory shop of half an hour at Tunbridge Wells on Liptrap Estate. Both at Shoreham and Tunbridge Wells there will be flying displays during the afternoon and evening, whilst at Shoreham, Hall will give looping demonstrations, and in the evening there will be illuminated night flying and fireworks. The principal events on Tuesday will consist of a speed handicap for a cup and cash prize, a bomb-dropping competition, and an altitude contest, whilst in the evening a military tattoo will take place.

Mr. B. C. Hucks at Scarborough and Darlington.

Last week Mr. Hucks tested his new 60 h.p. looping Blériot at Scarborough. On Wednesday evening he ascended from the Deepdale Golf Course, and during a flight of half an hour executed 30 loops, 15 of these being carried out consecutively. The majority of these loops Mr. Hucks described over Filey, and it is rather appropriate that he should have given what was undoubtedly his finest looping display to date over the territory where he practically commenced his flying career with erratic hops on an early type Blackburn monoplane. Mr. Hucks' two-seater Blériot had already been packed up for transport, when there were so many applications for passenger flights that it was again assembled, and kept Mr. Hucks busy for several days.

On Saturday last Mr. Hucks journeyed to Darlington, but found such a terrific wind that the promoters of the demonstration, the South Durham and North Yorkshire Horse and Cattle Show, suggested that the flights should be postponed. In spite of this, however, Mr. Hucks went up in the gale, but could not loop the loop. He, therefore, arranged to give a free demonstration of looping over the public park on the following Monday.

August Bank Holiday and Tuesday, Mr. Hucks appears at Southampton, and on Wednesday at Meyrick Park, Bournemouth.

Mr. Marcus Manton at Luton.

On Saturday last Mr. Manton was engaged to fly in connection with the Flower Show at Leagrave, near Luton. All the afternoon the wind ranged between 50 and 60 miles an hour, and as the aeroplane tent was in the most exposed quarter of the field it was not considered prudent to attempt to take the machine out for fear of the tent falling down. At 6 o'clock there was a lull, during which the Blériot was safely got out, and Mr. Manton made two fine flights, being blown about in all directions and finding the ground gusts very tricky when landing. In a wind still in the region of 50 Mr. Manton then went up and made three clean loops, apparently being untroubled by the occasional fierce gusts. On his next flight, when he made three more loops and an S dive, he was compelled on one occasion to warp to such an extent that his wrist came in violent contact with the side of the *fuselage* and smashed his wrist watch. On several occasions he was kept stationary, and once looked like being blown clean away from the ground. On the day before the flights fresh warping cables had been sent down, but they were found to be unsuitable. To send for fresh ones would have meant too long delay, so Mrs. Hewlett, of Messrs. Hewlett and Blondeau, whose works are near Luton, kindly stepped into the breach and made entirely new cables, generally rendering most valuable assistance during the visit. On Wednesday of this week Mr. Manton flies at the Heavitree Flower Show, Exeter.

Good Work on Blackburns.

On Wednesday, July 22nd, on the occasion of the Yorkshire Agricultural Show at Bradford, a considerable amount of flying was done on Blackburn 80 h.p. monoplanes. Mr. Sydney Pickles, flying the latest type machine, carried four passengers between Leeds and Bradford. The first passenger was the Lord Mayor of Leeds (Mr. E. A. Brotherton), who turns the scale at 14 stone. It is believed that this is the first time that a Lord Mayor has visited a neighbouring town by air, and he expressed himself as being delighted that he should have that honour, and also that it should be on a Blackburn monoplane built in his own city. Mr. Pickles' second passenger was Mr. H. F. Atter, who is Clerk to the West Riding Rivers Board. Two other passengers were carried between the two cities.

Mr. Harold Blackburn, also flying an 80 h.p. Blackburn monoplane, opened the first air-line service in Great Britain between cities flying to a time table. He was doing the journey between Leeds and Bradford every half hour from 10 a.m. to 5 p.m., and only missed the 11 o'clock and 11.30 a.m. flights, which speaks well for both the machine and the pilot. Mr. Blackburn's first passenger was the Lady Mayoress of Leeds, so that both the Lord Mayor and Lady Mayoress made the journey from Leeds to Bradford, a distance of nine miles, in Blackburn monoplanes.

During the afternoon Mr. V. Gaskell Blackburn (who, by the way, is no relation to either Mr. Robert Blackburn, the constructor, or Mr. Harold Blackburn, the pilot) arrived from York on his 70 h.p. Flanders biplane. He encircled the show ground three times, and then alighted beautifully. Since the Flanders machine was overhauled and reconstructed, Mr. V. Gaskell Blackburn has been doing some very good work in Yorkshire.

Thursday was a very bad day for cross-country work, being very windy and cloudy, but Mr. Pickles and Mr. Harold Blackburn both made the return journey. Mr. Pickles, in addition, made two more attempts to reach Bradford, but on both occasions he was obliged to return after getting within a mile or so of his destination, through running into mist and rain. Flying was out of the question on Friday and Saturday, as practically a full gale was blowing.

On Sunday afternoon, Mr. Pickles flew from Leeds Aerodrome to the Knavesmire at York, a distance of 23 miles, which was accomplished in 18 minutes, the machine attaining a speed of 105 m.p.h.

* * * *

ROYAL FLYING CORPS (MILITARY WING).

War Office summary of work for week ended July 25th, 1914:—

No. 2 Squadron. Montrose.—This squadron reached Montrose from Netheravon early in the week, complete in *personnel*, machines and transport. One machine was badly damaged, *en route*, but the pilot was unhurt. The work during the week has been confined chiefly to overhauling machines and transport after the journey, and, as regards one flight, in preparation for manœuvres in Ireland.

Nos. 3 and 4 Squadrons. Netheravon.—The course of instruction for 10 "regular" officers was continued. These officers were practised in reconnaissance work, being taken up for cross-country flights over the country in the neighbourhood of Salisbury Plain. Work in connection with the observation of artillery fire was also carried out. Major Raleigh, commanding No. 4 Squadron, made a short cross-country flight by night, carrying a passenger, and landing at Netheravon by means of flares.

No. 5 Squadron. Fort Grange, Gosport.—The pilots of this Squadron carried out several cross-country reconnaissances. Work on the erection of portable sheds was continued.

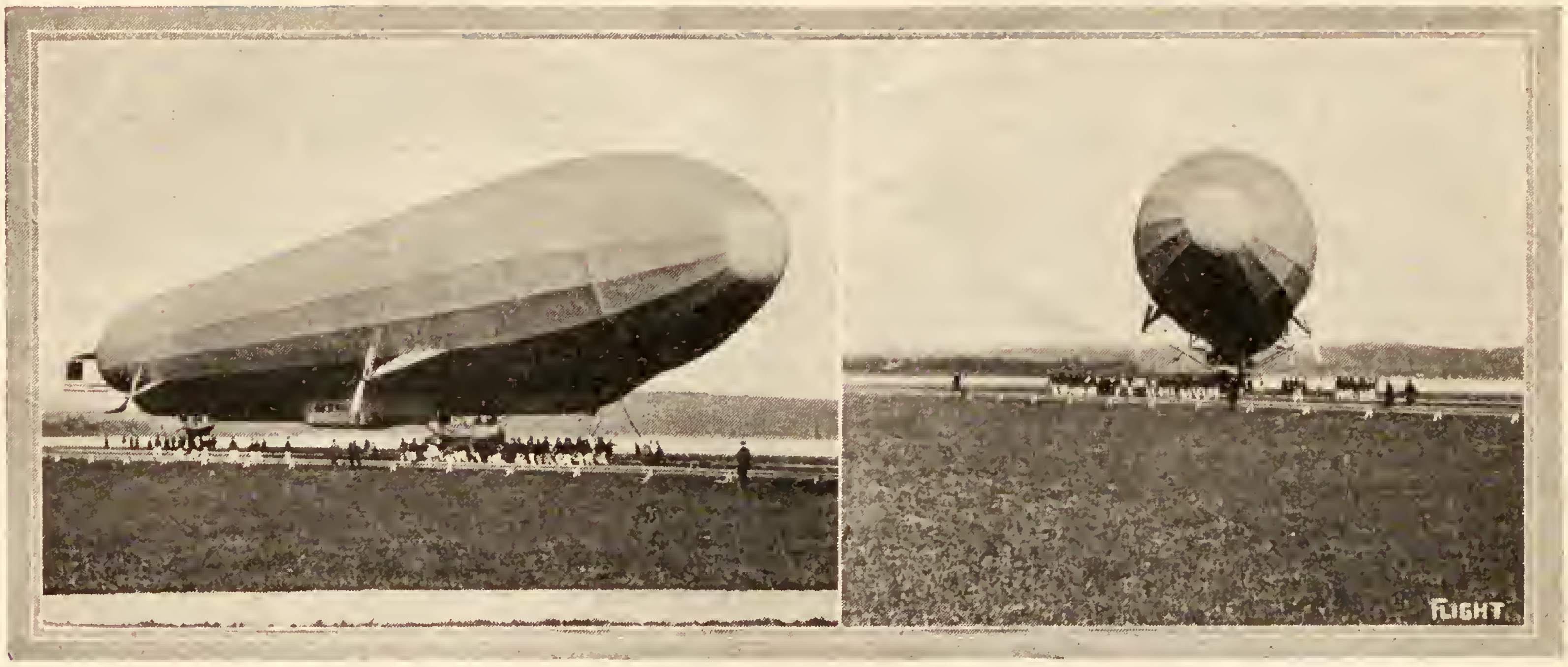
No. 6 Squadron. Farnborough.—Reconnaissances were made daily in connection with the training of the 1st and 2nd Division.

Nos. 1 and 7 Squadrons. Farnborough.—These two new Squadrons are gradually being built up.

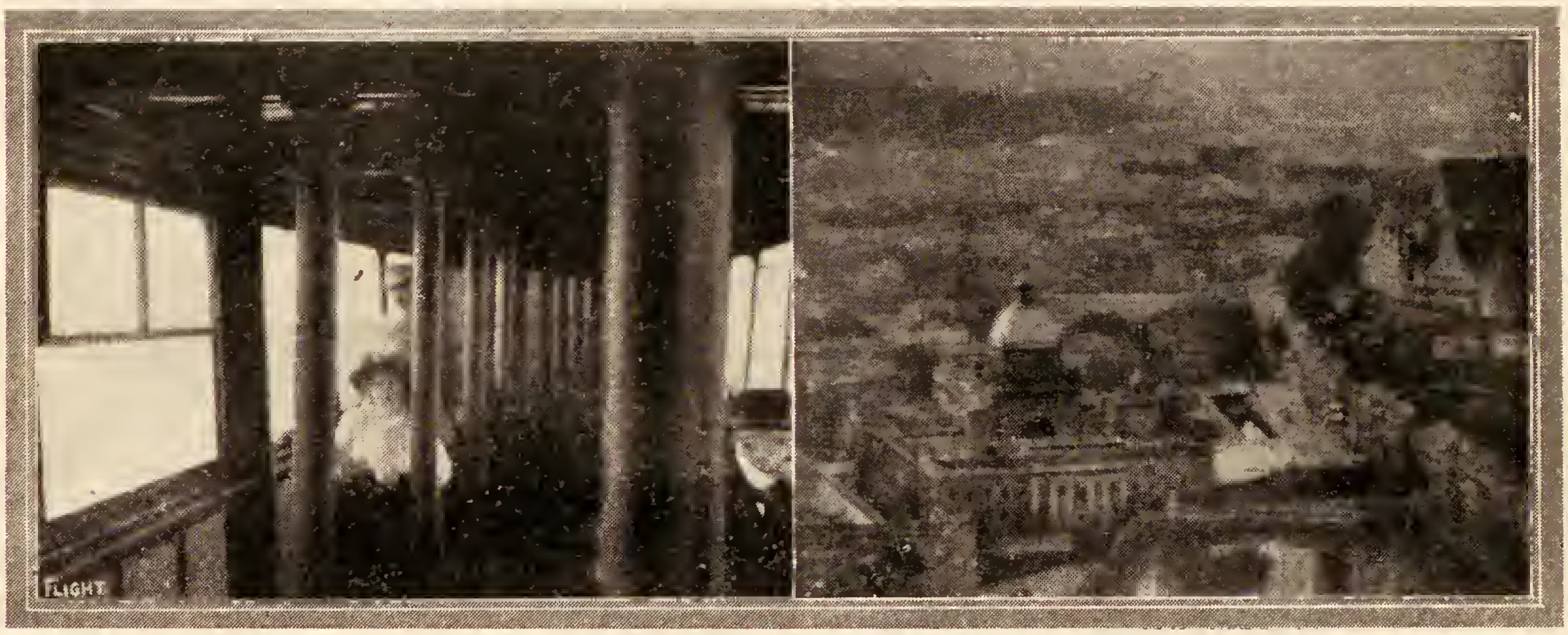
Aircraft Park. Farnborough.—Repair work to Aircraft and Mechanical Transport and the technical instruction of recruits was carried out daily.

Headquarter Flight. Farnborough.—Experiments of various kinds were continued. The Kite Section returned from Salisbury Plain, where they have been working in conjunction with the artillery.

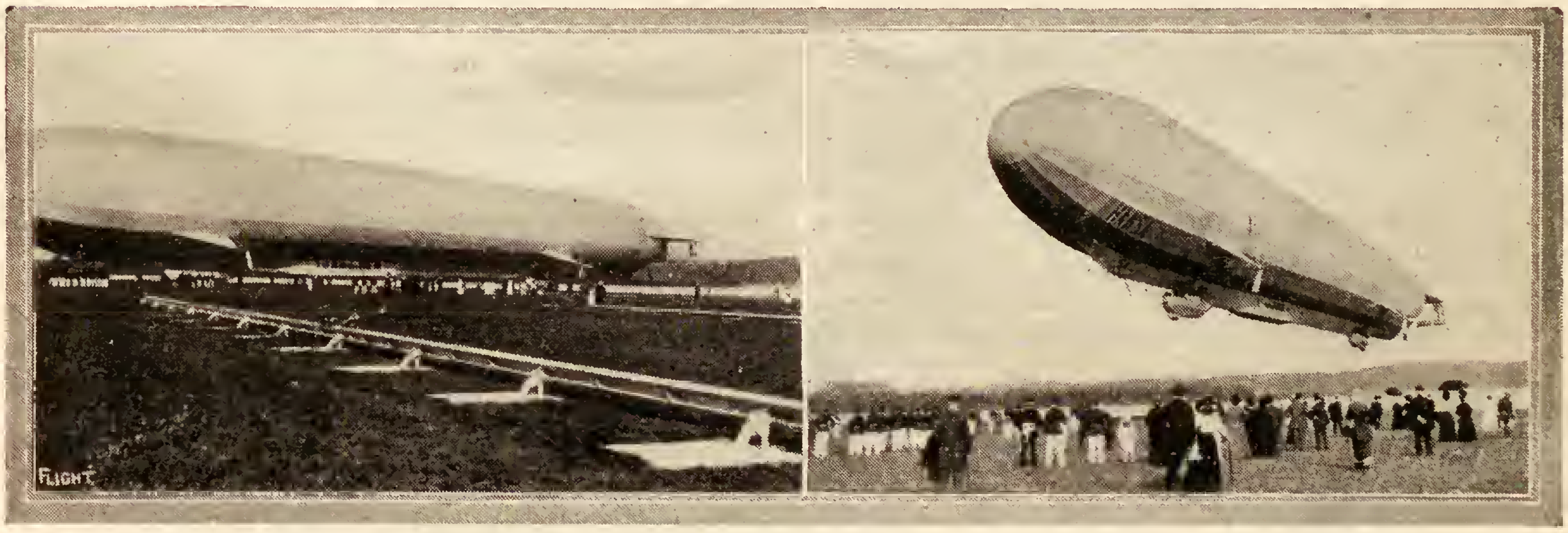
General.—The Military Wing suffered a severe loss on the 21st inst. by the death, as the result of an aeroplane accident at Fort Grange, of Lieut. L. C. Hordern, Lancashire Fusiliers and of No. 5 Squadron. This officer had been in the corps since November, 1913, and had done a considerable amount of flying on Henry Farman machines. The funeral took place on Friday at the Garrison Church, Fort Rowner, and Haslar Cemetery. Serjeant Campbell, his passenger at the time of the accident, is progressing favourably.



The "Hansa" airship, from photographs by Sir John Shelley.



Lady Shelley in the cabin of the "Hansa" dirigible whilst travelling on the 85 miles trip between Potsdam and Forst. On the right is a snap from the "Hansa" of the Stadt-Schloss, Potsdam. Photographs by Sir John Shelley.



TWO MORE VIEWS OF THE "HANSA" DIRIGIBLE.—On the left, the guide rails to the airship shed being seen more clearly. Photos by Sir John Shelley.

A Gigantic Hangar.

IN the presence of a number of friends of M. Clement Bayard, the first arch of what it is claimed will be the largest hangar in the world was erected in place at Lamotte Breuil on Saturday last. It will be a regular airship harbour capable of sheltering four of the largest airships. The principal dimensions are: length, 185 metres; width, 100 metres; and height at the entrance, 50 metres. It is to be ready for use by the middle of December.

The Photographing of British Military Aircraft.

SPECIAL attention is again being drawn by the military authorities to the fact that the photographing of British military aircraft is not permissible within a distance of 40 yards, nor may a tele-photo lens be used. No photograph is to be taken of air stations without special permission from the officer in command. Photographers are warned that any infringement will entail prosecution under the Official Secrets Act.

CORRESPONDENCE.

Brakes for Aeroplanes.

[1880] I have read the correspondence in FLIGHT on the above subject, and, if I understand correctly, it is only suggested to apply a brake after the aeroplane has alighted. Would it not be better to use a brake which can be applied *before* the machine alights, and thus land in greater safety? Most people would answer "Yes, but as the speed is reduced the machine would fall more rapidly."

As many of your readers are aware, I have been conducting experiments for some years with the object of including as many "desirables" as possible in one simple device, so, with your permission, I will give the net result of these experiments up to the present.

The following is a design of a combined propeller, lifter, brake, steerer and stabiliser:

The upper figure represents an end elevation of a propeller of the paddle-wheel type, revolving in the direction of the arrow, C, on a stationary crank shaft, L, having feathering planes, B^1 to B^4, worked by means of connecting rods, D, one end being attached to said planes and the other end to crank, E, the planes, B^1 to B^4, being pivotally attached to the arms A^1 to A^4. The dotted curves, M, show the position of the planes, B^1 to B^4, at various points in a revolution. The machine is travelling in the direction of the arrow, F.

Here are two chief peculiarities in this design.

1. It revolves in the opposite direction to that of an ordinary paddle-wheel.
2. The hollow surface of the blades or planes is on the outer side.

As a propeller, the thrust is largely obtained from A^3 to A^2, a very rapid movement of the near edge G of plane taking place within that quarter revolution. Compare the angle made with plane B^3 and arm A^3, with that made by plane B^2 and arm A^2.

As a lifter, the hollow surface of plane presses down on the air from A^2 to A^1. Further, a carriage wheel travels horizontally at three different speeds at the same time, viz., the centre travels at the same speed as the carriage; the point touching the ground does not travel at all; and the point opposite, *i.e.* the top of the wheel, travels horizontally at *double* the speed of the carriage.

Now apply this law to the above design. If there were no "slip," A^3 would be stationary in the air and A^1 would be travelling forward at *double* the speed of the aeroplane. With what result? Either an enormous increase in the lift, or the capacity of flying more slowly on account of the increased lift.

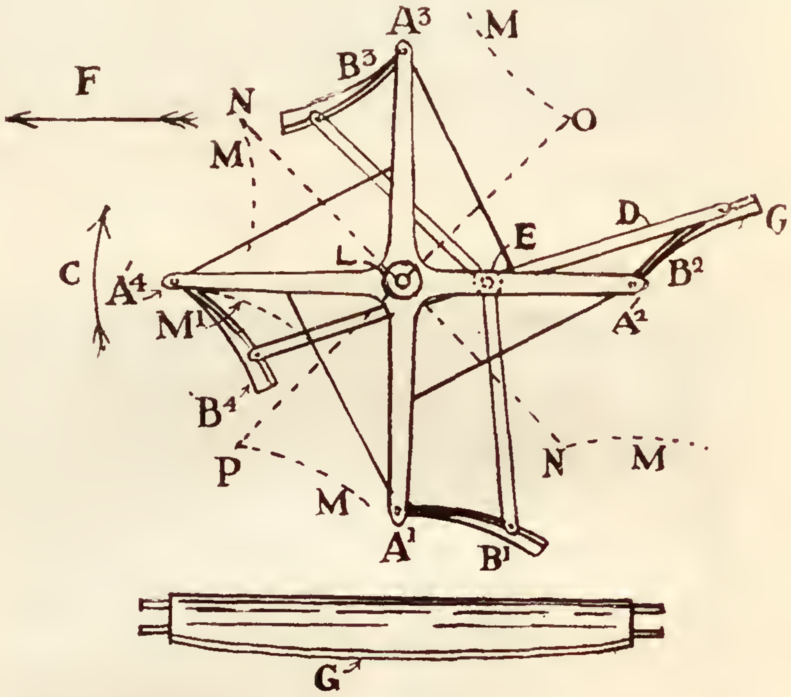
But as there *would* be some "slip," A^1 would be travelling forward at *more* than double the speed of the aeroplane and the lift still further increased. In a coarse pitch propeller the hollow surface of plane would be as at M^1, the others remaining practically unchanged. On this and another point I had a stiff argument with the late S. F. Cody at the Olympia Aero Show of 1913, and who remarked after some discussion, "I don't see it, but if I do I'll give way." I was able to demonstrate my points by means of a model, and, like a good sportsman, he gave way.

To use the device as a brake, it is only necessary to partially revolve the crank shaft, L, in the direction of the arrow, C. If the reader will turn the design 45° in that direction, so that N is at the top and NM at the bottom, it will show him the relative positions of the planes B^1 to B^4 and M when the crank shaft L has revolved 45°. The aeroplane is still travelling in a horizontal direction, viz. O to P, but he will observe that the plane at NM forms a greater angle of incidence than at B^1 when A^1 to A^3 is vertical, and of course gives greater lift and helps to support the machine when the flying speed is reduced.

If the reader will turn the design still further until A^2 and A^4 are vertical, he will notice that the plane B^2 (which is now at the bottom) has a still greater angle of incidence and the lift is double what it was when B^1 was at the bottom. The machine is still travelling horizontally, viz. from A^3 to A^1, and the brake may be considered "hard on," or nearly so. If we turn the design still further (which is equivalent to the pilot partially revolving the crank shaft L), the machine would run backwards when the planes at any point from B^2 to B^3 are at the bottom, assuming the machine to have alighted. This gives the same result (but with safety) as reversing the thrust of a screw propeller by reversing the engine, which I should consider most dangerous. Is it not a fact that in order to overcome the torque of a screw propeller, the engine and propeller are fixed slightly on one side of the lateral centre of gravity?

If so, and the engine is reversed, which means the torque of propeller is reversed, what is going to prevent the machine from capsizing laterally?

In order to steer with this propeller, two would be fixed on a machine, one on either side of the *fuselage*, and just as an oarsman may backwater with one oar and steer to right or left, so by converting only one propeller into a brake, an aeroplane may be steered.



To obtain lateral stability, divert the thrust of one propeller up and the other down at the same moment to counteract any tendency to capsize laterally. The lower figure shows a back view of plane B^1.

These details have not previously appeared in FLIGHT or any other journal devoted to aeronautics, and for lack of them a rather peculiar incident occurred at this year's Aero Show at Olympia. I attended most of the lectures arranged by the Aeronautical Society, and at one of them, on "How an Aeroplane is Propelled," I heard my invention quoted and wrongly described. It was not the lecturer's fault, for, in conversation with him afterwards, he told me he had taken it from an old copy of FLIGHT (March 18th, 1911). These particulars were as supplied by me, but it was then in its early experimental stage.

I note you are frequently advising modellists to make experiments of a more scientific nature; if they care to try this device on their models, they may obtain permission by asking. The No. of my English patent is 16402 of 1912.

JOSEPH CLARKSON.

Prestwich Park, near Manchester.

* * *

Flying Over Monte Rosa.

DURING a trip from Novara in Italy to Viege, Valais, Switzerland, on the 26th inst., the Italian pilot Landini on a Gabardini monoplane flew over Monte Rosa in the Pennine Alps, the highest point of which is 15,217 ft. He flew by way of the Nordengrat, the Gornergrat, the Findelen Glacier, and then along the Zermatt valley. He was accompanied by Dr. Giuseppe Lampugnani. It is claimed that during the flight Landini beat the Italian height record for pilot and one passenger with 3,450 metres. The old record to the credit of Pettazzi was 3,275 metres.

New Italian Height Record.

ON the 27th inst. at Milan, the Italian pilot Desbrueres on a Gabardini monoplane succeeded in improving on the Italian height record by going up to 4,950 metres. The previous record was 4,700 metres made by Lieut. Salome.

A Fatality at Juvisy.

LIEUT. VALENSI, of the French Navy, was killed on Monday through a fall from a height of 500 ft. when flying at Juvisy.

Renaux Crosses the Channel.

WITH Mdme. Renaux as passenger on board his Maurice Farman, M. Renaux on the 23rd inst. flew from Hendon to Beaumarais, close to Calais. After a short rest he flew across to Hardelot.

From Paris Across Bavaria.

ON a Voisin biplane fitted with a 130 h.p. Salmson-Canton-Unné engine, Laporte, on the 22nd inst., set out from Villacoublay to fly to Bucharest and Constantinople with a view to securing the Coupe Pommery and the Prince Bibesco prize, &c. He was, however, brought down by a storm at Osterhofen on the Austro-Bavarian frontier, and in landing the propeller was smashed. The distance covered was about 850 kiloms. The machine carried a passenger, M. Sauval, as well as 450 kilogs. of fuel, &c.

Models

Edited by V. E. JOHNSON, M.A.

The Ladies' Model Competition.

The ladies' duration model competition was held on Wimbledon Common on July 25th, under very trying weather conditions, since something like half a gale was blowing during the whole of the time. In spite of this fact some very fine flights were made. The competitors were permitted to submit models of any kind, either home-made or purchased, but the models must not be under 4 ozs. in weight. A special rising board was provided. The greatest difficulty was experienced, as one would naturally expect, under the circumstances, in launching the models. Once up in the air they were carried long distances by the wind, in one or two instances nearly off the Common. In spite of the high wind several of the models fought the wind for some time before turning into it, generally speaking rising to a high altitude whilst doing so. One model looped the loop in magnificent style, coming down to within about a yard of the ground at the finish and then rising again and making a very good flight.

The winner was Mrs. Frances Holt, who, flying a Houlberg model, succeeded in making a very fine flight of 67 secs. Miss May Bond and Miss Doris Bond, both flying Bond models, came second and third respectively. Both succeeded in making a single flight of 50 secs., but the former's average was rather the better. Mrs. Jannaway, flying a Jannaway model, accomplished a very long flight and a duration of 35 secs. Miss Powell, flying an Easedale tractor (a fearfully difficult machine for a lady to launch), was nevertheless successful in obtaining a duration of no less than 34 secs. A very fine performance considering that the machine was a single-screw model, and the day was such a bad one for tractors, that a tractor competition to be held there the same afternoon was postponed in consequence. Miss Dew, flying a Birmic model, accomplished a duration of 31 secs. Taking it altogether the meeting was quite a success, and we hope to see it repeated. The prizes, which consisted of a silver back brush, a mirror and comb in case, for the first prize; a case of six teaspoons and tongs for the second, and a biscuit box for the third, were presented by the Women's Patriotic Aerial League.

Mr. F. W. Jannaway's Olympia Weight-Lifting Model.

The following is a brief description of this model, which has made a very large number of excellent flights: Length, 4 ft.; span, 4 ft. 3 ins.; chord, 8 ins.; elevator, 20 ins. by 4 ins. Weight of machine 19 ozs. carrying a dead load of 5 ozs. Length of rubber motor, 3 ft. 8 ins., run on a triple gear of 10 strands each. Diameter of propeller, 13 ins. *Fuselage* of spruce, ⊏-shaped section, ⅝ in. by ½ in. and well braced.

Planes constructed of 18 gauge steel wire and braced, covered with brown jap silk and proofed. Duration at trials 23, 28 and 5 secs. respectively. The model was slightly over-elevated in the last trial and came to the ground.

One of the chief points of interest about this model is that it is one of the very few really successful models that have been evolved fitted with three equal cogs or a triple gear. It would have been most interesting to have seen what it could have accomplished if a twin gear had been substituted for the triple one.

An Interesting German Model.

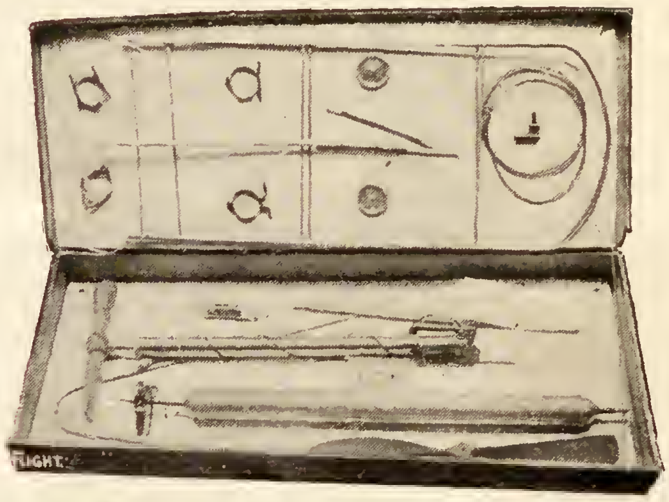
The following description and illustrations have been sent us by Mr. Carl Hochhaltinger, of Steyr, Germany:—

"Being a subscriber to your esteemed paper, I have frequently seen photographs of models, and I take the liberty to send you some photographs of a model which I have made and which works faultlessly. The model in question is an Etrich Taube; it has a span of one metre and weighs 120 grammes. All control organs are movable, the chassis is sprung, the propeller is a Chauvière running in ball-bearings. The machine can be dismantled to the smallest details in 3 minutes, and erected again in the same time. Apart from models of the best-known machines such as Blériot, Farman, Grade, Curtiss, &c., I have also a model balloon to be filled with gas, and having a small electric motor, which drives the two propellers on the left and right. The weight of the balloon complete in flying order, with motor and accumulator, is 600 grammes, the length of the balloon 180 centimetres, with a major diameter of 26 centimetres." [We shall be pleased to receive a photo and some further particulars of the model balloon for publication.]

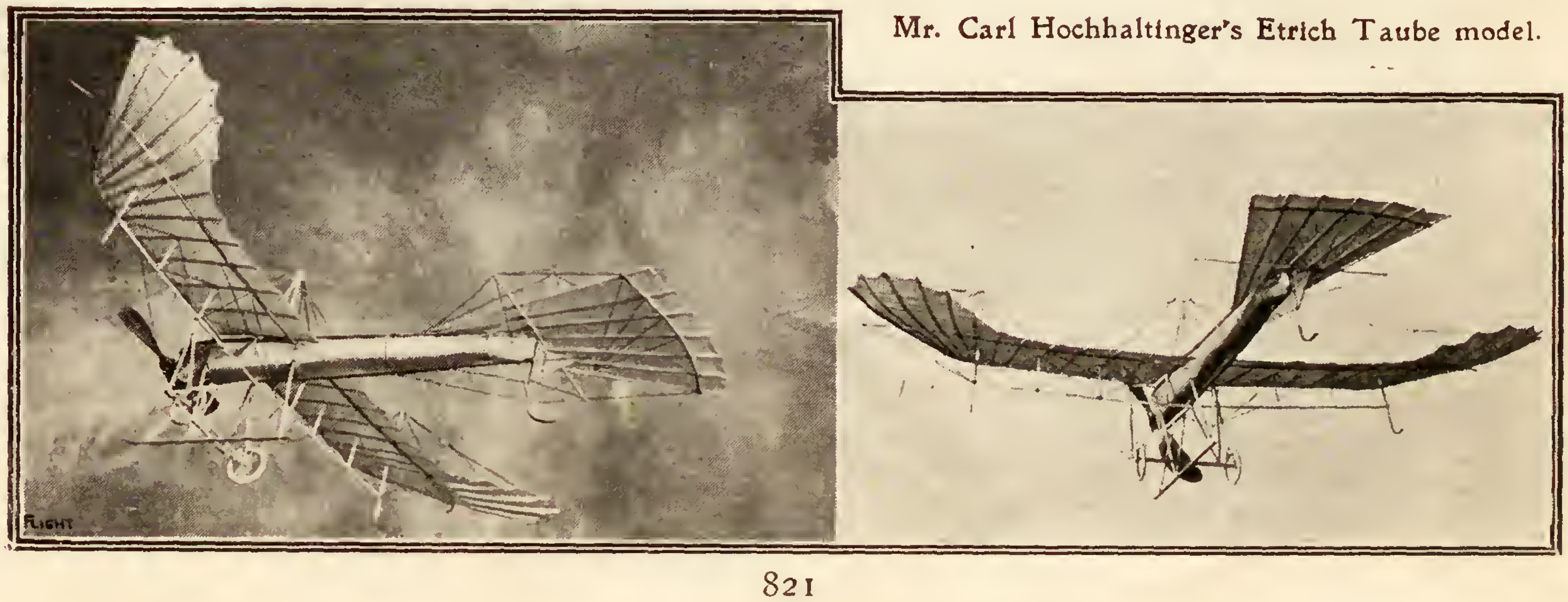
Messrs. T. W. K. Clarke's Compressed Air Motored Machines and Parts.

During the present year considerable progress has been made with model aeroplanes driven by compressed air, and quite a large number of experiments have been made. Many prefer such models, even if their actual flight duration be not so great as that obtained with some rubber driven machines, because the machine is driven by a real engine and not by a twisted skein of rubber. Apart from their uses on model aeroplanes, compressed air motors can be used with even greater success to driven model hydroplanes and submarines; for the latter both steam and petrol cannot be used, and we are compelled to resort to a rubber, spring, electric or compressed air motor. The bubbles of air rising to the surface in the case of the last-named make the model appear so much more like the real thing.

Messrs. T. W. K. Clarke and Co. have a large selection of such motors and accessories in prices ranging from a guinea upwards.



Messrs. T. W. K. Clarke and Co.'s box of parts for compressed air-driven model, including pump.



Mr. Carl Hochhaltinger's Etrich Taube model.

The illustration given is taken from a photograph of one of their boxes of materials for building a complete model, of 54 inch span and fitted with a three-cylinder motor, a sprung chassis and landing wheels. Every part is finished save the planes, which require covering. Directions and plan are enclosed, and the vendors state that the machine can be fitted up in 10 minutes with the aid of a pair of pliers.

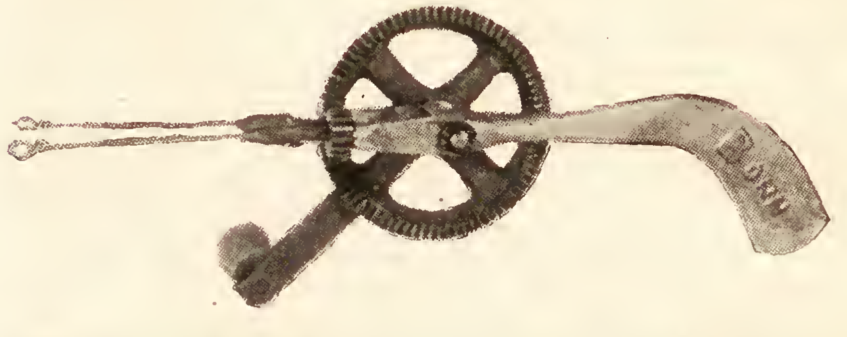
The price complete is 30*s*. The same model complete can be purchased for £2.

Modern Models.

Under the above title, Messrs. Arthur Pearson, Henrietta Street, have just issued a further addition to their "How Does It Work Series." This little book of some 126 pp., which is illustrated with 25 photographs and 46 diagrams, gives full particulars how to build and use: Model aeroplanes and hydro-aeroplanes, dirigibles, mono-rail models, wireless telegraphy, X-ray apparatus, submarines, &c., all of a simple and inexpensive character. The book is specially written for the beginner, and the price at which it is published, viz., 1*s*., should place it within the reach of anyone desiring to commence work on some of the most popular type of up-to-date models.

Messrs. J. Bonn and Co.'s New Double Winder.

We have received from the above firm one of their newly-designed twin winders, whereby the two rubber motors on model aeroplanes are wound up, from the nose of the machine, at the same time. In the case of twin-screw models this custom may now be considered to have become universal, since it possesses so many advantages, and naturally takes only half the time. The winder itself is well designed, and is both light and very strong, with well cut cogs. The two wire extensions, as the illustration shows, are long, and thus enable the winder to be used with machines of different make and varying size. To those not already possessed of such an article we can most certainly unreservedly recommend it.



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KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration ...	J. E. Louch ...	95 secs.
Twin screw, do.	Distance ...	R. Lucas	590 yards.
	Duration ...	G. Hayden ...	137 secs.
Single screw, rise off ground	Distance ...	W. E. Evans ...	290 yards.
	Duration ...	J. E. Louch ...	68 secs.
Twin screw, do.	Distance ...	L. H. Slatter ...	365 yards.
	Duration ...	J. E. Louch ...	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance ...	C. C. Dutton ...	266 yards
	Duration ...	J. E. Louch ...	91 secs.
Do., off-ground	Distance ...	C. C. Dutton ...	190 yards.
	Duration ...	J. E. Louch ...	94 secs.
Single screw hydro., off-water	Duration ...	L. H. Slatter ...	35 secs.
Single-tractor, do., do. ...	Duration ...	C. C. Dutton ...	29 secs.
Twin screw, do., do. ...	Duration ...	L. H. Slatter ...	60 secs.
Engine driven off grass ...	Duration ...	D. Stanger ...	51 secs.

Competitions.—The Women's Aerial League Model Competition took place on Wimbledon Common, July 25th. There was a good entry, the results being; 1st, Mrs. F. Holt, K. and M.A.A.; 2nd, Miss May Bond, Leytonstone: 3rd, Miss Doris Bond, Leytonstone; 4th, Mrs. F. Jannaway, K. and M.A.A.; 5th, Miss D. Nokes; 6th, Miss Hersham, Leytonstone. The best flight was made by Mrs. Holt, viz., 67 secs., and she won the silver-back brush, mirror, and comb in case, Miss M. Bond taking the case of 6 teaspoons, and tongs, and Miss D. Bond, biscuit box; all prizes presented by the Women's Patriotic Aerial League. The Ladies' Kite Contest was postponed on account of the gale that was blowing at 900 ft., only one lady being able to manage the official kite at that height; therefore to prevent injury to competitors or spectators it was postponed, although it would have been an ideal day for the men.

Model Competition.—Mitcham Common, August 15th, at 3.30 p.m.; entries close Saturday, August 8th. The Wakefield Competition, for biplane models rising from the ground under their own power (open to the world). Prizes: 1st, silver challenge cup and gold medal (presented by Alderman Sir Charles Wakefield, D.L., J.P.); 2nd, silver medal of the Association; 3rd, bronze medal of the Association. Tests: Duration, stability in flight. Marks: Duration actual seconds, stability 25. Additional rules governing this competition: 1. Competitors may submit biplanes of any kind. 2. Models must not weigh less than 10 ozs. 3. Competitors must be at the judges' flag at 3 o'clock; those not present at that time will be disqualified. 4. Models to be timed from time of leaving ground till time of landing, or till they disappear from the observer's view. 5. Competitors will not be allowed to replace any part (or parts) without the permission of the judges. 6. Each competitor is entitled to three trials if time permits.

27, Victory Road, Wimbledon. W. H. AKEHURST, Gen. Hon. Sec.

AFFILIATED MODEL CLUBS DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (30, CORRINGHAM RD., GOLDERS GREEN).

AUG. 1ST., competition for r.o.g. duration twin-screw for members only. Hampstead Garden Suburb fields, 3 p.m. Prize 5*s*.

Monthly Report.—July 4th: The Windsor Model Aero Club scratched for the competition for the Farrow Shield. Mr. C. C. Claflin with h.l. tractor, aspect ratio 12½ to 1 very large tail, made flight of six mins. timed by some of the club's official observers. The distance was seven-eighths of a mile. Mr. Claflin also made a fine flight with his twin-screw r.o.g. of 112 secs. Mr. Hinsley did 65 secs. with his twin-screw tail machine Others flying, Mr. Johnson (r.o g. tail machine); Mr. Fletcher (h.l. twin-screw), 115 secs. July 17th, Mr. Hinsley with twin-screw h.l. Mr. C. C. Claflin (tractor). Mr. Nichols (first tractor hollow spar), 35 secs. h.l. Mr. C. C. Claflin has been elected secretary.

Bristol and West of England Aero Club (Model Section) (42, ROYAL YORK CRESCENT, CLIFTON, BRISTOL).

THE Summer Model Aeroplane Competition will be held at Bristol International Exhibition to morrow (Saturday) at 3 p.m.

Croydon and District Ae.C. (82, CLARENDON ROAD, CROYDON).

MEMBERS are requested to note that the date for the second round of Farrow Shield Competition is Aug. 22nd.

Monthly Report.—During the past month it has been pleasing to note that both the flying and the workmanship of the models made by members have been raised to a much higher standard than in the past. It is quite fair to say that a flight of under 40 secs. is now a rare occurrence. Several club records have been broken, the most notable achievement being 96 secs. off ground with a twin-screw r.o.g. by Mr. D. Pavely. Mr. F. Carter has been out with his first single-screw r.o.g., doing durations from 40 to 50 secs. This is the first machine of this type to be made by a club member, and it is evidently Mr. Carter's intention to establish a record. Good durations have been obtained by the various Farrow Shield models. Mr. H. Smither had his new F S. model out for testing last week, but after a flight of 67 secs. rain prevented further tests. The competition for the Wakefield Cup takes place on the club's ground at Mitcham on Aug. 15th, and the secretary would like to see as many members as possible competing.

Leytonstone and District Aero Club (23, WOODHOUSE ROAD).

AUG. 3RD. A model flying meeting will be held with the Leyton Fire Brigade sports at end of Church Road at 2.30; 8-oz. models, 4-oz. loading; entry free. Anyone wishing to enter for competition kindly give name on field to sec. Prizes, 3 silver medals; other prizes according to number of entries. At committee meeting on the 23rd, five silver medals were offered for competition; competition to be announced later.

Monthly Report.—The new month opened with a record hydro., C. Hersom obtaining 100 secs. off water; it was being tuned up for the official record, which he now holds. F. Gratton 4-oz. tractor, Mr. Wharmsby r.o.g. doing quick climbs with 65 secs. Bedford out with special steering device for figure 8. H. G. Bond r.o.g. Scout Mason, a new promising member, tuning up r.o.g. for junior competition on the following Saturday at Wimbledon Common and obtained first place. W. Hersom working on 2-cylinder engine which we hope to see out very shortly. Mr. Midson has nearly finished his Handley Page biplane stream pusher, span of top plane 7 ft. T. Kimpton r.o.g. Other members out: L. O'Leary, Mr. B. Ludlow, Midson, Doris, May, W. Hersom, F. Hawthorn, J. Mason. July 12th, at 6.30, Wharmsby out with doped r.o.g. F. Hawthorn, W. Hersom, B. Ludlow at 10.30. S. C. Hersom with hydro. 9½-oz. doing 80–90 secs. Wharmsby r.o.g. Mason with his prize r.o.g. doing 40 secs. Osborne built-up *fuselage* canard type 30 secs. At the steering competition on the 11th, at Wimbledon, Mr. Louch won first, silver cup, and Mr. H. Bedford second, silver medal, both of Leytonstone, Mr. Mason winning junior, also of Leytonstone. On July 19th, at 6.30 a.m., Mr. W. Hersom with tractor hydro. single-screw. Bedford, Bond, Wharmsby and S. C. Hersom flying heavy loading 'buses. After "grub" T. Kimpton was out prompt trying his free-wheel propellers, and much improves his model which is in the 80's. Wharmsby r.o.g. Lamplugh, F. Hawthorn, Mr. Midson working hard on H.P. pusher biplane working for the Shelley Cup. Osborn r.o.g. built-up streamline *fuselage*. Mr. B. Ludlow twin, Hersom with "Toby" mascot. On the 25th, three ladies entered for the Ladies' duration competition on Wimbledon Common, Messrs. May and Doris Bond winning second and third respectively. Miss Hersom broke her spar in one of her flights. July 26. Owing to high winds little flying has been done, Wharmsby flying speed model. Mr. T. Kimpton free-wheel props Morane-type wings, looping the loop, and upside down flying, which amused all spectators. Bedford r.o.g. Others out: Midson, F. Hawthorn, Bond, Ludlow. Will all correspondence be sent to 23, Woodhouse Road, Leytonstone, until further notice.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

AUGUST 1ST, Open Competition for Paddington Cup. Winner to hold cup for one year and wins silver gilt medal, second receives silver medal, and third bronze medal. Any competitors not weighed in by 4 p.m. will be disqualified.

Monthly Report.—July 4th, the competition in the first round of the Farrow Shield, Paddington *v.* Wimbledon, resulted in a lucky win for Paddington after a very exciting contest, the result being in doubt until the last two flights. The competitors' names and their durations were published in the K. and M.A.A. notice in FLIGHT, July 11th. Tea for all competitors was provided by the club, after which a club competition was held, the same models being used. The wind having dropped, much better flying was seen. Mr. W. E. Evans won first prize with an average of 83⅓ secs., Mr. D. Driver only 1 sec. behind, 2nd prize; Mr. C. C. Dutton, 69 secs., 3rd; Messrs. H. Woolley, R. Bird, and A. Rasmussen also flew well. On July 11th, 18th, and 25th, trials were held for Paddington Cup models, a silver and a bronze medal being offered for the best averages on any of the three dates named. The result will be announced later. On the 18th, Mr. D. Driver made an average of 60 secs., his best flight being 73 secs. Mr. W. Evans' model landed prematurely with the wind, an inglorious end to the machine, which made two records last November. Several Farrow Shield models were again out, Mr. H. Woolley's heavy weight doing 60 secs. Messrs. Driver and Evans had a friendly duel, the final result ending in a victory for Mr. Evans, with a fine flight of 95⅕ secs. r.o.g., Mr. Driver's durations were, 82⅘, 80, 90, and 93⅕, and Mr. Evans' 80, 85, 86, 88⅗, 88⅖, 90, 90, 93, and 95⅕. On the 25th, the best single propeller durations were Mr. D. Driver's 65 secs., Mr. W. Evans 60 secs., and Mr. R. Bird 51 secs. (very windy). Members will please note that the tests for club certificates have been altered from a single flight to average of three flights. The tests are, therefore, as follow: Superior certificate, 90 secs. av.; first class, 60 secs. av., and second class, 30 secs. av.

Reigate, Redhill and District (THE COTTAGE, WOODLANDS AVENUE, REDHILL).

Monthly Report.—A fair amount of flying has been done during the month, the chief event being the flying for first round of Farrow Shield Contest. Although the Club's opponents (Stony Stratford) scratched, the club flew as arranged, and some good flying resulted; the highest average being 68$\frac{3}{15}$ the lowest 39$\frac{4}{15}$. The official observers were, Messrs. S. G. Wilson, H. V. May, and J. W. Burghope, stop watch being used. Mr. Kennard was unfortunate, in that his machine "landed" in Earlswood Lake, and a fine swim was made by Mr. Hoyle to rescue it. A competition was arranged in connection with this round, a silver medal being presented to the one who made the longest individual duration during the round; the winner proved to be Mr. Key after a splendid flight of 72$\frac{3}{5}$ secs. The club goes forward to the second round, and it is hoped that members will make every effort to improve their durations. Mr. Sutton has had his Olympia tractor "in dock" recovering, &c., and has had much improved flights, durations of about 35 secs. and a flight of 227 yds. after circling, the height also being much improved. He has also been making demonstration flights at Gatton with same. With his 8-oz. r.o.g. mono. he has had about 60 secs. Mr. Hooton 75 secs. with 8-oz. r.o.g. mono., very steady and high flying. Mr. Hoyle 55 and 60 secs. with Olympia r.o.g. mono. Mr. Funnell 50 and 60 secs. with 8-oz. r.o.g. mono. Mr. Kennard 50 and 60 secs. with 8-oz. r.o.g. Mr. Norton has had 60 secs. with 9-oz. r.o.g. mono. and tested new screws on same. Etrich tractor overhauling in shop. On July 18th members turned out at short notice at "Wiggie" in connection with men's own sports, and some very good exhibition flying was done, much interest being caused by Mr. Funnell's "looper." Several members are now designing some improved "model" tractors.

Sheffield Ae.C. (41, CONISTON ROAD, ABBEYDALE, SHEFFIELD).

A NUMBER of the members are now on the construction of hydro-aeroplanes and other machines in anticipation of taking part at the Burton-on-Trent Water Carnival and Fête on August 29th.

Monthly Report.—June 30th, at general meeting, held at the Palace Restaurant, the following presentations were made: Master C. Dewsnap, the Colver Cup and silver medal for r.o.g. machines, as well as a silver medal presented by Mr. Marcus D. Manton for tractor biplanes; Mr. W. H. Bagshaw, bronze medal, as second prize in Colver Cup Contest. Owing to the changeable weather members have been experimenting indoors instead of at the aerodrome.

Stony Stratford and District Kite and Model Ae.C. (OLD STRATFORD).

AUG. 18TH, monthly competition, combination formula rules, r.o.g. contest for M.S.C. Special meetings to be announced later. Buckingham members please see branch secretary.

Monthly Report. June 27th, Palmer at Buckingham improved the single screw h.l. record with a flight of 279yds. and 47$\frac{3}{5}$ secs. Mennell improving his own figures to 46 secs. Members' general meeting July 8th; subject: single-screw models; excellent and instructive evening. Arrangements made regarding special prizes and competitions. It was also decided to reduce the subscription until the close of year (Oct. 31st) to 1*s.* 6*d.*, as an incentive to members to join. Excellent flying being made during the month by Messrs. Mennell, Palmer, Cherry, Williams, Neve, Elmes and the secretary. On July 11th, Palmer successfully attacked the duration again in the single-screw class and raised it to 60$\frac{1}{5}$ secs. Mr. Palmer was using a boat-shape *fuselage* machine with a twin motor. Meeting at Buckingham July 3rd. Subject: r.o.g. models. Good time was spent. July 25th, in a gusty and gale of wind. At Buckingham, first competition under combination system of marking introduced by Mr. Mennell. Result: 1st, E. Brown, 52·2 marks; 2nd, B. Williams, 37·8 marks; 3rd, W. Palmer, 36·7 marks. Best flights, 66$\frac{1}{5}$ secs. and 255 yds. by Mr. Brown. The wind was very rough.

Wimbledon and District (165, HOLLAND ROAD, W.).

THE tractor competition, which was announced for the 25th, was postponed owing to the high wind, and will now be held on August 1st at 3.30. August 2nd, flying at 11 and 3. August 3rd, same times. Prizes will be awarded to (1) the machine making the greatest duration during the day, (2) the machine making the greatest number of flights of over 35 secs. duration. Further details will be announced later.

Monthly Report.—On July 4th, the club team flew against Paddington in the first round of the Farrow Shield, and were defeated, the respective averages being 38 and 43 secs. After the contest the team were hospitably entertained to tea by the winners. Several new machines have been out, both twin-screws and tractors. Great interest has been aroused by the flights of Mr. W. G. Smith with his small 30-in. A frame twin-screw; several durations of over 100 have been accomplished, the model getting up to a great height and gliding very flat. Mr. Davis has also done some high flying with his new hollow-spar twin-screw machine. Mr. Hayden has been experimenting with tractors, and has produced a very successful machine, but unfortunately it was lost over houses on the 26th, after a flight of 2 mins. at a height of 100 ft. Mr. Easdale's double-surfaced plane tractor has been out on several occasions, and when tuned up does 70. He is now experimenting with a lightly-loaded tractor biplane, which is expected to do very well. Messrs. Laing, Boniface, Tucker, and Smith have all flown their tractors, although the high winds have been very unfavourable for this type of machine. Several big machines will be out shortly, as Messrs. Laing and Hayden are building 1 lb. hydros. and Mr. Tucker's 24-oz. Martinsyde is nearing completion. Four compressed air machines are in course of construction, and their trials will be followed with interest.

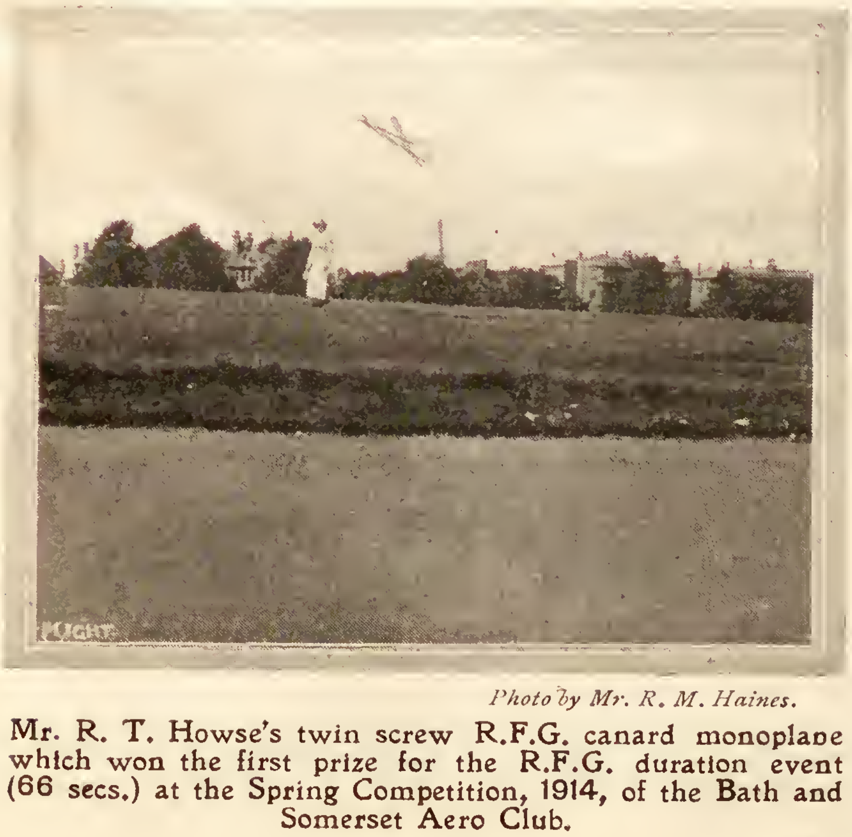


Photo by Mr. R. M. Haines.

Mr. R. T. Howse's twin screw R.F.G. canard monoplane which won the first prize for the R.F.G. duration event (66 secs.) at the Spring Competition, 1914, of the Bath and Somerset Aero Club.

UNAFFILIATED CLUBS.

Edinburgh Aero Club (13, HERMAND TERRACE, EDINBURGH).

AUG. 8TH. Club demonstration of model flying at the Marine Gardens, when the muster is expected to be about 30 machines. It is hoped that this event will do much to arouse interest in model aviation in Edinburgh, and the club members are tremendously keen on making it a success.

Monthly Report.—Strong gusty winds have interfered with the Saturday meetings. A number of new machines have appeared in view of the forthcoming demonstration at the Marine Gardens. Messrs. Saidler and Fiddes had out their long-expected tractor biplanes. Messrs. Watt, Ramsay, Nesbit, Clark and Harrison have flown h.ls., and Mr. Harrison has been busily engaged in smashing up lightweight r.o.gs. Mr. Hartley flew a small tractor mono., and Mr. Watt has been testing a single-screw biplane (Bragg-Smith type). Considerable interest was aroused on the 25th by the appearance of a 4-ft. span Caudron flown as a kite, the work of Messrs. Calder and Harrison. It climbed amazingly and performed some excellent glides with the strings slacked off. It is proposed to fly it at all meetings as a species of club banner. A proposal to acquire a club workshop is under consideration.

Finsbury Park and District (66, ELFORT ROAD, HIGHBURY, N.).

AUG. 1ST, h.l. distance, all types and duration: h.l. for tractors, r.o.g. for twin-screws, at Tottenham Marshes, 5.0 p.m.

Monthly Report.—The past month has been a very successful period for this club, and the general class of flying is steadily improving. The competition meeting on July 4th was a success, Mr. B. H. Barnard, Morane-Saulnier mono., 1st with 147 points, closely followed by Mr. Savage, canard type, 143 points, and A. Richards, 114 points, the other competitors following on closely. The events were:—1. Speed. 2. Duration. 3. Target. In the latter Mr. Savage's model alighted within 4 yards of "target." Messrs. G. Wren, H. Mullen and S. Platt have been flying square wing tractors, and S. Gibbs Morane tractors, all flying well. Several models of the Morane type have made their appearance this month, and all have been successful, and this type seems to be very efficient. Mr. B. H. Barnard's Morane-Saulnier has proved itself a veritable stunt flyer, executing "cartwheels" of about 15 ft. diameter, and looping the loop with the greatest ease. On July 11th attempts at weight carrying were carried out, and Messrs. B. H. Barnard and H. Mullin succeeded in carrying a third of their model's weight in flight for about 20 secs. July 18th, S. Gibbs out with Caudron, tractor monoplane; G. Wren, Deperdussin mono.; A. Richards, Morane mono.; Mr. B. H. Barnard, Morane-Saulnier looping and bomb dropping; H. Mullin, Deperdussin mono.—all tractors and flying well. Mr. A. Richards machine, after a high 50 secs. flight, glided into the top of a high tree. Mr. B. H. Barnard's bomb-dropping experiments were very interesting; the machine recovered its equilibrium almost immediately after dropping the weight. Good flying was also done by Mr. Clay, Caudron mono., and A. Richards, Sopwith biplane. Flying on July 25th was almost impossible owing to 35–40 m.p h. wind. In moments of calm, Mr. R. Mullin, with Martinsyde mono., S. Gibbs, Morane tractor, and A. Richards all obtained about 20 secs. flights, but for the most part little flying was done, although there was a record attendance.

Ilford Model Ae.C. (83, ENDSLEIGH GARDENS, ILFORD).

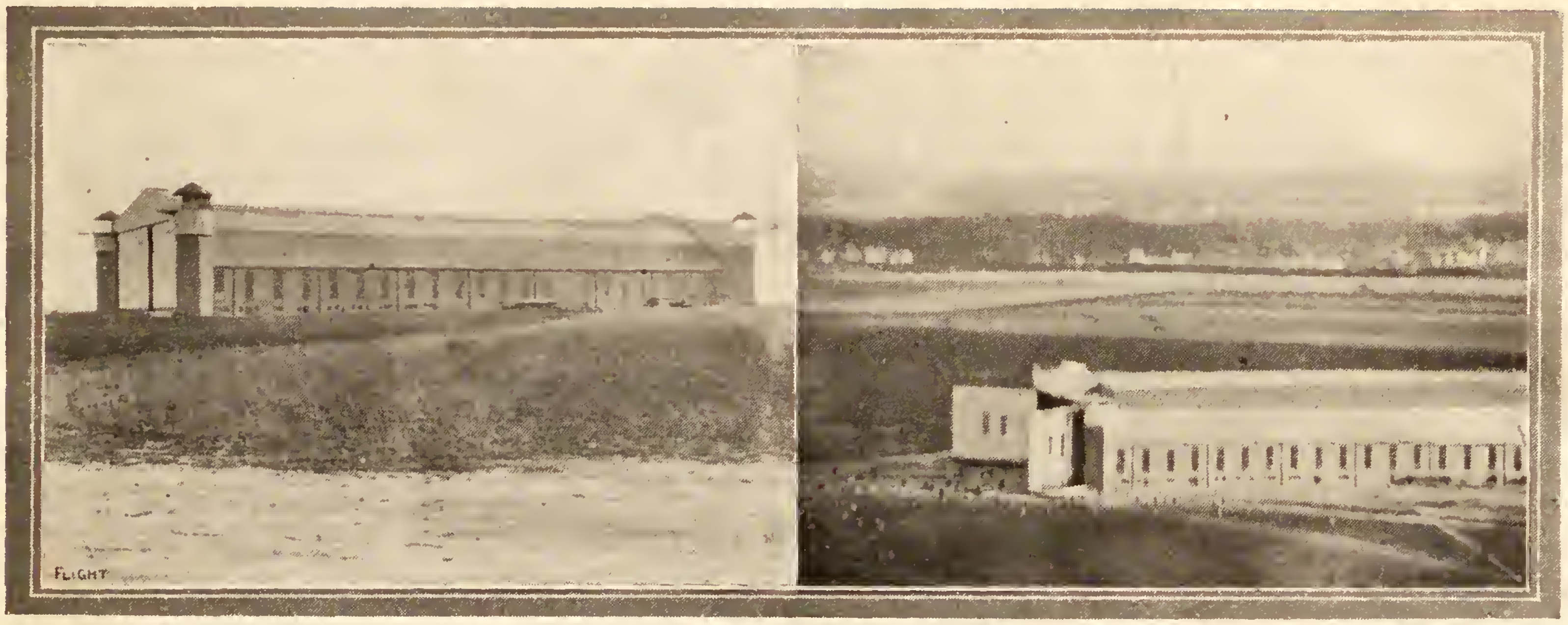
AUG. 2ND, flying as usual 10 a.m., at "aerodrome," Hog Hill, Hainault Forest, Chigwell Row (weather permitting). Members are specially asked to get their machines well tuned up for the Model Flying Exhibitions at Barking Park on Aug. 20th, when the patron, Mr. B. C. Hucks, will give scientific flying demonstrations, including "looping the loop." The programme for the model flying performed by this club will appear in FLIGHT at an early date. Messrs. Ajax Co., of Ilford, have kindly offered this club a prize for duration. The competition will be held after the Barking Exhibition. The above club's entry in the Ilford Hospital Carnival, held on July 11th, caused a large amount of interest all along the route. The aeroplanes were attached to bicycles and looked most realistic.

Monthly Report.—July 6th: No official flying meeting owing to some of the members constructing machine for the Ilford Hospital Carnival. July 12th: Wind boisterous. Mr. F. Wood made some excellent flights with his hydro-monoplane. Mr. Tupper's tractor flew amazingly well, obtaining about 50 secs. duration. Messrs. Jenkinson, Hartnall, Nicholls and Hyett also obtained excellent durations. July 19th: Wind gusty and strong. Messrs. F. Wood and A. C. Tupper had the misfortune of having their machines "land" in the "hydro." lake, but did not suffer much damage.

Liverpool Aero Research Club (62, CEDAR GROVE, LIVERPOOL).

AUG. 1ST, model flying, Stanley Park, 4 p.m. till dusk. Aug. 3rd, 10.30 a.m. till 1 p.m., at Stanley. Also at 3.30 p.m., at Sefton Park, h.l. duration competition for certificates. Aug. 6th at Lister drive 8 p.m.

Monthly Report.—July meetings had been arranged to enable visits to be made in the shape of a tour throughout the district, and should do much to popularise the club. Sefton Park, June 27th, B. Tear, A. G. Pugh and G. H. Kilshaw h.l. "canards," fair durations. July 4th, Stanley Park. T. W. Bennett gave one of his finest kite flying exhibitions, box, wing-box and bird, ranging from 8 ft. 6 ins. down to 4 ft., and in addition doing fine flying with back-swept 1-1-0-P2. B. Tear trying new 1-1-0-P2, G. H. Kilshaw testing triangular covered-in body canard and flying h.l. Etrich plane at good heights. The third mid-week meeting Bennett and Tear at Shiel Park, G. Kilshaw and Beale at Lister drive, crowds compelling stoppage of proceedings. The finest flyings took place at Magul, July 11th, when members attended a festival and gave exhibition flights. Models had to be restricted to circle flying owing to tall tree surroundings, heights of over 150 ft. being easily accomplished. Best durations were T. W. Bennett 35 secs., W. Beale 30 secs., B. Tear 32 secs., G. H. Kilshaw 38 secs., the latter's model suddenly making off on one occasion and landing a $\frac{1}{4}$ mile away. July 18th at Lister drive ground, W. Beale, B. Tear, G. Kay, T. W. Bennett and G. H. Kilshaw, the two latter doing splendid high flights, best durations respectively being 39 and 37 secs., Tear having out new long-distance model.



THE HUGE AIRSHIP SHED AT LEIPZIG.—Note the watch towers at each corner. The length of the shed is 600 ft. and breadth 240 ft. It contains offices, waiting rooms and a restaurant, and can house three dirigibles. On the right, the shed is seen as taken from the "Sachsen," airship, the photographs being secured by Sir John Shelley.

Scottish Ae.S. Model Ae.C. (5, Doune Quadrant, Glasgow).

No official meetings will be held during August owing to holidays.

Monthly Report.—On July 4th at Paisley, Mr. Ian S. Ross was experimenting with a twin-screw h.l., getting 51, 57, and 60 secs. duration. Mr. G. Pinney's (o-1-1-P2) best duration, 30 secs. Mr. Jas. C. Balden testing a "looper," and had the rather unique experience of a propeller bursting in mid-air, the model landing very well considering. July 11th, at Maxwell Park Pond, the third and final competition for "The Arthur Corbett Cup," for waterplanes was held, Mr. T. Graham being the winner. Mr. Graham, having the greatest total of points for the three competitions held, is therefore the holder for one year. The Cup carries with it the honour of "Club Champion." The hon. joint secretary, Mr. Jas. C. Balden, would be glad to have particulars of any petrol, steam, or compressed-air motors suitable for model work.

S. Eastern Model Ae.C. (154, Peckham Rye, S.E.).

The next South-Eastern Trophy Competition will be held in September, and is to be a duration contest for r.o.g (grass) single propeller monoplanes. The number of entries already to hand exceeds a dozen, and is sufficient to guarantee that, barring accidents, this competition will be one of the most successful of the "Trophy" series. The complete rules will be published very shortly, and members should note that full particulars, entry forms, and receipts for this year's subscriptions can be obtained from the hon. sec. at the above address.

Monthly Report.—During the past month most members have been very active and an all-round improvement in the efficiency of the models is one of the most noticeable results. In order that his efforts to popularise model aeronautics may attain a wider field, Mr. A. B. Clark, the club's hon. secretary, has entered the field of journalism, and carries with him the club's best wishes and thanks. Although this appointment will necessitate him relinquishing the office of hon. secretary, he intends to remain one of the club's most active members, and to continue to be chairman of the committee. He is succeeded by the assistant hon. sec., Mr. S. E. Grimestone.

Southend, Westcliff and Leigh Model Aero Club (96, Valkyrie Road, Westcliff-on-Sea).

Monthly Report.—Flying meetings Wednesday evenings and Saturday afternoons. Good flights were obtained during the month by E. Woodfield, who passed for his *brevet* with 40 secs. on a small twin-screw mono. Steady flights have been accomplished by E. Louis, winner of Padgett prize; D. Plaistowe, single-screw, second; E. Woodfield, silver medal. E. Procktor broke record with single-screw tractor, 74 secs.

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Bank Holiday Flying at Brooklands.

On August Bank Holiday, there will be two cross-country flying handicaps at Brooklands, one at 3.45 p.m., and the other at 5 p.m. Although definite particulars are not available, the distance for these races has been reduced in order to enable spectators to follow more easily the progress of the competitors. A strong entry has been secured, including the following:—80 h.p. Sopwith biplane (Mr. Hawker), 80 h.p. Sopwith biplane (Mr. Pixton), 100 h.p. Sopwith biplane (Mr. Mahl), 50 h.p. Blériot (Mr. Gower), 45 h.p. Blériot (Mr. Wilberforce), 60 h.p. Martinsyde biplane (Mr. Blatherwick), 80 h.p. Bristol biplane (Mr. Sippe), 100 h.p. D.F.W. biplane (Mr. Dukinfield Jones), and 100 h.p. Albatros biplane.

Mr. Alcock Visits Wolverhampton.

On Tuesday last week Mr. Alcock left Brooklands, accompanied by Harold Lane to fly to Wolverhampton in order to deliver a magneto at the Sunbeam's works. Running into a thick fog he was obliged to land at Snitterfield, near Warwick, but when it cleared a little he was able to get on to Dunstall racecourse, Wolverhampton, his flying time being 1 hr. 46 mins. for the 112 miles.

Whilst at Wolverhampton, Mr. Alcock gave exhibitions of flying and passenger carrying to the Sunbeam workmen, who were keenly interested in the Sunbeam-engined Maurice Farman machine.

On Saturday he started back for Brooklands in a gale, but had to land at Snitterfield again as Mr. Lane was troubled with air sickness. With the wind behind, the journey to Snitterfield, 34 miles, took 19 mins. At Snitterfield pilot and passenger had a very hospitable reception, and in return Mr. Alcock gave some pretty exhibitions of flying. The remainder of the journey to Brooklands was completed on Monday.

Vickers Ltd., at Shepherd's Bush.

One of the most fascinating and interesting displays at the Anglo-American Exhibition, Shepherd's Bush, is that of Messrs. Vickers Ltd., in the Land and Aerial Transport Section. There are a large number of beautifully finished models of different types of war vessels which have been constructed by Messrs. Vickers for British and foreign Governments, as well as an array of various types of guns. No less interesting are the wonderful small tools and the Vickers single-battery train lighting system, which is shown in operation, generating current for lighting the stands, and also for operating the different tools, &c. Each evening there is a cinematograph display, illustrating the many branches of activity of the great Vickers concern, among the films shown being one depicting work at the Vickers flying school at Brooklands, while another gives some splendid impressions of motor boat racing, &c.

An Echo of Mr. McClean's Nile Flights.

It may not be generally known that the waterplane which Mr. McClean flew up the Nile in the early part of the year was doped with Cellon. It has recently been necessary to remove some of the fabric, and it is extraordinary to notice the effective way in which it has stood up to the hard usage. In spite of the fact that the machine was left exposed to the atmosphere for the whole of the time it was on the Nile, the condition of the fabric is extremely good.

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